FINANCIAL PERFORMANCE AND SIZE DETERMINANTS: GROWTH TREND AND SIMILARITY ANALYSIS OF INDIAN PHARMACEUTICAL INDUSTRY

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Abstract

Purpose of the study: The purpose of the present study is to find out the growth trend, Similarity in financial performance, and co-movement, sensitivity, or governance of firms' size determinants on the profitability of Indian pharmaceutical companies.

Methodology: The analysis is based on ratio analysis, while Chain based index numbers are calculated to get the trend of financial performance and size determinants. Statistical tools, ANOVA, and coefficient of variations (CV) used to get the Similarity of profitability and Liquidity while Chain based index numbers are the base to calculate the movements of variables and Similarity.

Main Findings: The trend of profit measures growth governs the growth trend of the size measurements of the Indian pharmaceutical companies. The pharmaceutical companies are utilizing their funds equally and total resources in the pharmaceuticals companies govern the operational profitability (EBIT), short term, and long term liquidity while it does not affect the short-term movement symmetry of the profitability and size determinants. There is no significant difference in short term movement or sensitivity of profitability and firms' size determinants of Indian pharmaceutical companies.

Applications of this study: The finding of the study implies that the funds invested in total resources enhance the profits while equal utilization of resources by selected pharmaceutical companies. So, this study recommends enhancing the investment in total resources to get increased amounts of profits.

Novelty/Originality of this study: This study is one of the few studies that measure the trend of Similarity and sensitivity of financial performance and size determinants of Indian pharmaceutical companies. In this process, it performs the trend, movement sensitivity, and financial performance similarity analysis using the index numbers of financial variables of Indian pharmaceutical companies.

Keywords: Financial Performance, Indian Pharmaceutical, Similarity Analysis, Growth Movement Analysis, Liquidity.

INTRODUCTION

The financial performance of the business organizations includes the profit earning capacity, the velocity of the activities, and the paying abilities of the short term and long term liabilities (Ramya & Sekar, 2014). The velocity of the activities affects the profits of the business while profitability or profit-earning capacity and velocity of the business activities enhance the profits progressively. The velocity of the business activities is the result of internal management of factors of production, i.e., labor, capital, physical, and information resources driven by the demand and price of the product.

So, the optimum utilization of the factors of the production enhances the frequency of the operational activities, and the business organization gets the benefits of the level of production. The stationary nature of the fixed costs enhances the contribution or margin of the profit of products and services. As per Ramya & Sekar (2014), the process of enhancements of financial performance and its ingredients can be well explained by the diagram (Figure 1).

Figure 1 explains that the optimal utilization of the factors of production leads to the velocity of the operational activities and ultimately enhances the profitability and liquidity of the business organization. Indirectly, factors of production and velocity of operational activities are the proxies for the size determinants i.e. total assets, W.C., and sales turnover, and affect the financial performance of the business organization. It refers to the direct relationship of size determinants and profitability of the business organization.

The financial performance analysis includes the analysis of financial statements, i.e., analysis of income statement and Balance sheet. The income statement of the business organization reveals that the goods or services of the business organization are to be sold at lower or above its cost to the customers (McLaney, 2006). The Balance-sheet of a business organization is a depiction of assets, properties, and capital and liabilities at the end of the financial year (Brigham & Ehrhardt, 2013). The horizontal analysis is to be done to measure the profitability and liquidity of a business organization for a given time (Gibson,2010). Externally, the financial performance of the business organization is measured by the profitability and paying ability of the liabilities. But, there is a negative relationship between profitability and liquidity in pharmaceutical companies in India (Johny, 2017). The Indian pharmaceutical industry is
the largest provider of generic drugs globally (Mondal & Pingali, 2017). Indian pharmaceutical industry supplies more than 50% of various vaccines globally, while 40% of generic demand in the U.S. and 25% of all medicine in the U.K. The Indian pharmaceutical companies supply 80% of medicines for AIDS (Acquired Immune Deficiency Syndrome) globally (14) since the sales revenue of the Indian pharmaceutical industry is increasing progressively (Table 2).

![Figure 1: Process of enhancements of the financial performance of the business organization](image)

![Figure 2: Revenue trend of Indian pharmaceutical companies](image)

As per the figure 2, the revenue of the Indian pharmaceutical industry is increasing every year, and the trend of the revenue reflects the perspective growth in revenue. From 1991 to 2018, the export of drugs (formulations) was more than the imports of pharmaceutical products. (Rani, 2020). The export of the Indian pharmaceutical increased after trade-related intellectual property rights (TRIPS) period (Rentala et al., 2017). The Indian pharmaceutical industry is expected to arrive at 100 billion (USD) while the export of pharmaceutical products reflecting a declining trend in 2020, and it includes the bulk drugs, intermediates, Ayush & herbal products, surgical, drug formulations, and biological. The domestic pharmaceutical market of India stood at USD 20.3 (Billion) in 2019 by achieving a yearly growth rate of 9.8% (In 2018, USD 18.12 Billion) (14).

The government is taking initiatives to enhance the Indian pharmaceutical industry and allocate funds under the Ministry of Health and Family Welfare of Rs 65,012 crore while Rs. 34,115 crore towards the National Health Mission for the rural and urban people of India. For the assurance of the health of Indians, the government allocated Rs 6,400 crore under scheme Ayushman Bharat – Pradhan Mantri Jan Arogya Yojana (14). To make an easier ‘Make in India’ program, there is a single-window facility by the Drug Controller General of India (DCGI) for consents, approval, and other information. So, the Indian government is taking steps to boost the pharmaceutical industry financially and facilitating legally. The profitability of the Indian pharmaceutical company is satisfactory (Saravanan, & Prabhu, 2018).

In India, foreign-owned pharmaceutical firms focus on the domestic or host country market and provide a low preference for export. The liberalization enhanced the demand for pharmaceutical products. FDI regulations enhance the competition and direct towards the export of pharmaceutical products (Sudershan et al., 2012). There are significant growths in the Indian pharmaceutical industry due to new products, innovative production methods (Panigrahi et al., 2018). The Indian pharmaceutical industry has a large domestic market of generic products, while new IPR (Intellectual
property rights) has opportunities and threats to the industry (Mahajan et al., 2015). Overall, the pharmaceutical companies of India are scaling the heights and scoring the enhanced goals of revenue every year, but it does not disclose the insights of the pharmaceuticals companies.

**RESEARCH PROBLEM**

There are very few studies available explaining the relationship between financial performance and the size determinants of the Indian pharmaceutical industries. Mostly, available studies establish a relationship between the profitability and liquidity of the Indian pharmaceutical companies. The size determinants of the firm may govern the financial performance and enhance the profitability and liquidity of the business organizations. In Indian pharmaceutical companies, working capital (W.C.) governs the profit positively but not proportionately (Ali, 2020), while W.C. indirectly governs the sales revenue of the business organization. So, the W.C. and sales govern the financial performance, and the arguments behind the inclusion of the total assets are facilitating the base for the level of operational activities. Hence, the W.C., sales revenue, and total assets considered as size determinants and a co-movement relationship established between size proxies of the firm (W.C., sales, and total assets) and profitability, liquidity to get governance of the size determinants on the financial performance of the selected Indian pharmaceutical companies.

**Research objectives**

The objective of the study is to find out the growth trend, Similarity of financial performance, and short-term co-movement, growth sensitivity, and governance of firms’ size determinants on the financial performance of Indian pharmaceutical companies.

**LITERATURE REVIEW**

Indian pharmaceutical companies' financial stability has been decreasing while the industry is increasing its market share in India (Bhunia, 2010). The liquidity ratios have a positive and significant impact on the profitability of the Indian pharmaceutical industry (Yameen et al., 2019). The inefficient managerial efficiency and low production level are the responsible factors for the unexpected performance of pharmaceutical industry of India while marketing and advertisement factors also affect the pharmaceuticals industry and operational cost can be lowered by reducing capital cost, salary and wages, and marketing cost (Mahajan et al., 2014).

Sound Total Quality Management practices positively govern the operational performance of the Indian pharmaceutical industry (Sharma, & Modgil, 2019). The TQM affects the Supply Chain Practices (SCM) and SCM affects the operational performance and suggested TQM for the smoother supply chain management practices in the pharmaceuticals industry of India. The impact of patent issues on the productivity of the pharmaceuticals companies in India is insignificant (Mahajan, 2020). The research and development govern the total factor productivity (TFP) of the Indian pharmaceutical industry up to great extent. The advancements of technology support the growth and development of the pharmaceutical industry of India. Operational excellence and digital technology are important to improve productivity excellence in the Indian pharmaceutical industry. The importance of advertisement, marketing, and patent regime on the profit earning capacity of the Indian pharmaceuticals companies and easy availability of raw material, advanced research and development affects the profitability in Indian pharmaceutical companies while efforts should be made to enhance the exports of the medical products (Tyagi & Naurival, 2017).

The types of ownership affect the performance of business while labor, capital, advertisement, and expenditures on marketing enhances productivity and efficiency of the pharmaceutical companies in India (Mahajan et al., 2014). Liquidity and profitability are inversely related in most pharmaceutical companies and companies with higher working capital needed higher revenue to maintain healthy operation (Panigrahi, Raul, & Gijare, 2018). There is a positivity between financial performance and research and the development of pharmaceutical companies in India (Jaisinghani, 2016). There is a positive relationship between intellectual capital and financial performance of the Indian pharmaceutical industry (Vishnu, & Gupta, 2014; Ferdaous, & Rahman, 2017). There is a satisfactory profitability status of the companies avoiding the negligible deviations for the period 2009 to 2014 (Vijayalakshmi & Srividya, 2014).

To enhance the level of production and to earn more profits by improving the performance, investment of more capital is necessary for the resources. Sales revenue can be a base for the financial performance measurements in the Indian pharmaceutical industry, while factors of production or resources assure the sustainable growth and development of the Indian pharmaceutical industry (Shivdas & Ray, 2017). I.C. (intellectual capital) affects the profitability positively, and market valuation and productivity negatively (Smriti & Das, 2017). The Intellectual Capital (I.C.) and physical capital govern the profitability in Iranian pharmaceutical companies (Mehralian et al., 2012).

The capital structure also enhances the positivity of the profitability of pharmaceutical companies. The sales revenue of the pharmaceuticals companies increased two times in last five years of MIST (Mexico, Indonesia, South Korea, and Turkey) and BRICS (Brazil, Russia, India, and China), and companies are expanding the business activities of production of specially related to cardiovascular, diabetes, oncologic and infectious diseases (Tannoury, 2017). Capital structure decisions govern the financial performance up to a great extent, while capital structure decisions are influenced
The Indian pharmaceutical industry (Kumar et al., 2012). The Indian pharmaceutical industry’s profitability is satisfactory (Srivastva, 2017).

The big companies earn as they have enough funds for R & D and technological advancements (Boldeanu & Pugna, 2014). There is a positive impact of the research and development (R&D) on the total factor productivity growth while the foreign-owned pharmaceutical firms attract more towards R&D comparatively domestic firms (Sharma, 2012). In the Indian pharmaceutical industry, a global joint venture enhances the financial performance up to a certain level and thereafter it starts to decrease (Sivakumar et al., 2011).

There is a significant difference between the gross profit margin ratio and the net profit margin ratio of the Indian pharmaceutical companies (Swadia, 2018). The import of the Indian pharmaceutical industry was not satisfactory during 10 years (2007-16) (Dhanalakshmi, 2017). The profitability of selected companies in India was satisfactory for the period 2012 to 2016 (Panigrahi, 2019). The working capital and its components have an important effect on the profitability of the pharmaceuticals companies in India (Kumar et al., 2016). There was no relationship between liquidity, profitability, and working capital management in Indian pharmaceutical companies. There was a very weak correlation seen between the working capital cycle and profitability (Bhunia & Das, 2015). There is a strong correlation between working capital and financial soundness of the Indian pharmaceutical companies, while excess investment in inventories and accounts receivables lowers profitability (Palanisamy & Sengottaiyan, 2015).

In the Indian pharmaceutical industry, there is a significant relationship between Intellectual capital (I.C.) and profitability while physical capital and relational capital enhances profitability. The human capital is also to be found a positive impact on firms’ profitability (Gupta et al., 2020). The level of research and development activities, higher patent, and size of the firm defines the level of export of the Indian pharmaceutical companies (Tyagi & Nauriyal, 2017). Excess investment in receivables and inventories is the cause of lower profitability while there is a positive and strong relationship between working capital management and the sound financial position of the pharmaceutical companies in India (Viswanathan et al., 2016). In Bangladesh, effective working capital management is vital for the profitability of the pharmaceutical companies and it is also beneficial for owners' point of view (Chowdhury et al., 2018). Structural and physical capital affects the financial performances of the Indian pharmaceutical companies' performances positively while the human capital does not play any effective role in the enhancement of the financial performances (Narwal, & Ramandeep, 2014).

**METHODOLOGYL**

The analysis of the study considers data from the annual financial statements of the pharmaceuticals companies from 2013 to 2018. The study period was chosen based on the availability of the annual financial statements reports of the Indian pharmaceutical companies of India. The pharmaceuticals companies under study are Sun Pharmaceutical Industries Limited (Su), Aurobindo Pharma Limited (Ar), Dr. Reddy's Laboratories (Dr), Lupin limited (Lu), Cipla Limited (Ci), Cadila Healthcare Limited (Ca), and Glenmark Pharma Limited (Gl). The selected pharmaceutical companies are the leading pharmaceutical companies based on total net sales (2019) in the Indian pharmaceutical industry (50). The absolute variables are extracted from the financial statements of the leading selected pharmaceutical companies and for relative study variables (ratios) calculated based on the absolute values by establishing a logical relationship (Ali & Haque, 2014). Return on Equity and return on investment are the most appropriate measures of the profitability of the firm and provide a base for the operating, investing, and tax-related decisions (Sheela, & Karthikeyan, 2012). The theoretical notion behind our study is historical trend analysis based upon the financial statement analysis obtained from the annual financial reports of the concerned pharmaceutical companies.

\[ I_{CB} = \frac{V_{Cy}}{V_{Py}} \times 100 \]

Where \(I_{CB}\) is Chain based index no., \(V_{Cy}\) and \(V_{Py}\), are respectively, variable of current year and variable of the previous year. The variables are the absolute values or calculated ratios from the absolute values of the annual financial statements of the concerned companies. The following formula is calculated to analyze the profitability and the liquidity or the financial soundness of the pharmaceutical companies.

**A. Profitability**

\[ \text{EBIT Ratio} = \frac{\text{EBIT}}{\text{Sn}} \times 100; \]

Where EBIT and Sn are earnings before interest and tax, and Net sales, respectively.

Return on total assets/resources/investments

\[ \text{ROI} = \frac{\text{Pbt}}{\text{At}} \times 100; \]

Where ROI is the return on investment, Pbt and At, are respectively, profit before tax and total assets.

\[ \text{ROE} = \frac{\text{Pat}}{\text{Eo}} \times 100; \]

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Where ROE is the return on Equity, \( P_{at} \) and \( E_{O} \), are respectively, profit after tax and owners' Equity.

B. Liquidity

\[ C.R. = \frac{A_c}{Lc} \]

Where C.R. is the current ratio, \( A_c \) and \( Lc \), are respectively, current assets and current liabilities.

\[ D/E-R = \frac{Dlt}{Eo} \]

Where D/E-R is the debt-equity ratio, \( Dlt \) and \( Eo \), are respectively, long-term debts and owners' equity.

To know the significant difference among the financial performances, and movement of financial performances and size determinants, ANOVA is applied. Fisher’s ratio (F) is calculated and compared with the critical value (\( F_{\alpha} \)) to know the significance of difference among the financial performances or short-term movements of relative profitability and liquidity measures or size determinants of the pharmaceutical companies.

\[ F = \frac{bss/df_1}{wss/df_2}, \quad \text{While, } F \geq F_{\alpha}, \text{ Reject } H_0; \]

Where, F is Fisher's ratio, \( B_{ss}/df_1 \) and \( W_{ss}/df_2 \), are respectively, the sum of squares between samples divided by respective degrees of freedom and sum of squares within samples divided by respective degrees of freedom. The definitions of the variables and their source used in this study are given below.

### Table 1: Definition of Variables

| Variables   | Definition                                                                                                                                                                                                 | Source                                      |
|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------|
| EBIT Ratio  | Is the relationship between earning before interest and tax and Net Sales. I choose the EBIT ratio to measure gross earning capacity.                                                                      | Liesz (2002)                                |
| ROI         | Is the relationship between profit before tax and total assets. I choose the ROI variable to measure the utilization of resources (total assets).                                                                 | Ross, Westerfield, Jaffe, & Jordan (2008)  |
| ROE         | Is the relationship between profit after tax and owners' Equity. ROE is used to assess the return on owners' funds.                                                                                           | De Wet & du Toit (2007)                     |
| C.R.        | Is the relationship between current Assets and Current Liabilities. C.R. is calculated to get the short term paying ability.                                                                               | Mayliza, Manurung, & Hutahayan (2020)       |
| D/E-R       | Is the relationship between long-term debt and owners' Equity. D/E-R calculated to get the long term paying ability or financial soundness?                                                             | Mayliza, Manurung, & Hutahayan (2020)       |
| Sales       | Is the main source of revenue by selling products and services. I choose the sales variable to assess the operational efficiency by establishing a relationship with EBIT and used it as a size determinant of the business organization. | Spathis, Doumpos & Zopounidis (2002)        |
| Total assets| Is the total investment in the business organization. I choose total assets as a variable to calculate ROI and used as a size determinants of Business organization.                                         | Spathis, Doumpos & Zopounidis (2002)        |
| Working Capital (W.C.) | Is the excess of current assets over current liabilities. Working capital is used as a size determinant of the business.                                                                                  | Ali (2020)                                  |

Table 2 reflects the average absolute amounts of profits and size determinants and reveals the variations for the period 2013 to 2108. After finding all the absolute and relative variables, Chain based Index numbers (\( I_{cb} \)) were calculated to get the movement trend of the profitability and size determinants variables. Table 3 shows the incremental or decrement trend of the variability of movement of profitability measures and size determinants of the selected pharmaceutical companies of India. Table 4 and Table 5 show the Similarity among the financial performances of the Indian pharmaceutical companies, and Similarity among the financial performances movement and size determinants movements of the Indian pharmaceutical companies.

### Research Hypothesis

To achieve the objectives of the research, the null hypothesis (\( H_0 \)) can be divided into two broad categories:

**\( H_{01} \):** There is no significant difference in EBIT, ROE, ROI, C.R., and D/E-R among the selected Indian pharmaceutical companies.

**\( H_{02} \):** There is no significant difference in the movement of EBIT, ROE, ROI, sales turnover, total assets, and W.C. among the selected Indian pharmaceutical companies.
DATA ANALYSIS AND RESULTS

Financial variability results

The variability trend and its movement trend of will explain the comparative variability of size determinants and profits measures. Also, it explains the co-movement Similarity among the size determinants and profitability ratios.

Table 2: Financial variability of average size determinants and average profits of pharmaceuticals companies of India (Rs. in Millions)

| Years | Yearly av. size determinants of selected Indian pharmaceutical Companies | Yearly av. profit measures of selected Indian pharmaceutical Companies |
|-------|-------------------------------------------------------------------------|---------------------------------------------------------------------|
|       | Sales                        | Total Assets                | WC            | EBIT         | PBT          | PAT          |
| 2013  | 84,662                      | 109,228                     | 30,656        | 22,200       | 15,347       | 14,568       |
| 2014  | 105,068                     | 135,885                     | 39,773        | 29,765       | 20,456       | 21,196       |
| 2015  | 136,207                     | 181,115                     | 43,919        | 33,403       | 24,687       | 22,327       |
| 2016  | 149,810                     | 219,349                     | 50,150        | 37,261       | 26,380       | 23,765       |
| 2017  | 161,245                     | 248,602                     | 50,135        | 40,202       | 29,075       | 26,446       |
| 2018  | 160,577                     | 268,256                     | 54,341        | 37,261       | 26,380       | 23,765       |
| Av.   | 132,928                     | 193,739                     | 44,829        | 32,714       | 22,697       | 20,924       |
| σ     | 31521                       | 63035                       | 8651          | 6277         | 4966         | 4349         |
| CV(σ/Av.) | .24                          | .33                         | .19           | .19          | .22          | .21          |

Source: Own calculations based on average Size determinants and average profits extracted from the websites of selected Indian pharmaceutical companies.

The financial variability of the average absolute amounts of pharmaceutical companies of India reflects that there are no significant variations in the average absolute amounts of the firms' size determinants (sales, total assets, and working capital) and profits measurements (EBIT, PBT, and PAT) as the coefficient of the variations (CV) of all firms' size determinants and profits are below 1 (Table 2).

Financial variability trend and its movement trend results

As above, the financial variability results explain that there are no significant variations in the average absolute amounts of the size determinants and profits measures of the Indian pharmaceutical companies. The Financial variability trend and their movement's trends will explain the short term cohesiveness of firms' size determinants and profits measures, mutually.

Table 3: Financial variability trend and its movement trend of pharmaceuticals companies of India

| Years | Chain based Index numbers of Size determinants and their short term movement based on pre. year | Chain based Index numbers of profit measures and their short term movement based on pre. year |
|-------|------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|
|       | Sales | Move. Trend in % | Total assets | Move. Trend in % | Working Capital | Move. Trend in % | EBIT | Move. Trend in % | PBT | Move. Trend in % | PAT | Move. Trend in % |
| 2013  | 100   | 100          | 100          | 100            | 100            | 100            | 100  | 100            | 100 |
| 2014  | 124   | 124          | 124          | 124            | 124            | 124            | 124  | 124            | 124 |
| 2015  | 130   | 104          | 133          | 107            | 110            | 85             | 112  | 84             | 121 |
| 2016  | 110   | 85           | 121          | 91             | 114            | 103            | 112  | 99             | 107 |
| 2017  | 108   | 98           | 113          | 94             | 100            | 88             | 108  | 97             | 110 |
| 2018  | 100   | 93           | 108          | 95             | 108            | 108            | 83   | 77             | 70  |
| Av.   | 112   | 101          | 117          | 102            | 110            | 103            | 108  | 98             | 107 |

Source: Own calculation of Chain based index numbers ($I_{C_B}$) based on given values in table 2.

Table 3 shows that the firms' size determinants (sales, total assets, and working capital) increase yearly but the rate of increment of size determinants diminishes from 2016, except working capital (the average of the $I_{C_B}$ of sales, total assets, and working capital is 112, 117, and 110, respectively). The rate of increment of the average amount of working capital starts to decline from 2017 as it is governed by the sales and ingredients of the total assets. The profit measures start the
decline from the next years (from 2017) of the decline in the sales and total assets (as the average of the % of EBIT, PBT and PAT are 108, 107, and 106), respectively while same as the working capital starts to decline. The movement trend of sales and total assets movement trend reflects a declining movement trend from the year 2016 (as the average of the movement trend is 101), but the working capital starts one year before. This reflects that the enhancement of the sales and total assets affects the working capital after one year while the movement trend reflects that the working capital starts growth movement before one year in case of a negative trend. So, there is one year's lag period between sales, total assets, and working capital. The movement trend of the profit measures (EBIT, PAT, and PBT) reflects that it starts one year before the movement decrement in the firm size determinants (sales, total assets, and working capital). It means the profit measures growth trend governs the growth trend of the size measurements of the Indian pharmaceutical companies.

Financial performance ability Similarity results

The absolute financial performances (profits, liquidity, and long-term paying ability) of the pharmaceutical companies are significantly different for the period 2013 to 2018. But, the financial performance ability is to be measured by establishing a logical relationship between the variables of financial statements of the business organization. So, financial performance does not need to vary as per the amount of the size determinants or the amount of the profits of a business organization. To explain the Similarity among the financial performances, the H1 can be divided among five sub-categories as per the financial performance variables i.e. EBIT, ROE, ROE, C.R., and D/E-R.

| H01. No. | Hypothesis | F* | Fα** | Decision: H0 |
|----------|------------|----|------|-------------|
| H01.1    | There is no significant difference in EBIT among the selected Indian pharmaceutical companies. | 8.228019 | 2.371781 | Reject |
| H01.2    | There is no significant difference in ROI among the selected Indian pharmaceutical companies. | 2.038709 | 2.371781 | Don't Reject |
| H01.3    | There is no significant difference in ROE among the selected Indian pharmaceutical companies. | 1.934059 | 2.371781 | Don't Reject |
| H01.4    | There is no significant difference in Liquidity (C.R.) among the selected Indian pharmaceutical companies. | 7.412857 | 2.371781 | Reject |
| H01.5    | There is no significant difference in financial soundness (D/E-R) among the selected Indian pharmaceutical companies. | 17.10659 | 2.380313 | Reject |

Source: *F values (ANOVA) calculated based on the ratios of selected pharmaceutical companies (as given in appendix 1, 2, and 3) and **Fα taken from the t-table.

Notes:
(a): Fα taken from the t-table at 5% significance level.
(b): F* values are the Fisher's ratios values and calculated using EXCEL's calculation.

From the above table 4, it is obvious that the earnings before interest and tax, short-term liquidity, and long term paying ability of the leading Indian pharmaceutical companies are significantly different. The integrated analysis of operational profitability (EBIT) and profitability on investment (ROI and ROE) reveals that the operational efficiency of the pharmaceutical companies varies (Table 4, H01.1) and the reason for profitability variance is uneven amounts of the turnover and corresponding EBIT, possibly. There is no significant difference in the profitability of investment (Table 4, H01.2, and H01.3) and it means that the pharmaceutical companies are utilizing their funds equally. Ultimately, the operational profitability is governed by the level of funds invested in business activities in Indian pharmaceutical companies. The liquidity and the long-term paying ability of the pharmaceuticals companies are significantly different like the operational profitability (Table 4, H01.4, and H01.5) while operational profitability is governed by the levels of funds invested in the business activities. So, Ultimately, EBIT, short-term, and long-term liquidity governed by the funds invested or total resources of the Indian pharmaceutical companies. The average, yearly movement, and trend of total resources reflect the positive yearly movement and long term positive progressive trend of total resources of Indian pharmaceutical companies (Appendix 7). The similarity results of the short term movements of financial performances and size determinants of the Indian pharmaceutical companies will explain the short term sensitivity in the mutual movement profitability and size determinants.

Profitability and size determinants similarity movements’ results

The movements of the profitability and size determinants of the pharmaceuticals companies of India reveal the sensitivity status and indicate the Similarity among the movements for the period 2013 to 2018 (Table 5). The following hypothesis and their results will explain the sensitivity and similarity movements of profitability and size determinants of the Indian pharmaceutical companies. To explain the Similarity among the movements of profitability and size
determinants, the H_{2.2} can be divided among six sub-categories as per the profitability & size determinants’ movement variables i.e., EBIT, ROE, ROE, sales, total assets, and W.C.

Table 5: Similarity among the financial performances movement and size determinants movements of the Indian pharmaceuticals companies

| H_{2.} No. | Hypothesis | F*    | F_{<c}** | Decision: H_0       |
|------------|------------|-------|----------|---------------------|
| H_{2.6}    | There is no significant difference in EBIT movement among the selected Indian pharmaceutical companies. | 1.072579 | 2.371781 | Accepted            |
| H_{2.7}    | There is no significant difference in ROI movement among the selected Indian pharmaceutical companies. | 1.010723 | 2.371781 | Accepted            |
| H_{2.8}    | There is no significant difference in the ROE movement among the selected Indian pharmaceutical companies. | 1.010723 | 2.371781 | Accepted            |
| H_{2.9}    | There is no significant difference in sales turnover movement among the selected Indian pharmaceutical companies. | 0.718142 | 2.371781 | Accepted            |
| H_{2.10}   | There is no significant difference in total assets movement among the selected Indian pharmaceutical companies. | 0.667715 | 2.371781 | Accepted            |
| H_{2.11}   | There is no significant difference in working capital movement among the selected Indian pharmaceutical companies. | 0.42735  | 2.371781 | Accepted            |

Source: *F values (ANOVA) calculated based on the ratios of selected pharmaceutical companies (as given in appendix 4, 5, and 6) and **F_{<c} taken from the t-table.

Notes:
(a): F_{<c}** taken from the t-table at 5% significance level.
(b): F* values are the Fisher's ratios values and calculated using EXCEL's calculation.

From the above table, it can be explained that the profitability and size determinants of Indian pharmaceutical companies' movement are similar. There is no significant difference in the movement of profitability (EBIT, ROI, and ROE) and size determinants (Sales turnover, total assets, and working capital) of the pharmaceuticals companies of India, Mutually. Even, there is dissimilarity in EBIT (Table 4) among the pharmaceutical companies but short-term movements and their trend is similar and reflects the symmetry in profitability movements (H_{2.6}, H_{2.7}, and H_{2.8}). The movement trend sensitivity of the size determinants of Indian pharmaceutical companies is not significantly different (H_{2.9}, H_{2.10}, and H_{2.11}). This reveals that irrespective of operational profitability (EBIT), short-term liquidity (C.R.), and long-term liquidity (D/E-R) the movement trend of all profitability measures and size determinates are similar. This implies that the level of funds invested in total resources in pharmaceutical companies does not govern or affects the short-term movement symmetry of profitability measures and size determinants provided that it governs the EBIT, short-term liquidity (C.R.), and long-term liquidity. So, the short-term movement of all profitability measures and size determinates is not governed by their operational profitability and liquidity measures or indirectly by the funds invested in total resources of the pharmaceutical companies.

DISCUSSION

From the above analysis, financial variability of the average absolute amounts of selected pharmaceutical companies of India reflects that there are no significant variations in the average absolute amounts of the firms’ size determinants (sales, total assets, and working capital) and profits measurements (EBIT, PBT, and PAT) for the period 2013 to 2018. The profitability (Appendix 1 and 2) of the Indian pharmaceutical companies was satisfactory since 2013 (Panigrahi, 2019). As per Swadia (2018), there is a significant difference in the profitability ratios of Indian pharmaceutical companies. The study reveals that the ROI and ROE of the Indian leading pharmaceutical companies' similar while gross profitability (EBIT) is similar significantly different.

The financial variability trend and its movement reflect that the enhancement of the sales and total assets affects the working capital after one year while the movement trend reflects that the working capital starts growth movement before one year in case of a negative trend. The working capital and its components have an important effect on the profitability of the pharmaceuticals companies in India (Kumar et al., 2016). The movement trend of the profit measures reflects that it starts one year before the movement decrement in the firm size determinants (sales, total assets, and working capital). Earnings before interest and tax (EBIT), short-term Liquidity (C.R.), and long-term paying ability (D/E-R) of the leading Indian pharmaceutical companies are significantly different while ROI and ROE are similar to the Indian pharmaceutical companies. The short-term and long-term paying ability of the Indian pharmaceutical companies is significantly different, mutually.

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The operational efficiency is governed by the amount of the funds invested in total resources while the status of the similarity of operational efficiency and Liquidity (short term and long term) is similar. Bhunia & Das (2015) explained no relationship between profitability, liquidity, and W.C. while Palanisamy & Sengottaiyan (2015) opined differently and established strong relationships W.C. and financial performance of the business organization (Chowdhury et al., 2018). In the present study of the Indian pharmaceutical companies, there is no significant difference in the movement of profitability (EBIT, ROI, and ROE) and size determinants (Sales turnover, total assets, and working capital) or positive relationship between the movement of size determinants and profitability of the pharmaceuticals companies of India.

CONCLUSION

Based on all analyses and results it can be concluded that there is one year's lag period between sales, total assets, and working capital. It means the profit measures growth trend governs the growth trend of the size measurements of the Indian pharmaceutical companies. In the Indian pharmaceutical industry, the declining growth of profit measures defines the size of the pharmaceutical companies. The profitability of the Indian pharmaceutical industry is satisfactory while there is significant variability in the profitability (Basak, 2019). Possibly, the operational efficiency of the pharmaceutical companies varies and the reasons for profitability variance are uneven amounts of the turnover and corresponding EBIT. The Indian pharmaceutical companies are utilizing their funds equally or return on invested funds is not significantly different. The investment in the total resources in the pharmaceutical companies governs the operational profitability (EBIT) (Narwal, & Ramandeep, 2014), short term, and long term liquidity of the pharmaceutical companies of India. This implies that the level of the funds invested in total resources in pharmaceutical companies does not govern or affects the short term movement symmetry of profitability measures and size determinants provided that it governs the EBIT, short term liquidity (C.R.), and long-term liquidity. So, the short-term movement or sensitivity of all profitability measures and size determinants is not governed by their operational profitability (EBIT) and liquidity measures (C.R. & D/E- R). If other factors remain constant, the pharmaceutical companies of India may enhance their investment in resources to get the benefits at larger production (Shivdas, & Ray, 2017). According to the pharmaceutical export promotion council of India, there is scope for the Indian pharmaceutical industry as the supply drivers of production factors, demand drivers (Tamoury, 2017) of the products, and policy support by the government in the favor of the Indian pharmaceutical industry. The Indian pharmaceutical companies have to focus on operational, advertisement, and marketing expenditures to improve their operational performance, and fund utilization (Tyagi, & Nauriyal, 2016).

LIMITATION AND STUDY FORWARD

Although, the study considers only financial data and there should be consideration of qualitative factors to get appropriate reasons for operational profitability and liquidity dissimilarity and factors responsible for financial performance variability and firms' size determinants. There is scope for further study and comparative common size income statement and balance sheet can be analyzed to get the trend and weightage of each variable in the financial statement of pharmaceutical companies.

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APPENDICES

Appendix 1: EBIT Ratio and ROI of Pharmaceutical Companies of India

| Years | Dr  | Lu  | Su  | Ci  | Ar  | Ca  | Gl  | Dr  | Lu  | Su  | Ci  | Ar  | Ca  | Gl  |
|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 201   | 23.8| 23.6| 45.2| 28.4| 15.1| 15.1| 15.1| 16.0| 21.5| 23.8| 17.6|     |     |     |
| 201.1 | 22.6| 29.4| 30.1| 20.2| 21.7| 17.1| 18.3| 15.5| 25.7| 13.6| 10.5|     |     |     |
| 5     | 3   | 5   | 2   | 8   | 9   | 4   | 9   | 5   | 1   | 2   | 9   | 1   | 8.07|
| 6     | 4   | 0   | 5   | 0   | 8   | 8   | 9   | 7   | 9   | 4   | 8.17| 4   | 9   | 8.65|
| 201   | 26.2| 26.8| 30.9| 19.2| 23.9| 20.6| 18.5| 13.3| 14.6| 13.7|     |     |     |     |
| 6     | 18.7| 26.1| 33.2| 18.2| 23.3| 24.9| 19.1| 13.2| 14.7|     |     |     |     |     |
| 7     | 3   | 7   | 5   | 6   | 9   | 5.99| 7.63| 6.89| 7.64| 5.83| 1   | 3   |     |     |
| 8     | 7   | 9   | 0   | 5.99| 7.63| 6.89| 7.64| 5.83| 1   | 3   |     |     |     |     |
| Av.   | 22.6| 25.6| 34.7| 21.3| 22.3| 19.5| 19.0| 12.4| 18.4| 16.1| 10.6| 14.9| 12.6| 9.32|

Source: Own calculation from the financial statements of the selected pharmaceutical company available at the concerned websites of the company.

Appendix 2: ROE Ratio and C.R. of Pharmaceutical Companies of India

| Years | Dr  | Lu  | Su  | Ci  | Ar  | Ca  | Gl  | Dr  | Lu  | Su  | Ci  | Ar  | Ca  | Gl  |
|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 2013  | 23.97| 25.76| 23.19| 17.20| 11.18| 11.18| 11.00| 1.51| 2.42| 4.05| 3.03| 1.21| 1.21| 1.21|
| 2014  | 24.96| 26.97| 20.95| 14.10| 31.17| 23.43| 22.54| 1.78| 2.76| 3.12| 2.21| 1.33| 1.20| 1.69|
| 2015  | 23.71| 26.66| 21.42| 11.62| 30.47| 24.32| 18.21| 1.74| 2.37| 1.79| 1.95| 1.35| 1.23| 1.61|
| 2016  | 18.39| 20.29| 18.57| 12.12| 28.03| 27.90| 11.75| 1.73| 2.64| 2.33| 1.14| 1.34| 1.29| 1.41|
| 2017  | 10.54| 18.94| 21.39| 8.32| 24.55| 29.01| 23.55| 1.15| 2.67| 1.84| 2.64| 1.39| 1.30| 1.45|
| 2018  | 7.53 | 1.88 | 6.91 | 9.97| 20.74| 20.88| 24.68| 1.52| 2.38| 1.59| 2.82| 1.40| 1.14| 2.54|
| Av.   | 18.18| 20.08| 18.74| 12.22| 24.36| 22.79| 18.62| 1.57| 2.54| 2.45| 2.30| 1.34| 1.23| 1.65|

Source: Own calculation from the financial statements of the selected pharmaceutical company available at the concerned websites of the company.

Appendix 3: Debt-Equity ratio of Pharmaceuticals Companies of India

| Years | Dr  | Lu  | Su  | Ci  | Ar  | Ca  | Gl  |
|-------|-----|-----|-----|-----|-----|-----|-----|
| 2013  | 0.20| 0.22| 0.01| 0.44| 0.48| 0.69|     |
| 2014  | 0.26| 0.09| 0.00| 0.03| 0.34| 0.40| 0.81|
| 2015  | 0.15| 0.06| 0.05| 0.03| 0.26| 0.27| 1.44|
| 2016  | 0.09| 0.64| 0.10| 0.02| 0.12| 0.17| 0.81|
| 2017  | 0.04| 0.59| 0.04| 0.29| 0.02| 0.35| 1.01|
| 2018  | 0.20| 0.53| 0.05| 0.26| 0.04| 0.29| 0.80|
| Av.   | 0.16| 0.36| 0.04| 0.13| 0.20| 0.33| 0.93|

Source: Own calculation from the financial statements of the selected pharmaceutical company available at the concerned websites of the company.
### Appendix 4: EBIT and ROI movement of Pharmaceuticals Companies of India

| Years | EBIT     | ROI      |
|-------|----------|----------|
|       | Dr         | Lu         | Su   | Ci   | Ar   | Ca   | Gl   | Dr   | Lu   | Su   | Ci   | Ar   | Ca   | Gl   |
| 2013  | 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 |
| 2014  | 106 115 100 81 176 120 135 103 129 101 80 314 213 213 213 |
| 2015  | 98 108 66 88 82 95 90 94 93 56 75 104 110 51 110 51 |
| 2016  | 107 91 103 95 110 120 101 86 57 101 78 103 134 122 122 122 |
| 2017  | 72 98 107 95 97 121 103 53 90 107 71 108 132 98 132 98 |
| 2018  | 92 79 71 104 100 84 117 84 57 47 131 82 50 38 50 38 |
| Av.   | 96 99 91 94 111 107 108 87 88 85 89 135 123 104 104 104 |

**Source:** Own calculation of Chain based index numbers (I\_CB) based on ratios given in appendix 1

### Appendix 5: ROE and sales movement of Pharmaceutical Companies of India

| Years | ROE     | Sales   |
|-------|---------|---------|
|       | Dr         | Lu         | Su   | Ci   | Ar   | Ca   | Gl   | Dr   | Lu   | Su   | Ci   | Ar   | Ca   | Gl   |
| 2013  | 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 |
| 2014  | 103 129 101 80 314 213 213 113 118 142 123 138 114 120 120 120 |
| 2015  | 94 93 56 75 104 110 51 113 114 168 110 150 120 109 120 109 |
| 2016  | 86 57 101 78 103 134 122 104 110 103 122 115 114 115 114 115 |
| 2017  | 53 90 107 71 108 132 98 88 122 111 106 108 98 122 122 122 |
| 2018  | 84 57 47 131 82 50 38 103 91 85 113 109 124 100 124 100 |
| Av.   | 87 88 85 89 135 123 104 103 109 118 112 120 112 111 111 111 |

**Source:** Own calculation of Chain based index numbers (I\_CB) based on ratios given in appendix 1 for ROE, and values of table 2 for sales

### Appendix 6: Total assets and Working Capital movement of Pharmaceuticals Companies of India

| Years | Total Assets | Working Capital |
|-------|--------------|-----------------|
|       | Dr                | Lu                | Su   | Ci   | Ar   | Ca   | Gl   | Dr   | Lu   | Su   | Ci   | Ar   | Ca   | Gl   |
| 2013  | 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 |
| 2014  | 119 114 143 115 130 108 135 158 127 147 67 200 74 74 74 74 |
| 2015  | 116 130 166 117 136 113 90 111 113 101 120 153 123 166 123 166 |
| 2016  | 108 171 111 134 122 111 101 99 139 138 29 117 147 120 147 120 |
| 2017  | 109 118 113 99 104 152 103 25 123 85 510 103 109 74 109 74 |
| 2018  | 103 99 105 109 130 119 117 285 93 78 129 135 70 64 135 70 64 |
| Av.   | 109 122 123 112 120 117 108 130 116 108 159 135 104 100 104 100 |

**Source:** Own calculation of Chain based index numbers (I\_CB) based on values given in table 2 for total assets and working capital
### Appendix 7: Total resources, its average yearly movement, and the trend of Indian pharmaceutical companies

| Years | Dr   | Lu   | Su   | Cl   | Ar   | Ca   | Gl   | Average | CBI | FBI |
|-------|------|------|------|------|------|------|------|---------|-----|-----|
| 2013  | 134872 | 89139 | 205827 | 11658 | 72729 | 73742 | 71710 | 94239 | 100 | 100 |
| 2014  | 160296 | 102060 | 293708 | 13403 | 94898 | 79865 | 86336 | 118652 | 126 | 126 |
| 2015  | 185978 | 132610 | 487985 | 15718 | 129145 | 90471 | 84439 | 160906 | 136 | 171 |
| 2016  | 200104 | 226249 | 542196 | 21128 | 156994 | 100163 | 98454 | 192184 | 119 | 204 |
| 2017  | 218165 | 266073 | 614102 | 20953 | 162494 | 152207 | 117639 | 221662 | 115 | 235 |
| 2018  | 225443 | 263054 | 643028 | 22861 | 211052 | 180653 | 125954 | 238863 | 108 | 253 |
| Average | 187476 | 179864 | 464474 | 17620 | 137885 | 112850 | 97422 | 171085 | 117 | 182 |

**Sources:** Extracted from the financial statements of the concerned Indian pharmaceutical companies