Working Capital Management and Firm Performance of Companies in Pharmaceuticals & Chemicals Industry of Bangladesh

Maliha Rabeta

Abstract:

This study has been initiated as an effort to understand working capital management practices of firms in the Pharmaceuticals and Chemicals Industry in Bangladesh. It has focused on relationship between the working capital variables and firm performance using panel data consisting of a sample of 31 firms from the Pharmaceuticals and Chemicals industry for a period of 19 years from 2000 to 2018. Various types of statistical tools such as mean, median, quartile analysis, graphs and charts and regression analysis have been used for the analyses. Fixed Effect model regression has been used based on the output of the Hausman Test. For testing the relationship between a firm's profitability and its norms of working capital management, regression has been run considering Basic Earning Power as a dependent variable and current ratio, the cash conversion cycle, quick ratio, inventory conversion period, payable deferral period, days sales outstanding as explanatory variables. The cash cycle has a negative impact on the basic earning power which signifies that, as the cycle grows bigger the core profitability of the business reduces. The same applies for holding inventory for a longer period as it reduces core profitability. As the time to collect payment for sales increases, the core profitability of a business decreases. As companies age, they enjoy learning effects and become more efficient so positive relationship with core profitability exists. The major findings hence indicate that working capital is found to have significant impact on core profitability of firms in Pharmaceuticals and Chemicals industry.

Keywords: Working capital, Basic earning power, Cash conversion cycle, Days Sales outstanding, Inventory conversion period, Pharmaceuticals, Chemicals, Bangladesh.

About Author (s)

Maliha Rabeta, MBA, Department of Finance, Faculty of Business Studies, University of Dhaka, Bangladesh**.**

1. **Introduction:**

This study is conducted as an effort to reveal the connection between various practices used for management of working capital and firm performance on the basis of a sample of 31 firms from the Pharmaceuticals and Chemicals industry over a period of 19 years from 2000 to 2018. The study is going to be beneficial for researchers, regulators, investors and many more to comprehend the importance of ensuring a balanced flow of working capital in a firm. The verdicts of this study will aid the beneficiaries from these industries to maintain the proper level of working capital more effectively as keeping more working capital than required could result in a decrease of profitability and keeping less could result in lack of efficiency. The intention of this paper is to investigate the stimulus of working capital management practices on the operating performance of companies in the Pharmaceuticals and Chemicals industry. It is important to handle the funds carefully for working capital as it ensures whether a firm is able to satisfy its operative expenses and short-term obligations. There have been various researches on proper management of the working capital of firms with relation to their performances in terms of productivity, profitability and other different aspects in the developed counties. But these researches are low in number when it comes to studies regarding developing countries like ours. Although there are some papers from Bangladeshi researchers as well, those studies mostly cover practices in working capital management and in some cases, its connection with firm profitability. This paper will contribute to the existing knowledge base by relating working capital management with firm performance specifically for the pharmaceuticals and chemicals industry. This will help upcoming researchers in future to take a thorough look at different aspects of working capital management and its relation with firm performance. Corporate managers, can also get help to maintain an adequate level of working capital in the firm. The study can also assist the analysts and investors to comprehend the significance of working capital management for profitability of a firm and thus help them choose better firms for investments. The findings of this research will also enable different companies from this industry to understand the management of funds for working capital more effectively. Last but not the least, this study is going to be of great help to the policymakers and regulators of the industry. Practicing to ensure a well-adjusted level of working capital in a firm is very much needed to ensure the optimum level of firm performance.

2. Review of the literature:

There are many theoretical and empirical studies initiated in diverse business environments using varied techniques in the literatures of financial management by various academics. The most common observations advocate the existence of a negative relationship between the variables of working capital and performance of a firm. Mathuva (2010) studied the effects of operating capital constituents on firm profitability by using a sample illustration of 30 companies listed on the Nairobi Stock Exchange (NSE) from 1993 to 2008. The key findings from the study suggested a significant negative relationship between the accounts collection period and profitability, which implies that more profitable firms take the shortest time to collect cash from their customers. Again, there is a significant and positive relationship between the inventory conversion period and net profitability of a firm. This means that firms which maintain sufficiently high level of inventory reduce the cost of possible interruptions in the manufacturing process and loss of business due to scarcity of products resulting in reduced supply costs and protections against price fluctuations. The study also finds that the longer a firm takes to pay its creditors, the more profitable it is.

Olufemi and Olubanjo (2009) conducted a study on a sample of fifty Nigerian firms listed on the Nigerian Stock Exchange and the results show a significant and negative relationship between net operating profitability and the average collection period, inventory turnover in days, average payment period and cash cycle. Additionally, the study found no noteworthy discrepancies in the impacts of operating capital between large and small firms. The findings of the study suggested that managers can generate value for their shareholders if the firms manage their resources for operating capital resourcefully by reducing the number of days for receivables and inventories to a rational minimum. Zariyawati et al. (2009) conducted a study by using cash cycle as a measure of circulating capital based on panel data of 1628 firms for the years 1996-2006 that consist of 6 different economic sectors registered in Bursa, Malaysia. The results provide a highly negative significant relation between cash cycle and firm profitability. This implies that decreasing cash conversion period outcomes to profitability upsurge. Thus, to generate shareholder value, firm manager should apprehend on shortening of cash to cash cycle till optimal level is accomplished. Caballero, Teruel and Solano (2014) examined how performance of corporations are related with operating capital for a sample of non-financial UK companies. In disparity to preceding studies, the results provide strong patronage for an inverted U-shaped connection between investment in circulating capital and performance of firms. This implies the existence of an optimal level of investment in operating capital can help to balance out costs and benefits and maximizes a firm's value.

Raheman et al. (2010) indicated that the cash to cash cycle, net trade cycle and inventory turnover in days have substantial impact on firm performance. The manufacturing companies are in general facing problems with their collection and payment policies along with the financial leverage, sales growth and firm size and all these factors also have effect on the firm's profitability. This study was based on Pakistani perspective and also advocates that efficient management and funding of working capital can cause the operating profitability of manufacturing firms to rise and for this, specialized persons in the fields of finance should be hired by the firms for expert advice on operating capital management in the manufacturing sector. Plumb (2005) recognized further major disadvantage of producing and analysing intermediates is cost of storing operating capital and handling the solid intermediates (labour costs). Chowdhury et al. (2018) conducted a research to find out the probable effects of management of operating capital funds on the profitability of companies in the Bangladeshi Pharmaceutical sector. 9 pharmaceutical companies listed with Dhaka Stock Exchange (DSE) had been selected for the years 2001-15. Return on asset (ROA), return of equity (ROE) and earning per share (EPS) were used as the measures of profitability and average collection period (ACP), average payment period (APP), inventory conversion period (ICP), cash conversion cycle (CCC) and investment in marketable securities (INV) served as the components of operating capital management. As per the study, if the average collection period, inventory conversion period and cash cycle can be concentrated to a rational level with enhancement of average payment period, superior profitability of the firms can be accomplished. Overall, the variables of operating capital management had shown some apparent short-term impacts but did not have adequate force in the long run. Chowdhury and Amin (2007) critically appraised management of operating capital as practiced in particular companies of the Pharmaceutical sector. The research helped in examining different practices for managing cash and strategies for managing inventories, receivables and payables. The evaluation of principles were taken into account but impacts of political and economic factors on the operating capital management were overlooked. Ultimately, it was found that

Bangladeshi pharma companies are able to competently manage their operating capitals based on the liquidity and investment preferences owing to the extreme competition in the industry.

Islam and Ara (2012) researched on the relative relationship between the investments in operating capital and financing practices of 5 selected listed pharmaceutical companies in Bangladesh over a period of 5 years. It was observed that the pharmaceuticals have almost same policies regarding the operating capital investment conforming to the required funding. The results advocated a significant difference in the operating capital investment and financing policies among the pharmaceuticals and had shown an interrelation between the aggressive operating capital investment policy corresponding to conservative financing policy of the pharmaceuticals over the study period and vice-versa. The study also observed a relatively aggressive investment policy balanced by relatively conservative financing policy of the pharmaceutical sector of Bangladesh. It was concluded in the study that if relatively aggressive operating capital investment policies are tracked, they are stabilized by relatively conservative operating capital financing policies in the selected listed pharmaceutical companies of Bangladesh. Agha (2014) tried investigate the connection between firm performance and operating capital by collecting secondary data from Glaxo Smith Kline pharmaceutical company registered in Karachi stock exchange for the years 1996-2011. In this study, variable of return on assets ratio has been used to measure the profitability of company and variables like account receivable turnover, creditor's turnover, inventory turnover and current ratio were used for the criteria of working capital. The results showed that the impact of management of operating capital on profitability of a pharmaceutical company is significant. Consequently, managers may augment the earning power of their firms by reducing the inventory turnover, account receivables ratio and by reducing creditors turnover ratios but no significant effect of aggregating or reducing the current ratio was seen on profitability. Bhunia and Das (2015) investigated the pharmaceutical companies of India to detect the underlying relationship between the performance of firms and organization of operating capital. The results of the study supported that effective operating capital management perked up firms' earning power and liquidity position, and as a result growing the firm's market value. Multiple regression tests validated a lower degree of relationship between the operating capital management and profitability under study.

An evaluation of preceding studies also designates that researchers have engaged many proxies to measure working capital management. These proxies consist of cash conversion cycle, inventory turnover, average payment period, current ratio, and net working capital ratio, but deliver inconsistent outcomes. Mehta (2014), Akbar (2014), and Makori and Jagongo (2013) demonstrated that cash conversion cycle significantly impacts profitability, but the relationship was proven to be insignificant for Manzoor (2013). Kusuma and Dhiyaullatief (2018) advocated that, if working capital is managed properly it can significantly improve a firms' performance. The proxy of inventory turnovers turned out to be the best measure of working capital in explaining firm performance as per this study. Kajola, Nwaobia and Adedeji (2014) revealed that Cash Conversion Cycle is negatively and significantly related with firm's financial performance (ROA). Thus, efficient management of working capital items would bring about increase in profitability level of firms. Shur and Chakraborty (2011) examined the controversy over the issue whether the operating capital of a firm, as reflected by its financing and investment decisions, affects its profitability or not. The study attempted to revisit the interrelationship between operating capital management

and profitability of 10 selected multinational companies in the Indian Pharmaceutical industry during the years 1996-97 to 2007-08. Even though the study had failed to provide final explanation to this highly controversial issue, a substantial outcome was derived from it. Current study is conducted to find out the impact of working capital management on financial performance of firms. The empirical study showed that effective working capital management perked up firms' profitability and liquidity position, and as a result growing the firm's market value. This study is different from the previous research in many characteristics such as the variables and industries selected. Other than that, the timeline of 2000-2018 also makes it more relatable to the recent times and as a result this study will be able to contribute more to the existing knowledge base.

2.2 Hypothesis Development: Based on theories, following hypotheses are going to be tested to find out the impact of working capital management on firm performance:

i) **H_{11}: There should be negative impact of CCC on BEP:** Cash conversion cycle refers to the number of days that a company would need to convert its investments in inventory or other resources into cash. A cash conversion cycle is calculated by adding up receivable conversion period, inventory conversion period and deducting payable deferral period. An increase in cash conversion cycle refers to a decrease in core profitability before taxes and leverage and hence there is a negative relation.

ii) **H_{12}: There should be negative impact of Current Ratio on BEP:** Current ratio helps to asses Company's ability to pay its short term liabilities and so an increased current ratio refers to a decrease in core profitability before taxes and leverage by holding up more current assets idly.

iii) **H_{13}: There should be negative impact of Quick Ratio on BEP:** Quick ratio helps in measuring a firm's ability to repay its short term liabilities with its most liquid assets and so an increased quick ratio can hamper core profitability before taxes and leverage by holding up liquid assets rather than utilising it.

iv) **H_{14}: There should be negative of DSO on BEP:** Days sales outstanding indicates the number of days that a firm needs in order to collect the payment after sale and an increase in DSO can result in an increase in the cash conversion cycle. This in turns results in a lower level of profitability which is indicated by lower level of BEP.

v) **H_{15}: There should be negative impact of ICP on BEP:** Inventory conversion period refers to the time that is needed for raw materials to be converted into sales. The more time a business needs to convert inventory into sales the less profitable it becomes and hence there is a negative relation.

vi) **H_{16}: There should be positive impact of PDP on BEP:** A payable deferral period measures the management's ability to delay payments to the creditors. And increase in delaying can help in reducing the cash conversion cycle and this delay can actually help in boosting profitability. This is why PDP and BEP have a positive relationship.

3. Methodology:

The main objective of this study is to analyse the impact of working capital management on the core profitability of firm in the Pharmaceuticals and Chemicals industry. Study has been conducted on panel data using various tools like regression, ratio analysis, quartile analysis, DuPont analysis and overall analysis of the industries to attain the aforesaid objective.

3.1 Econometric Model: For the purpose of this study, panel data have been used hence Ordinary least squares (OLS) have not been used. It is because using OLS on panel data could lead to a possibility of heteroskedasticity which implies that as value increases the variance also increases. To remove this issue, either fixed effect of random effect regression is used.

For determining the perfect regression model for this panel data set, Hausman test has been used to see whether fixed effect or random effect regression should be used. As the result of Hausman test shows a p value less than 0.05, fixed effect regression has been used. Also, here individually one variable has been taken for regression as correlation among more than one independent variable could raise the possibility of multicollinearity and as a result insignificant variable could become significant and thus hinder the actual results.

Now, the regression equation is as follows based on the hypotheses to be tested:

$$BEP_{it} = \alpha_{it} + \beta_1 WC_{it} + \beta_2 Ln\ TA_{it} + \beta_3 Age_{it} + \beta_4 FATO_{it} + \beta_5 Spon_{it} + \varepsilon_{it}$$

Where, BEP = Basic Earning Power

α = Constant

WC= Working Capital Indicators; these are the explanatory variables which can be either of the following:

➢ *CCC = Cash Conversion Cycle*
➢ *Cur_ratio = Current Ratio*
➢ *Quick_ratio = Quick Ratio*
➢ *DSO = Days Sales Outstanding*
➢ *ICP= Inventory Conversion Period*
➢ *PDP= Payable Deferral Period*

The control variables are as follows:

➢ *Ln TA = Log of Total Assets*
➢ *Age = Age of the company*
➢ *FATO = Fixed Asset Turnover*
➢ *Spon = Sponsor Shareholding*

β_1= the degree of change in BEP for every 1unit of change in working capital indicator.

β_2= the degree of change in BEP for every 1unit of change in the log of total assets

β_3= the degree of change in BEP for every 1unit of change in the age of the company

β_4= the degree of change in BEP for every 1unit of change in the fixed asset turnover of the company

β_5= the degree of change in BEP for every 1unit of change in the sponsor shareholding of the company

ε=Residual

i = Firm

t = Time

3.2 Other Statistical Tools: Other than regression analysis, few other statistical tools have been used for the study such as Mean, Median, Graph and Chart and Quartile Analysis.

3.3 Variable Definition: This study has considered one dependent variable which symbolises the core profitability of a firm prior to effects of taxes and financial leverage. Other than that it has used 6 explanatory variables and 4 control variables.

3.3.1 Dependent Variable: In this study *BEP* is the dependant variable. The reason being BEP is a ratio that computes the core profitability or earning power of an entity prior to the effects of income taxes and financial leverage. It is computed by dividing earnings before interest and taxes (EBIT) by total assets (TA).

$$\text{Here, BEP} = \frac{EBIT}{TA}$$

Where, BEP = Basic Earning Power

EBIT= Earnings before interest and taxes

TA= Total Assets

3.3.2 Explanatory Variables: In this study the following 6 explanatory variables have been used as indicators of working capital:

i) *Cash Conversion Cycle (CCC):* Cash conversion cycle has been used as an explanatory variable as this variable is not completely independent for certain. This calculates number of days required by a firm to convert its investments in inventory or other resources into cash. Cash conversion cycle is calculated by adding the inventory conversion period and the receivable conversion period and deducting the payable deferral period.

$$CCC = ICP + RCP - PDP$$

Here,   ICP = inventory conversion period
         RCP = receivable conversion period
         PDP = payable deferral period

ii) *Current Ratio:* Current ratio is a measure of liquidity in the short term and has been used as an explanatory variable in the study. It calculates the ability of a company to pay off the short term debts or debts that are due within a year. Current ratio is calculated by dividing current assets by current liabilities.

$$Current\ Ratio = \frac{Current\ Assets}{Current\ Liabilities}$$

iii)   *Quick Ratio:* Quick ratio has also been used as an explanatory variable in this study. This ratio helps in measuring a firm's ability to repay its short term liabilities with its most liquid assets. The most liquid assets include cash and cash equivalents, marketable securities and accounts receivable. Quick ratio can be calculated in the following manner:

$$Quick\ Ratio = \frac{Current\ Assets - Inventory - Prepaid\ Expenses}{Current\ Liabilities}$$

iv)   *Days Sales Outstanding(DSO):* DSO has been considered as an explanatory variable in this study. This ratio indicates the number of days that a firm needs in order to collect the payment after sale. This is also called average collection period or receivable conversion period and is calculated as follows:

$$DSO = \frac{Accounts\ Receivables}{Total\ credit\ sales} \times 365$$

v) *Inventory Conversion Period (ICP):* Inventory conversion period refers to the time that is needed for raw materials to be converted into sales that means the time required starting from obtaining raw materials, producing or manufacturing items from those materials and ending that by selling it as a final good. This explanatory variable measures firm's ability to produce with a lower volume of inventory. This is calculated as follows:

$$ICP = \frac{Inventory}{Cost\ of\ Goods\ Sold} \times 365$$

vi)   *Payable Deferral Period (PDP):* A payable deferral period measures the lag between the time of receiving a bill and paying it. This refers the management's ability to delay payments to the creditors. This explanatory variable is calculated as follows:

$$PDP = \frac{Accounts\ Payable}{Cost\ of\ Goods\ Sold} \times 365$$

3.3.3 Control Variables: The following 4 control variables have been used in the study to clarify the relationship between the dependent variable and the explanatory variables:

vii)   *Log of Total Assets (Ln TA):* Log of total assets have been used as a control variable which is an indicator of size and controls the scale effect. Control variables are used so that there are no missing variable in regression model. This independent variable has been used demonstrate if the company experiences economies of scale as it gets bigger in size.

The effect of this variable is expected to be positive on the dependent variable; hence a positive sign is expected.

viii)   Age of the company (Age): Age of the Company is a control variable. This is another independent variable which has been calculated by deducting the year of commencing commercial operation from respective years of analysis. This variable tries to determine the impact of the learning effect. That means, it tries to show whether the efficiency of a company increases with its age. The effect of this variable is expected to be positive on the dependent variable hence a positive sign is expected.

ix)Fixed Asset Turnover (FATO): Fixed asset Turnover is another control variable in the study. This is calculated by dividing the total sales by the total amount of non-current assets. This is technically an indication of how efficiently an entity is able to utilise its fixed assets in generating revenues. It is calculated as follows:

$$FATO = \frac{Net\ Sales}{Fixed\ Assets}$$

x) Sponsor Shareholding (spon): Sponsor shareholding has been used as a control variable. Technically, a bigger percentage of sponsor shareholding indicates a lesser chance of agency conflicts.

3.4 Sample: For the sample selection of this study, all the 31 listed companies from 2000 to 2018 in the Pharmaceuticals and Chemicals industry of Dhaka Stock Exchange have been selected. The study includes panel data from 2000 to 2018 from the annual reports of the listed companies.

This sample size is justified as it takes all the companies from a specific sector into consideration. In the Dhaka stock exchange, there are 31 companies listed under the Pharmaceuticals and Chemicals industry from 2000 to 2018. The sample size is justified enough to show the impacts of different analyses to reflect the relationship between working capital management and firm performance of all these listed companies.

3.5 Sources of Data: This study is mainly based on secondary data collected from various sources. Majority of the information is collected from the annual reports of the companies from 2000 to 2018. In some cases, DSE monthly reviews were used to derive the shareholding matrix for different companies. The annual reports have either been collected from the websites of the company or, Lankabangla financial portal or, Dhaka Stock Exchange Library. For analytical parts of the study, various publications from different authors and institutions have also been used as references when needed. For the purpose of this study, a total of 384 annual reports of 31 listed companies in the Pharmaceuticals and Chemicals industry have been collected.

4. Stock Market of Bangladesh in Brief:

The journey of stock market in Bangladesh was marked by the establishment of East Pakistan stock exchange association in 1954 which commenced formal trading operations in 1956. Later on it was renamed as East Pakistan Stock exchange in 1962 and further renamed as Dacca stock exchange in 1964. At present there are two stock exchanges in Bangladesh; **Dhaka Stock Exchange (DSE) and Chittagong Stock Exchange (CSE)**

The operation of Dacca Stock exchange was withdrawn for 5 years till 1976 owing to the Liberation war of Bangladesh. On 16 September, 1986 the formation of Dhaka stock exchange (DSE) was formed. In November, 1993 the formula for calculating DSE all-share price index was replaced according to instructions from IFC. The very first initiation of automated trading was started in August 1988 and it was officially started in January 2001. In January 2004, Central Depository system was introduced.

Chittagong Stock Exchange (CSE) was incorporated as a public limited company in 1995. It started trading using internet based system in 2004. In November 2009, the benchmark index of the Dhaka Stock Exchange (DSE) crossed 4000 points and set a record by reaching 4148 points. In 2010 this index had crossed 8500 points and ended up crashing in the first quarter of 2011. This crash caused millions of investors to lose their money. At present there are 22 sectors in DSE with a total of 586 listed companies. The Bangladesh Securities and Exchange Commission (BSEC) has the power to monitor and control the actions of the stock exchanges of Bangladesh. BSEC is controlled by the Ministry of Finance which is permitted by the Parliament. Following are a few graphs that can help in the better understanding of the stock market of Bangladesh:

Figure 1: Market Capitalisation as a Percentage of GDP

From the graph plotted above, it can be seen that from 2000 till 2018, there has been both an upward and downward trend in the contribution of market capitalisation as a part of GDP. However, in 2010-11 the contribution was huge as the market was booming but after the crash of stock market, the results had deteriorated.
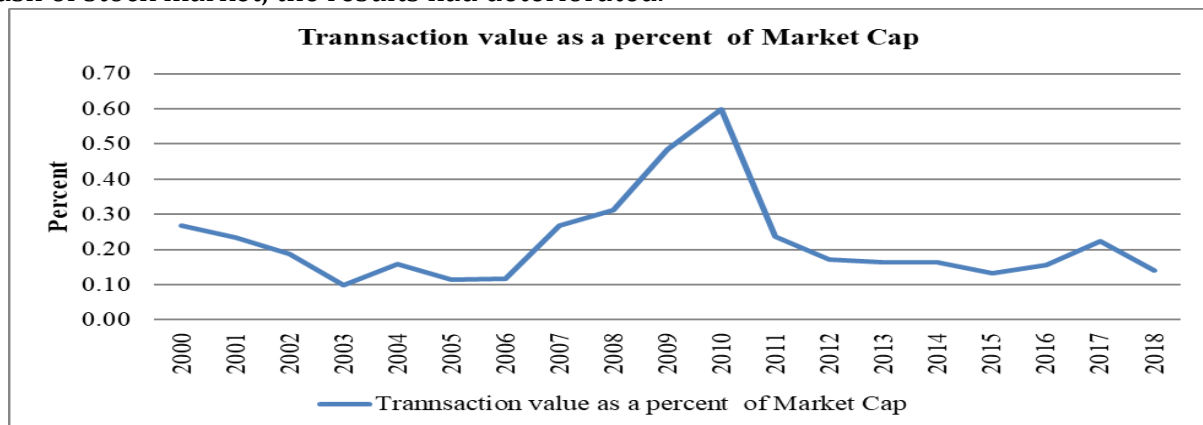

Figure 2: Transaction Value as a percentage of Market Capitalisation

From the graph plotted above, it can be seen that from 2004 till 2018, there has been both increases and decreases in the transaction values. The stock market bubble caused the value to increase a lot in 2010. But after that the crash led a massive fall which remained stable for some years and then again became unstable.

Figure 3: Growth of Market Capitalisation over time

From the graph plotted above, it can be understood that there have been sharp fluctuations in the growth of market capitalisation over time. The massive fall in 2011 owing to the market crash remained almost constant and ever since the market has been experiencing less growth in capitalisation.

5. Pharmaceutical & Chemical Industry of Bangladesh in brief:

Amongst the least developed countries in the world, Bangladesh is the only country which is able to meet up 97% of its demand for pharmaceutical items through its domestic operations which amounts to a market of around 200 billion BDT. According to information of Export Promotion Bureau, Pharmaceutical items are even exported overseas to 199 countries which helped in generating more than 103.46 million USD in the fiscal year 2016-17. The demand in the overseas market keeps increasing due to the lower cost and better quality of items delivered. As per the statistics of 2018 by Bangladesh Association of Pharmaceutical Industries, the industry is experiencing an upsurge over the last few years and the market size is around 200 billion BDT. This industry attracts long term investors as well owing to the dividend patterns and more EPS. The long term potential of this industry makes it an attractive choice for investors as majority of the listed firms have sound market capitalization bases and lately stated improved earnings per share (EPS) and dividends. The compound annual growth rate (CAGR) of Pharmaceutical and chemical industry from 2013-14 to 2017-18 was 15%. As per the statistics of Bangladesh Association of Pharmaceutical Industries (BAPI) and Directorate General of Drug Administration (DGDA), there are 257 licensed pharmaceutical manufacturers that are operating in Bangladesh out of which about 150 are functional. Till 2018, there are 31 listed companies in the pharmaceuticals and chemicals sector of DSE out of which 24 companies are of A category meaning that they hold AGM regularly and pay dividends regularly as well. The rest of the firms are listed in B, N and Z categories. According to a report by IMS Healthcare, it was revealed that the top 10 companies of the industries hold around 68.49% of the market share and the top 20 hold 86.33% of the shares. As per the World Trade Organization (WTO) Cell which is under the jurisdiction of Ministry of Commerce, it was stated that Bangladesh is the only nation in the 45-LDC group of the WTO that exports pharmaceutical products and meets almost all of its local demand. This industry has incredible opportunities to develop in the future. As per the research of Zion Market Research, Global generic drug market is expected to grow at a

Compound Annual Growth Rate of 10.8% from 2016 to 2021 and it is expected to reach USD 380.60 billion by 2021. During 2016, patented drugs worth USD 60 billion have gone off patent which opened up new opportunities for generic manufacturers around the world and Bangladesh is one of them. The major reasons of the success include omission of Bangladesh from the Regulations of Intellectual Property Rights Act of the WTO and patronage from the government of Bangladesh to help grow the local industry. Apart from the listed companies there are about 200 firms only in pharmaceutical sector and the approximate market size is about BDT 76,500 million per year. This is about 94% of the total demand of medicines. So, the rest is imported which is about 6%. These imported drugs include cancer drugs for viral infections or diseases, vaccines or other hormonal medicines. Particularly, the pharmaceutical industry is the second highest contributor to the national treasury after readymade garments, and is the largest professional concentrated occupation sector of the country. On the other hand, Bangladesh's chemical imports have nearly triplicated in the past 10 years, encouraged by the increasing demand from numerous industrial sectors supplying to local and overseas markets. Statistics state that garments and textile sectors are the main customers of the imported chemicals. After that, pharmaceuticals, food, cosmetics, toiletries, leather, plastic and other sectors are the biggest consumers. During the year 2017-18, businesses imported chemicals worth BDT 175,480 million as per the data collected from Bangladesh Bank. In a recent research it has been seen that the chemical industry of Bangladesh has been growing at a rate of 8% from 2010-18 and the market size is around 2.5 billion USD. During the past 20 years, the pharmaceutical and chemical industry of Bangladesh has been taken a newer pinnacle. Domestically, Bangladeshi local firms supply 82% of the market in pharmaceuticals whereas Multinational companies account for 13%, and rest is imported. The industry structure is relatively concentrated as he top 10 companies hold 68.49% of market where the top 20 companies hold 86.33%.

5.1 PESTEL Analysis: The term PESTEL is an abbreviation for Political, Economic, Sociocultural, Technological, Legal and Environmental factors of the environment. This analysis is often used as a tool for assessing the impacts of macroeconomic variables on the industry.

Political Factors: The political factors of the analysis includes government policies, overall political stability, foreign trade policies, tax policies, labour laws, trade restrictions etc. although the overall political situation of Bangladesh is unsteady, the pharmaceutical and chemical industry are affected a little less compared to other industries. It is because, the demand of medicine is an important issue which is not subject to any sort of political problems but the chemical industry might be affected by it. Taxation policies or changes in the policies are also capable of affecting as more tax results in fewer revenues and sometimes in increased expenses; which in turns will be increasing the price of the products from this industry. .

Economic Factors: Economic factors are one of most important components of the PESTEL Analysis. These factors include economic growth, exchange rates, unemployment rates, GDP, interest rates, inflation rates, income etc. According to Bangladesh Bureau of Statistics (BBS) the Pharmaceutical industry contributed 1.85 of the GDP in 2017. The accomplishment of the sector has also engendered a momentous number of professional and non-professional jobs and thus helping to alleviate unemployment.

Sociocultural Factors: The sociocultural elements include factors such as population, population growth rate, age, gender, lifestyle, cultural beliefs, religion etc. A growth in population indicates a growing demand for medicines as well. Bangladesh is prone to natural disasters as well and events like these also trigger the need for medicines. Chemical industry

is also affected by the cultural orientations. For example- during Eid-ul-Adha the need for chemicals for processing skin increases and the business booms. The pattern of age in the population also affects the need for medicines in a country.

Technological Factors: Pharmaceuticals and chemicals industry is affected by technological innovations to a great extent. Use of new technology can ensure efficiency and help in reducing costs as well. Tis sector has a massive scope for research and development as well. More and more research can help in ensuring expansion of the industry. Lately some industries have been established with hi tech tools and specialists which will improve the power of this sector. Bangladesh is set to go in the Highly Regulated Market and because of this reason different pharmaceutical and chemical companies are investing to build high tech industries.

*Environmental Factors***:** This environment includes factors like weather change, climate change, environmental policies made by the governments, pressures from NGOs. With the recent times, increase in global warming has triggered the need for environment friendly industry. The problem with Bangladesh is that, still environment is not considered as seriously as it should be and many factories are not managing their waste in an environment friendly manner.

Legal Factors: The legal factors include some laws regarding discrimination, antitrust, employment, consumer protection, health and safety, copyright etc. After the declaration of Drug Control Ordinance - 1982, the growth of this industry was speeded up. The specialized information, views and inventive notions of the pharmacists working in this segment are the key factors for this development.

5.2 Porter's Five Forces Model: The Porter's five forces model is a tool that helps in analysing the overall competition in any industry. This model focuses on five different forces which are threat of new entrants, rivalry among existing competitors, bargaining powers of buyers, bargaining power of suppliers and threat of substitutes.

Threat of New Entrants: The threat of new entrants in this industry is Moderate to high as these industries require a lot of capital and modern technology. Behind the success of local pharmaceutical firms the restriction on the import of drugs that are similar to locally manufactured variants plays a huge role. The capital intensive nature of this industry makes it tough for new competitors to enter and gain the trust of others easily and hence the threat is low in case of pharmaceuticals particularly.

Rivalry among Existing Competitors: The rivalry among the existing companies is high in this sector. Bangladesh pharmaceutical industry is mainly dominated by domestic manufacturers. Of the total pharmaceutical market of Bangladesh, the native companies are enjoying a market share reaching around 75 on an average. As the industry is more about generic medicines, the rivalry is very high. Other than that, the chemical industry is also very competitive because of the similar nature of the chemicals being in business.

Though there are 235 pharmaceutical companies registered in Bangladesh, only 80 firms are actively manufacturing medications. The top 30 to 40 companies rule nearly the entire market; where the top 10 firms hold 70 of domestic market share; and the top 2, beximco and square, seize over 30 of the market (chowdhury 2006).

Bargaining Power of Buyers: The bargaining power of the buyers is very low in the pharmaceuticals and chemicals industry. The scattered nature of buyers and recommendation by doctors regulate the demand in this industry a lot. The chemical industry also has a comparatively higher bargaining power of buyers.

Bargaining Power of Suppliers: The bargaining power of the suppliers is also very low. Pharmaceutical industry depends on different chemicals to run smoothly. The chemical

industry is very competitive and fragmented so supplier switching is easier as there are many suppliers who will supply the same chemical.

Threat of Substitutes: The threat of substitutes is low as there is no other feasible alternative of the medicines or chemicals. Though biotechnology is capable of making substitute of drugs, but the situation in Bangladesh is still not ready for this innovation.

5.3 HH Index: The Herfindahl-Hirchman Index, otherwise known as HHI helps in measuring the competitiveness of firms within a related industry by measuring the firm size in relation to that of the industry and indicates the level of competition within a market based on a score. HHI is calculated as follows:

$$HHI = s_1^2 + s_2^2 + s_3^2 + ... + s_n^2$$

The squares of the market shares of each of the firm are added to derive a score. The score ranges between 0 to 10000 where a score of 0 means a perfectly competitive market. If the score is below 1500, it means that the industry is narrowly concentrated. A score within the range of 1500-2500 means that the market is moderately concentrated. A score above 2500 means that the market is highly concentrated. If the score equals to 10000, then it indicates a monopolistic market.

5.3.1 HHI for Pharmaceuticals Industry: For testing out the competitive nature of the pharmaceutical industry, HHI has been calculated and the market shares have been considered from two different parameters i.e. Total Assets and Sales of the firms. The score of the pharmaceutical industry is 1526 when market share is calculated based on total assets and 1873 when market share is calculated based on Sales revenues. In both the scores, it is evident that the pharmaceutical industry is moderately concentrated.

From the below mentioned pie chart it can be seen that square pharmaceuticals is the highest shareholder in the market with 22.82% in terms of Total assets. After that, ACI limited is at the second place with 20.65% market share. Beximco Pharmaceuticals hold 15.10% of the share whereas Acme and Orion pharmaceuticals have 12.15% and 11.44% share respectively.
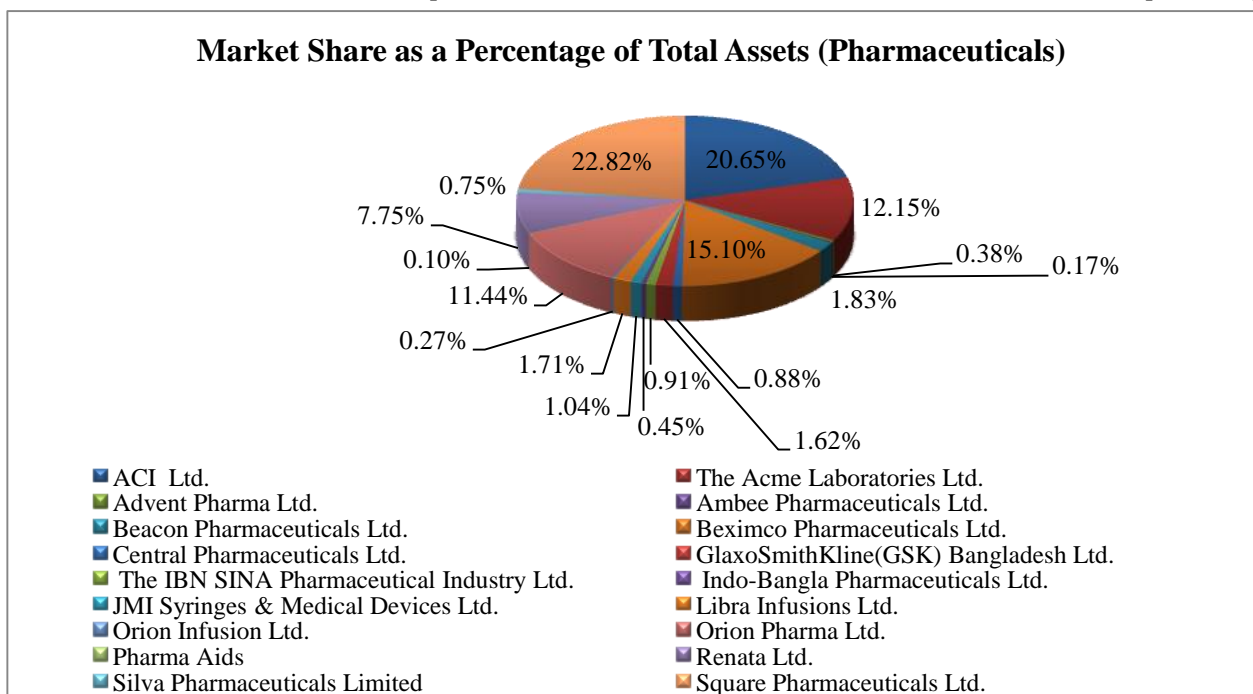

Figure 4: Pharmaceutical Industry Market share as a Percentage of Total Assets

Again, from the pie chart plotted below it can be understood that in term of sales as well ACI Ltd. has the highest market share of 31.96 and Square Pharmaceuticals has the second

highest market share of 22.58. Renata Ltd. and Beximco Pharmaceuticas hold shares of 10.6 and 10.09 respectively.
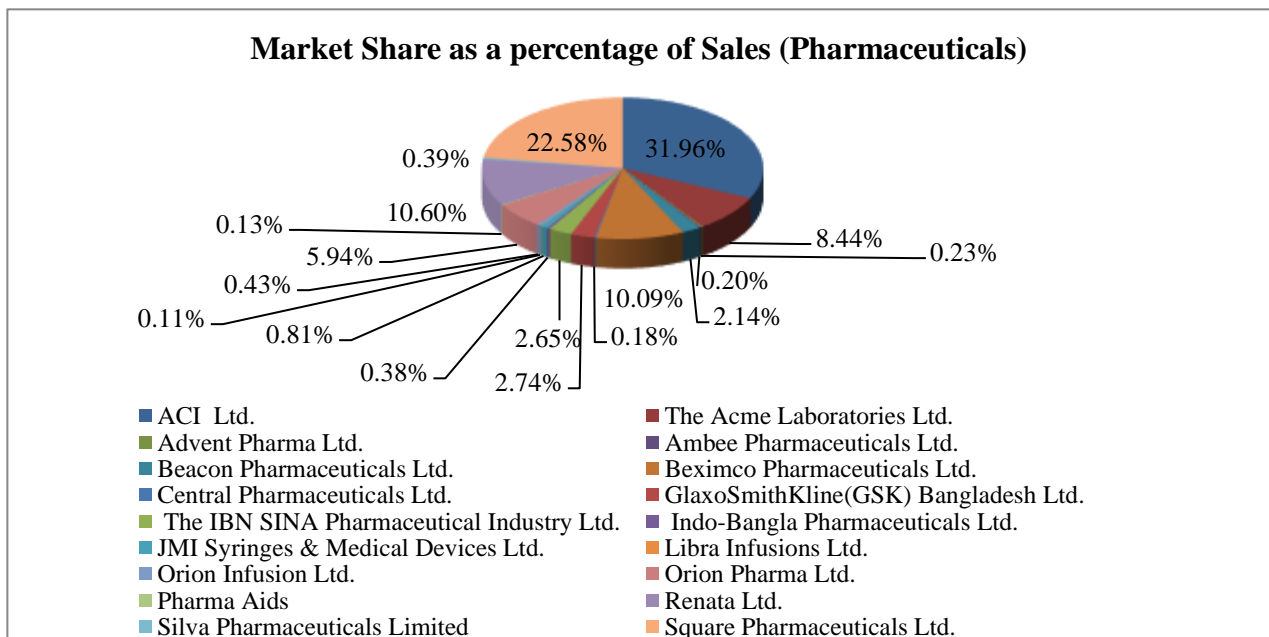
Market Share as a percentage of Sales (Pharmaceuticals)

- ■ ACI Ltd.
- ■ Advent Pharma Ltd.
- ■ Beacon Pharmaceuticals Ltd.
- ■ Central Pharmaceuticals Ltd.
- ■ The IBN SINA Pharmaceutical Industry Ltd.
- ■ JMI Syringes & Medical Devices Ltd.
- ■ Orion Infusion Ltd.
- ■ Pharma Aids
- ■ Silva Pharmaceuticals Limited

- ■ The Acme Laboratories Ltd.
- ■ Ambee Pharmaceuticals Ltd.
- ■ Beximco Pharmaceuticals Ltd.
- ■ GlaxoSmithKline(GSK) Bangladesh Ltd.
- ■ Indo-Bangla Pharmaceuticals Ltd.
- ■ Libra Infusions Ltd.
- ■ Orion Pharma Ltd.
- ■ Renata Ltd.
- ■ Square Pharmaceuticals Ltd.

Figure 5: Pharmaceutical Industry Market Share as a Percentage of Sales

5.3.2 HHI for Chemicals Industry: For testing out the competitive nature of the Chemicals industry, HHI has been calculated and the market shares have been considered from two different parameters i.e. Total Assets and Sales of the firms. The score of the Chemicals industry is 2502 when market share is calculated based on total assets and 1727 when market share is calculated based on Sales revenues. Based on both the scores, it is evident that the Chemicals industry is moderate to highly concentrated.

Market Share as a percentage of Total Assets (Chemicals)

- ■ ACI Formulations Ltd.
- ■ Active Fine Chemicals Ltd.
- ■ AFC Agro Biotech Ltd.
- ■ Beximco Synthetics Ltd.
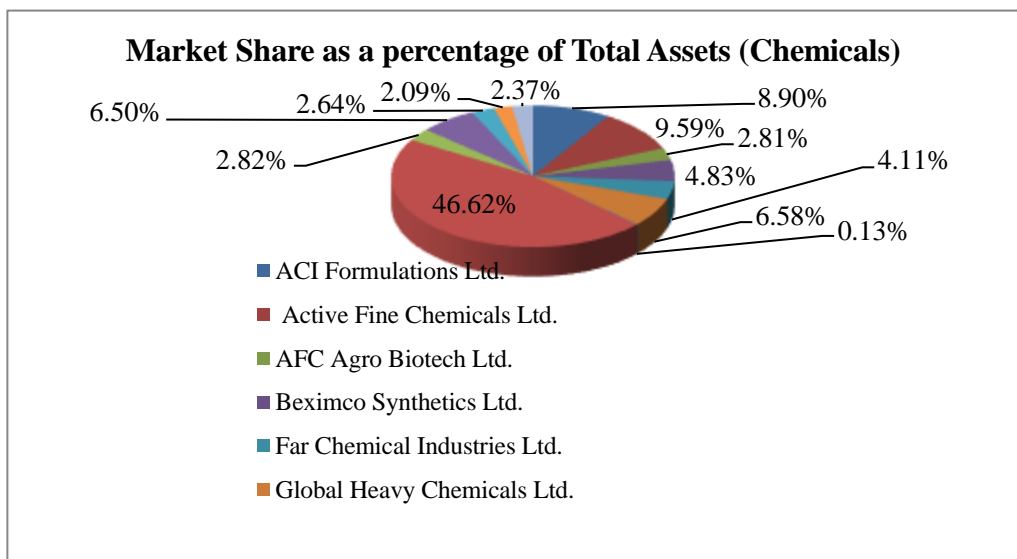- ■ Far Chemical Industries Ltd.
- ■ Global Heavy Chemicals Ltd.

Figure 6: Chemicals Industry Market Share as a percentage of Total Assets

From the abovementioned pie chart it is evident that, Keya Cosmetics has the highest market share among all which is 46.62%. The second and third place is occupied by Active Fine Chemicals and ACI Formulations with a value of 9.59%. and 8.90% respectively. Global Heavy Chemicals and Marico Bangladesh have shares of 6.58% and 6.50%respectively.
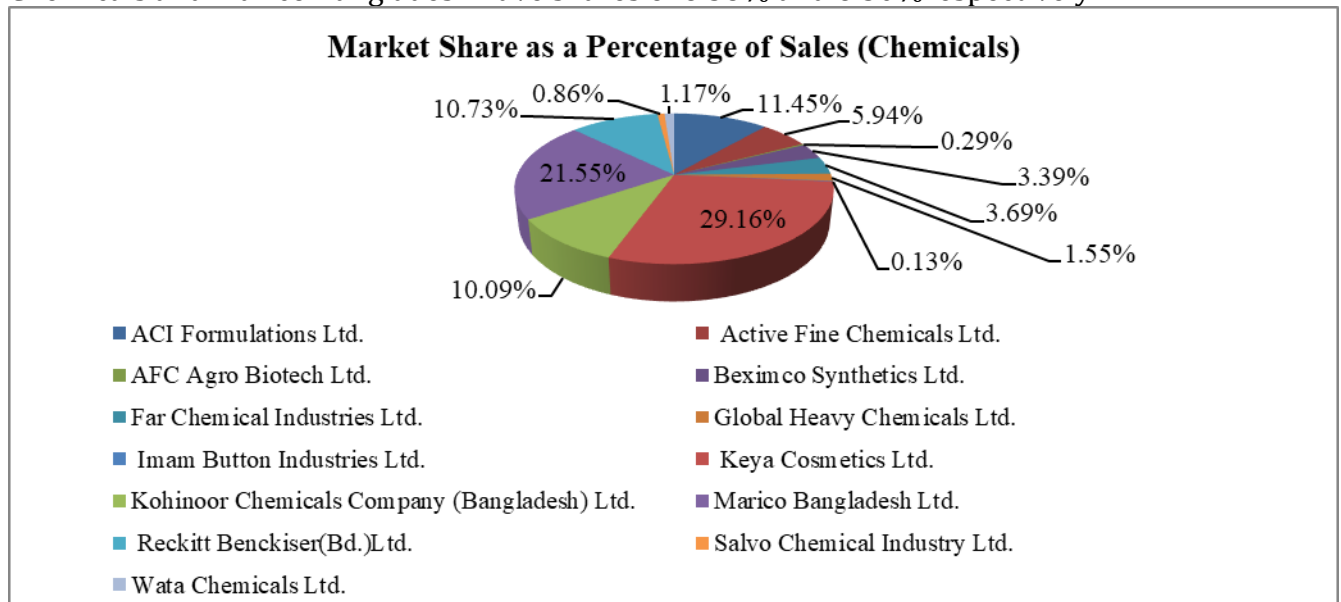

Figure 7: Chemicals Industry Market Share as a Percentage of Sales.

Now, if the pie chart plotted above is observed, it can be seen that in terms of market share as a percentage of total sales, Keya Cosmetics is still at the top position with a value of 29.16%. Marico Bangladesh is at the second position with a share of 21.55%. ACI formulation has a market share of 11.45% and Kohinoor Chemicals has a market share of 10.09%.

6. Descriptive Statistics:

The means, standard deviations and number of observations of different variables are listed as follows:

Table 1: Descriptive Statistics

Sl.	Variable	Unit	N	Mean	σ
1	Age	Years	394	27.71827	14.94619
2	Total asset	Million BDT	383	5434.792	9622.598
3	Property, Plant Equipment	Million BDT	383	2541.744	4925.306
4	Long term investments	Million BDT	383	109.1248	349.7281
5	Intangible assets	Million BDT	383	15.80464	102.
6	Other non-current assets	Million BDT	383	347.2746	1360.682
7	Total non-current assets	Million BDT	383	3013.948	5832.484
8	Current assets	Million BDT	383	2425.994	4424.458
9	Accounts receivable	Million BDT	383	602.3517	1499.069
10	Inventory	Million BDT	383	894.8568	1611.041
11	Advance, deposits, prepayments	Million BDT	383	293.3507	607.7539
12	Quick assets	Million BDT	384	1234.563	2547.212
13	Current liabilities	Million BDT	383	1596.348	3369.37
14	Accounts payable	Million BDT	383	268.6337	537.6669
15	Paid up capital	Million BDT	383	669.3462	1325.882
16	Number of shares outstanding	Million BDT	383	61.21112	125.3898

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Sl.	Variable	Unit	N	Mean	Ϭ
17	Total equity	Million BDT	383	3182.972	6558
18	Total debt	Million BDT	383	1402.745	3398.831
19	Financial lease	Million BDT	383	6.194221	23.55583
20	Sales	Million BDT	383	3643.699	6780.449
21	Cost of goods sold	Million BDT	383	2173.104	4248.983
22	Gross profit	Million BDT	384	1466.766	2806.298
23	Operating profit	Million BDT	383	654.0165	1437.442
24	Net profit	Million BDT	383	403.1562	1083.06
25	Operating cash flow	Million BDT	383	391.1187	1133.489
26	Sponsor shareholding	Fraction	383	.4778534	.2005938
27	Institutional shareholding	Fraction	383	.152593	.1100073
28	Government shareholding	Fraction	383	.0019773	.008873
29	Foreign shareholding	Fraction	383	.0342182	.078652
30	Public shareholding	Fraction	383	.3333584	.1992837

6.1 Ratio Analysis: For ease of understanding the characteristics of the data set based on one value, median and mean values of the ratio have been calculated. As mean values can be affected greatly by extreme values, it will be better to interpret the ratio using the median values and hence all the ratios mentioned below have been interpreted based on their median values for respective years.

6.1.1 Current Ratio: This is a liquidity ratio that helps in assessing a company's ability to pay its short term liabilities or liabilities that are due within a year. Following is a graph showing the median values of the current ratios of the companies in the Pharmaceuticals & Chemicals industry from 2000 to 2018:
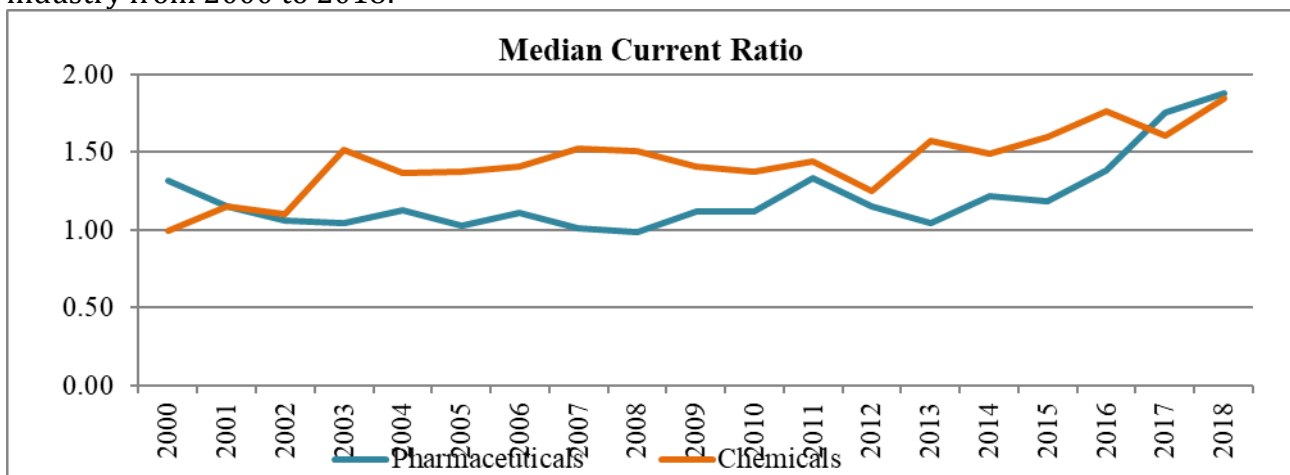

Figure 8: Current Ratio of Firms in Pharmaceuticals and Chemicals Industry

From the graph plotted above, it can be seen that in all cases the values of current ratio are fairly above 1. For pharmaceuticals, in 2000 the series starts with a median value of 1.31 and ends with a value of 1.88 in 2018. The trend shows both an upward and downward move which suggests that, as the age increases, the ability of the companies to meet up the short term liabilities increases and decreases some time. For chemicals, in 2000 the series starts with a value of 1 and ends with a value of 1.85. The values in both the industries are positive which means that the current assets are bigger than the current liabilities and the companies have a decent level of capacity to meet up the short term liabilities.

6.1.2 Quick Ratio: Quick ratio helps in assessing the firm's ability to pay its short term liabilities using its most liquid assets. Following is a graph showing the median values of the quick ratios of the firms in Pharmaceuticals & Chemicals industry from 2000 to 2018:
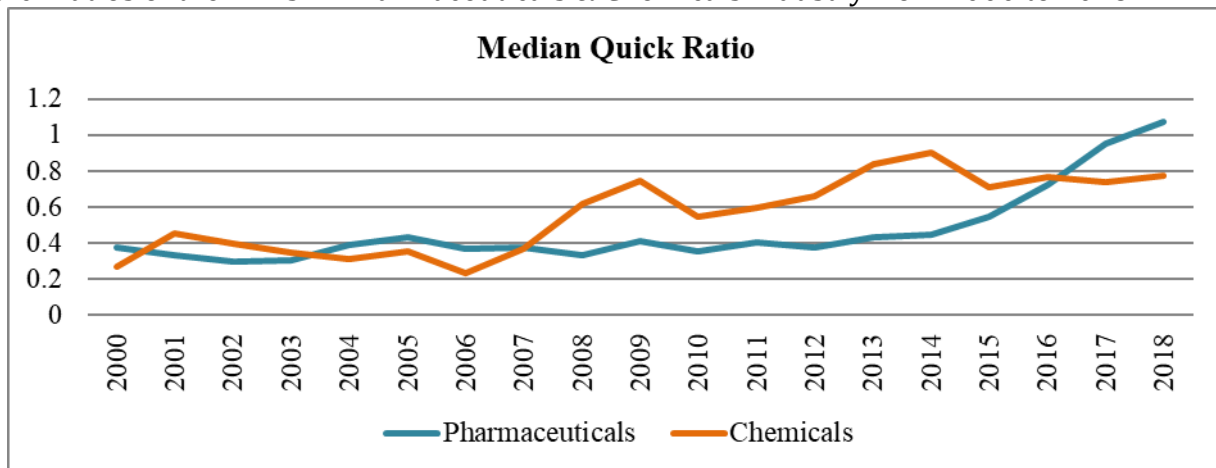

Figure 9: Quick Ratio of Firms in Pharmaceuticals and Chemicals Industry

From the graph plotted above, it can be seen for the pharmaceutical industry that, the quick ratio shows a dominating upward trend with a value of .38 in 2000 and ending at a value of 1.08 in 2018. The ratios are mostly below 1 which means that liabilities are higher. For chemicals industry quick ratios are always below 1 which suggests that the amount of quick assets is lower than the current liabilities. Though, the quick ratio shouldn't be usually more than 1 as it suggests that the firms have excess of liquidity in hand, it should not even be too lower as well. In 2000 the series starts with a median value of .26 and ends with a value of .78 in 2018. The pharmaceutical and chemical industry has an overall tendency of less liquidity and in spite of some ups and downs there is still a dominating upward trend which suggests that with the increase in age, the ability to meet up the liabilities with quick asset increases.

6.1.3 Inventory Conversion Period (ICP): The inventory conversion period is an indicator of the number of days between the time the raw materials are acquired and the time when the final goods are sold. The lower the time is the fast it is to convert a raw material in to a feasible good and the better it is. Following is a graph showing the median values of the ICPs of the firms in Pharmaceuticals & Chemicals industry from 2000 to 2018:
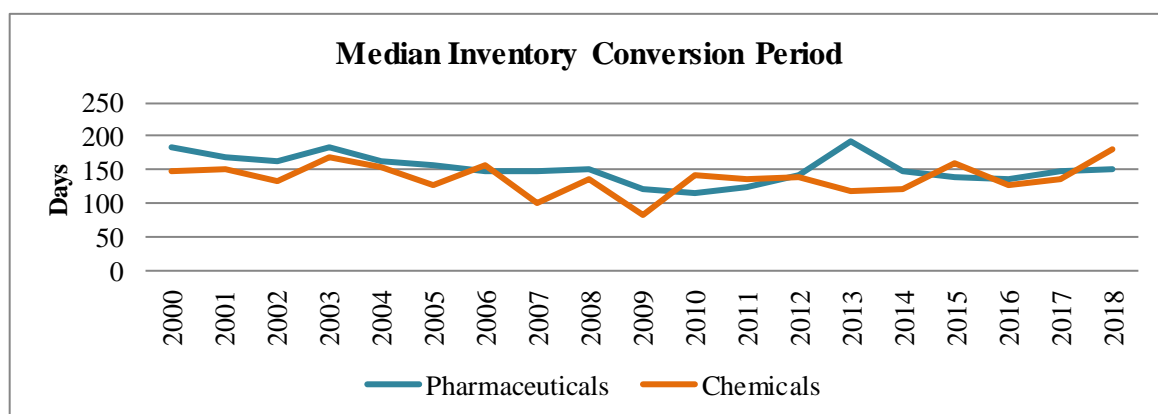

Figure 10: Inventory Conversion Period of Firms in Pharmaceuticals & Chemicals Industry

From the graph plotted above, it can be seen for Pharmaceutical industry that in 2000 the series starts with a median value of 183.56 days and ends with a value of 150.24 days in 2018

and there is no dominant consistent trend. For chemicals industry, the there is no consistent trend and the trend is more unstable than that of pharmaceuticals. For both the industries, the values are below 200 days which means the firms in both the industries take less than a year to convert their inventories into sales.

6.1.4 Receivable Conversion Period (RCP): Receivable conversion period refers to the time that is required to collect cash for the sales made on credit. The lower the days required, the faster it is to convert the credit sales into cash. From the graph plotted below, it can be seen that in all cases the median values of ICP in Chemicals industry are more unstable than the median values in the Pharmaceutical industry. From the median values it can be seen that the series starts with a value of 24.13 in 2000 and ends with a value of 73.54 in 2018 for Pharmaceutical Industry showing a little inconsistent still dominating upward trend. It means that the time required to convert receivable into cash is increasing gradually. For the chemical industry the series starts with a value of 34.77 in 2000 and ends with a value of 119.57 days in 2018 showing an inconsistent trend. The median values indicate that the receivable conversion period of pharmaceuticals is below 80 days on an average which means that the trend of this industry indicates that the overall collection period is below 3 months which is satisfactory compared to the chemicals industry.
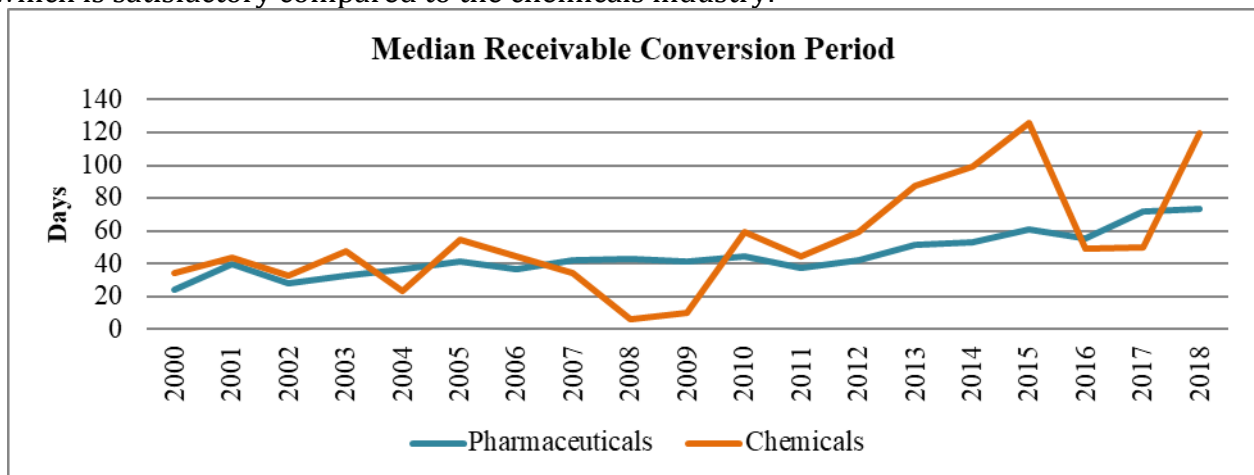

Figure 11: Receivable Conversion Period of Firms in Pharmaceuticals and Chemicals Industry

6.1.5 Payable Deferral Period (PDP): The payable deferral period shows how capable the management of a firm is in terms of delaying payments to its debtors. Following is a graph showing the median values of the PDPs of the firms in Pharmaceuticals & Chemicals industry from 2000 to 2018:
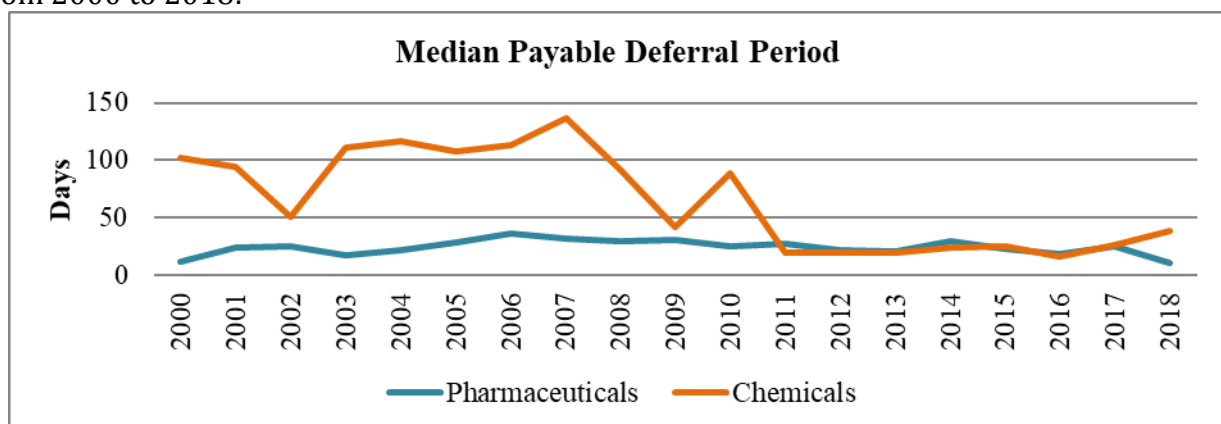

Figure 12: Payable Deferral Period of Firms in Pharmaceuticals and Chemicals Industry

From the graph plotted above, the median values of the Pharmaceutical industry show a comparatively stable trend than the chemicals industry. For pharmaceuticals, in 2000, the value is 11.80 days and at the end of 2018 the value is 10.39 days. So, the overall tendency of this industry is to clear the pending bills in less than two months. However, the median values of chemicals industry show a huge fluctuation owing to the practices of different companies to delay payments and utility bills for a very long time. The values range from less than a month to more 4 months as well.

6.1.6 Cash Conversion Cycle (CCC): Cash conversion cycle is calculated by adding the inventory conversion period and the receivable conversion period and deducting the payable deferral period. This represents the number of days that a company would need to convert its investments in inventory or other resources into cash. From the graph plotted below, it can be seen that the median values of CCC for Pharmaceuticals industry in the year 2000 is 212.86 days and at the end of 2018 the value 169.33 days. This means that the overall tendency of this industry is to take around less than 8 months to convert the investments into cash and the trend is comparatively consistent with some fluctuations. The lower the cycle is the better, as it suggests the speed of converting the resources and investments in inventory into cash. But the chemicals industry shows a lot of fluctuation and the trend is unstable but portraying a dominating upwards trend.
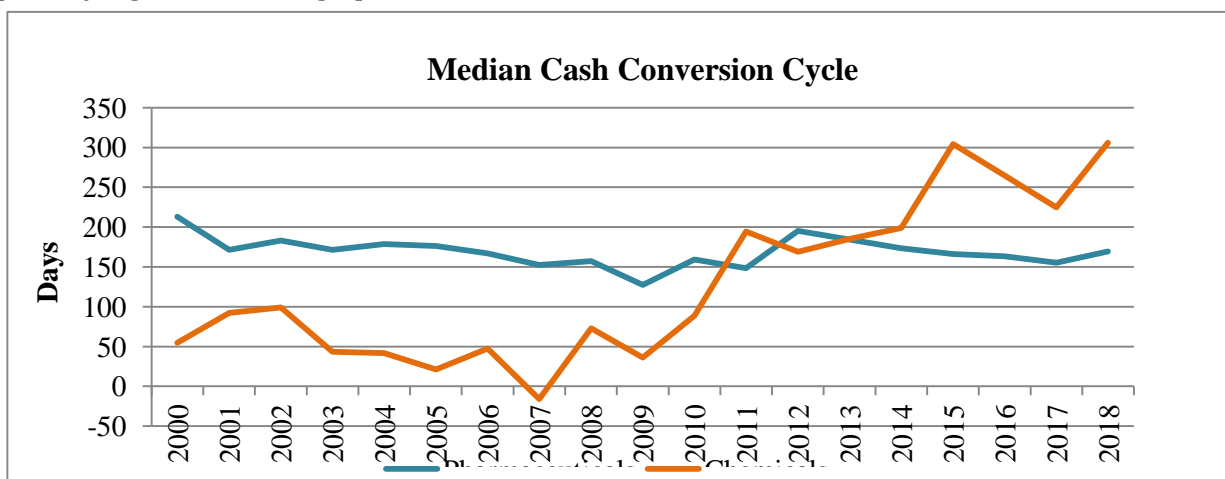

Figure 13: Cash Conversion Cycle of Firms in Pharmaceutical and Chemical Industry

6.1.7 Basic Earning Power (BEP): Basic Earning Power is a ratio that computes the earning power of an entity prior to the effects of income taxes and financial leverage. The graph plotted below shows both upward and downward trends over time. In case of both pharmaceuticals and chemicals industry no consistent trend can be found. Over the years, the BEP is positive for all the industries. However, the fluctuation is comparatively less in the pharmaceuticals industry owing to some industry specific characteristics. So, for pharmaceuticals industry even after both increasing and decreasing trends, the series doesn't depict too many abnormal changes rather it suggests a more stable pattern than that of the chemicals industry of maintaining a positive basic earning power.
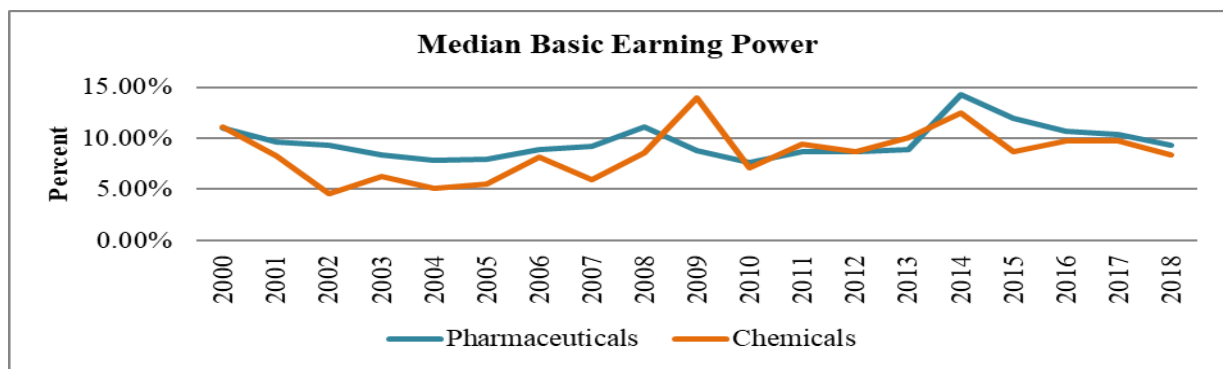
Figure 14: Basic Earning Power of Firms in Pharmaceutical and Chemical Industry

6.1.8 Gross Profit Margin (GPM): The gross profit margin is a profitability ratio that helps in assessing the gross profit of an entity as a percentage of its total revenues. In the graph plotted below, the Pharmaceutical Industry is showing a comparatively stable upward trend than the chemicals industry. For pharmaceuticals, the series starts with a value of 32.26% and ends with a value of 42.3% in 2018. For chemicals industry, the series starts with 23.4% in 2000 and ends with 29.8% in 2018. The trend in chemicals industry shows an inconsistent pattern for some years and in recent years, it shows a slightly upward trending pattern.
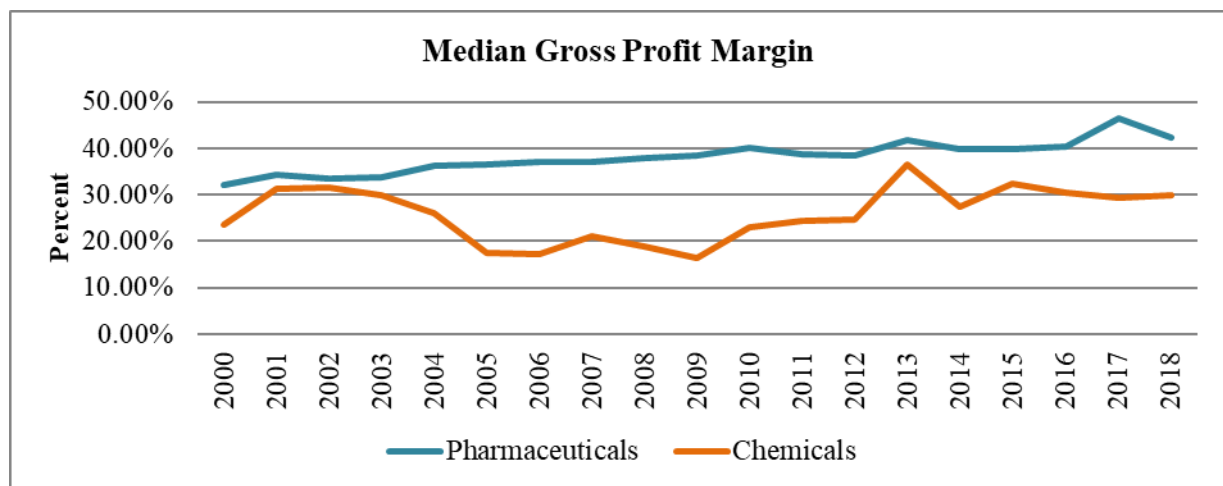

Figure 15: Gross Profit Margin of Firms in Pharmaceutical and Chemical Industry

6.1.9 Net Profit Margin (NPM): The net profit margin helps is assessing the ability of a firm to generate net revenue from its sales and is a widely used ratio of profitability. The graphical representation is as follows:
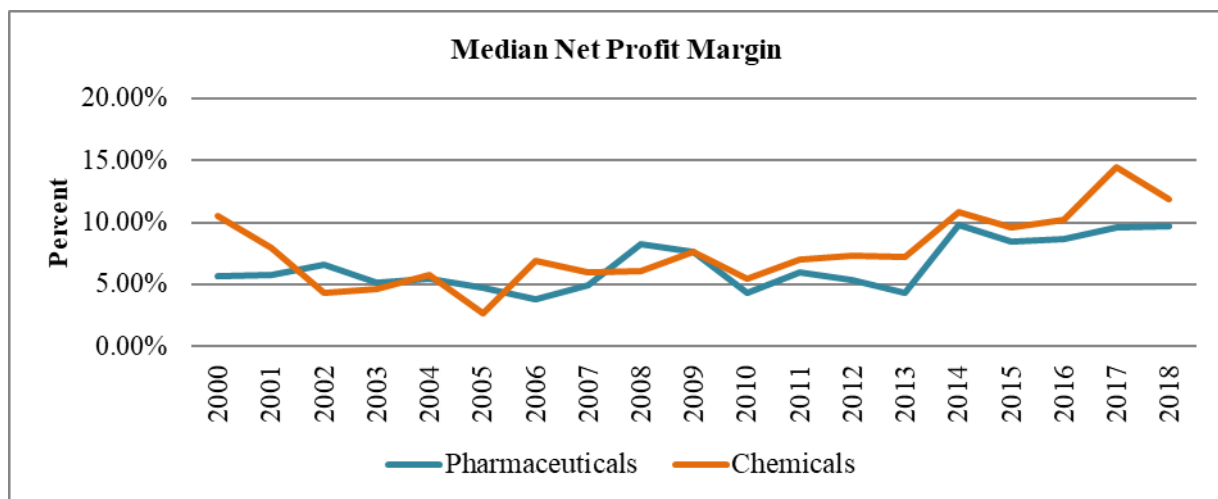
Figure 16: Net Profit Margin of Firms in Pharmaceuticals and Chemicals Industry

The graph suggests an overall unstable upward and downward trend in terms of profitability of both the pharmaceutical and chemical industry as the age of the company increases. For pharmaceuticals, in the year 2000 the median value is 5.65% and in the year 2018 the median value is 9.67%. The lowest net profit margin can be seen in the year 2006 which is 3.75%. In the chemicals industry, the trend is unstable but in most of the years the profit is higher than the pharmaceuticals industry. As the net profit margin is positive for all the years, it can be said that both the industries are capable of maintaining a good percentage of net profit over the years.

6.1.10 Return on Assets (ROA): The return on assets ratio is an indicator of how profitable the assets of a company are in terms of generating profit. The graphical representation of ROA is as follows:
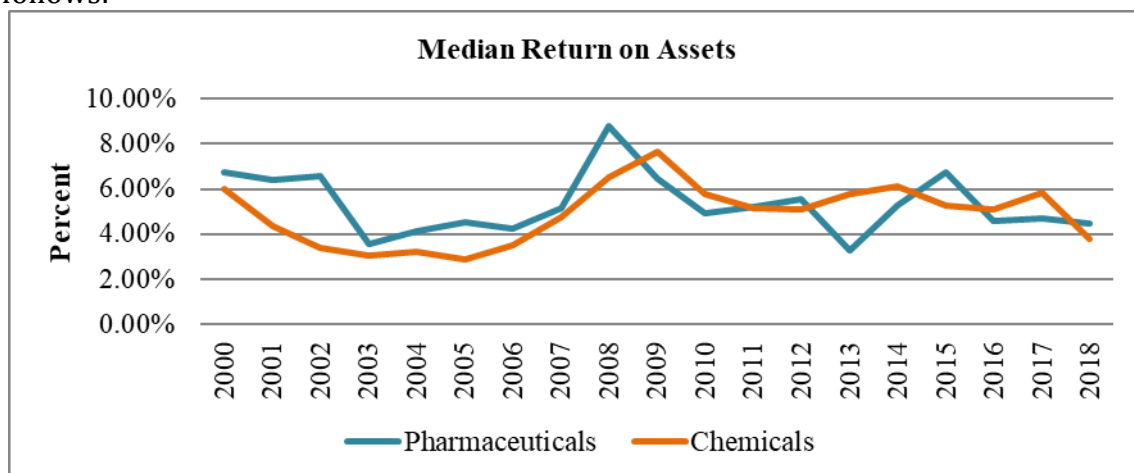
Figure 17: Return on Assets of firms in Pharmaceuticals and Chemicals Industry

The graph suggests both upward and downward trend in terms of return on assets of both the pharmaceutical and chemical industry as the age of the company increases. For pharmaceuticals and Chemicals both, the overall unstable trend shows that the profitability of firm's assets is not consistent. However, as the results are positive it means that there exist returns and no loss from assets for both the industries.

6.1.11 Return on Equity (ROE): Return on Equity helps in assessing how much profit a firm can generate from the investments made in equity by the shareholders. The graphical representation of ROE is as follows:
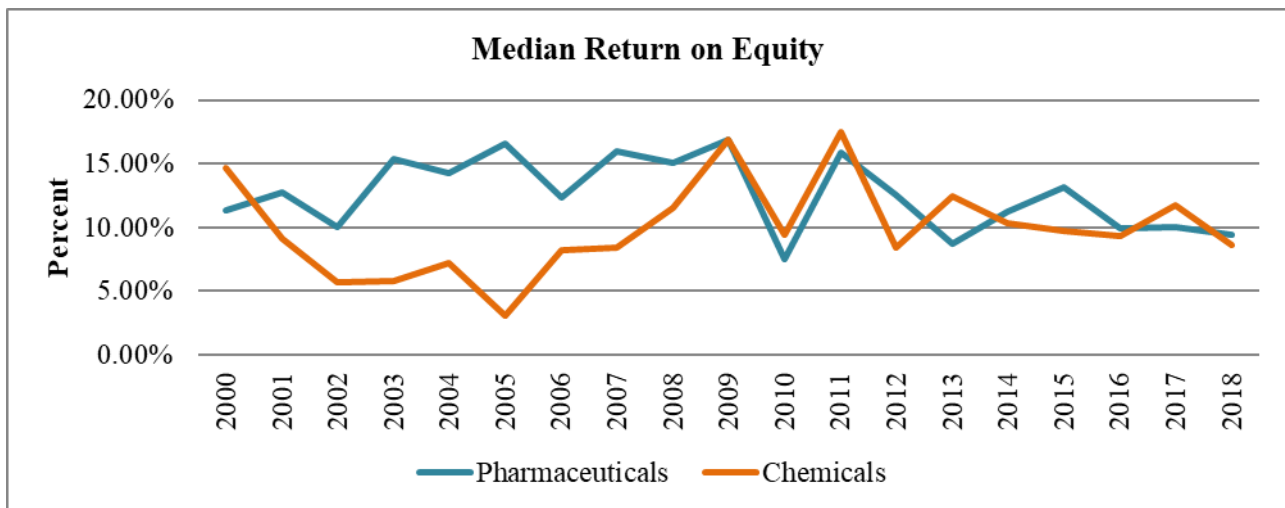
Figure 18: Return on Equity of Firms in Pharmaceuticals and Chemicals Industry.

The graph suggests an unstable trend with both upward and downward trends in terms of values return on equity of the pharmaceutical and chemical industry as the age of the company increases. The overall increasing and decreasing trends suggests that there has been fluctuation in terms of generating profit from the equity injected by the shareholders in both the industries. However, as the results are positive it means that there exist returns and no loss from equity injected for both the industries.

6.1.12 Fixed Asset Turnover (FATO): Fixed asset turnover helps in measuring a company's ability to generate revenues from utilising its fixed assets. The more utilisation, the better it is in terms of generating revenues.
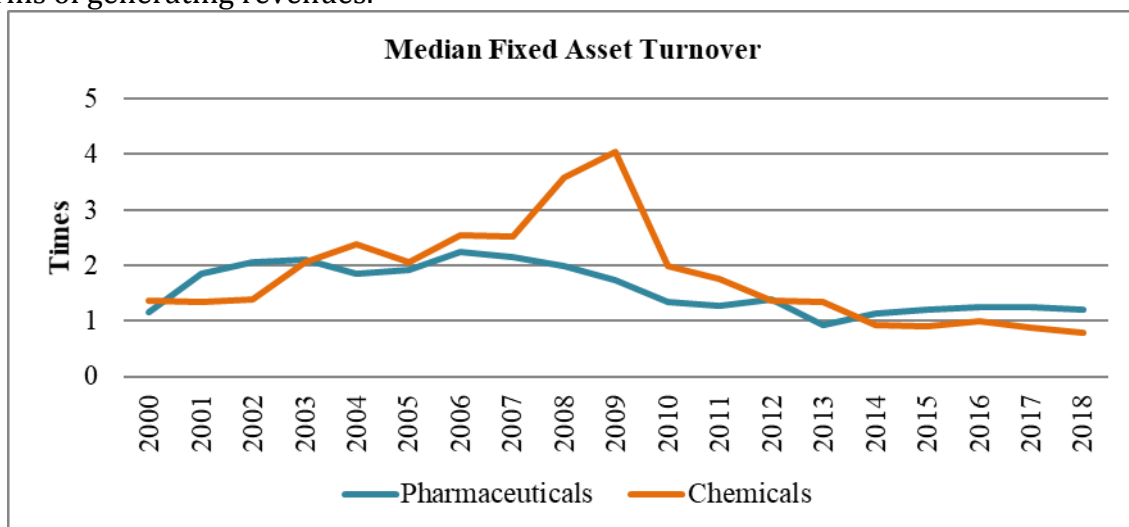
Figure 19: Fixed Asset Turnover of Firms in Pharmaceutical and Chemical Industry

From the graph plotted above it can be agreed that there is mostly a downward trend and a little upward trend in the fixed asset turnovers of the firms in both Pharmaceutical and Chemicals industry. The downward trend means, as the age of the companies increase, the efficiency has decreased. It means that the companies have not been able to utilise their existing level total assets in generating revenues in a satisfactory manner with the passing of time in both the industries. There is no stable trend owing to the fluctuations in both the industries.

6.2 DuPont Analysis: DuPont is the disintegration of ROE into diverse parts. The decomposition can be done using three or five factor DuPont as follows:

Return on Equity = Net Profit Margin X Total Asset Turnover X Financial Leverage

6.2.1 5 Factor DuPont: For the purpose of this study, 5 factor DuPont is going to be used. Here ROE is decomposed into the following five parts:

ROE = Tax Burden × Interest Burden × Operating Margin × Total Asset Turnover × Equity Multiplier

6.2.1.1 Tax Burden: The tax burden helps in detecting the share of profit that remains after tax. This is calculated by dividing net income by pre-tax income. From the graph plotted below it can be understood that the tax burden has been maintaining a more stable trend in the Pharmaceutical industry compared to that of the Chemicals industry. The main reason behind the fluctuations in the chemicals industry can be referred to the accumulated losses of many companies over time for which there remains no scope to pay profit for those respective years. The Pharmaceuticals industry on the other hand is more stable over the years as it enjoys tax advantage owing to higher leverage.
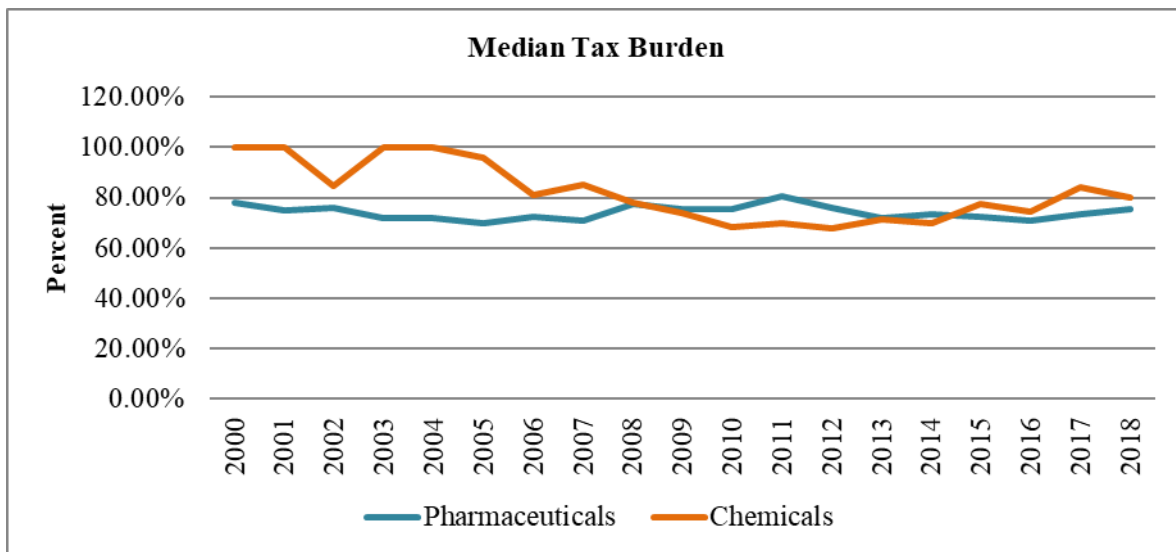
Figure 20: Tax Burden of Firms in Pharmaceuticals and Chemicals Industry

6.2.1.2 Interest Burden: Interest burden refers to the manner in which interests affect the profits. This is found by dividing pre-tax income by EBIT. An all equity company will have a value of 1 for this component. The interest margins of both the industries suggest an unstable movement over time and portray no consistent trend. The pharmaceuticals industry shows a comparatively stable trend in the beginning of the timeline and the chemicals industry has a comparatively stable trend at the end of the timeline. It means that there are fluctuations in the percentage of EBIT that is left after paying interest expenses.
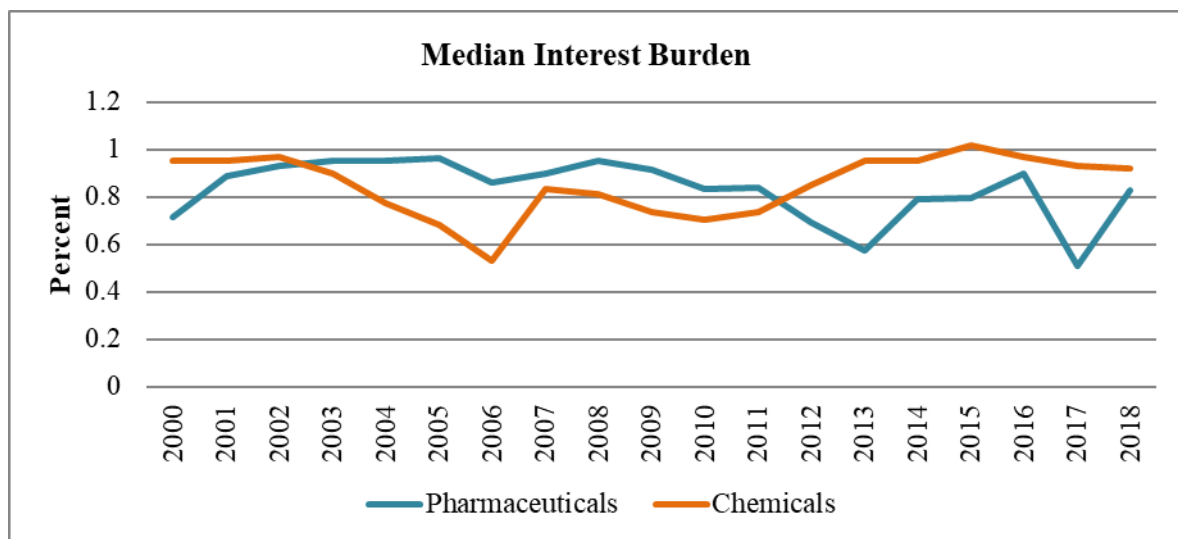
Figure 21: Median Interest Burden for Firms in Pharmaceuticals and Chemicals Industry

6.2.1.3 Operating Margin: Operating margin helps in assessing the operating income that is generated per unit currency of sales. This is found by dividing EBIT by sales. The operating profit margin indicates a firm's ability to generate profit on sales after paying the variable costs of production. In the graph plotted below, both upward and downward movements can be seen in both Pharmaceuticals and Chemicals Industry. For Pharmaceuticals Industry, in the year 2000 the median value is 10.75% and in the year 2018 the median value is 22.96%. The lowest OPM can be seen in 2005 at 8.39%. The median values in Pharmaceuticals industry suggest an overall inconsistent trend but more on the upward side in terms of operational profitability as the age of the company increases. But in case of the chemicals industry, the trend is not consistent at all.

Figure 22: Operating Profit Margin of Firms in Pharmaceutical and Chemicals Industry

6.2.1.4 Total Asset Turnover: This component represents the level of efficiency in utilising the assets. The total asset turnover ratio suggests how much efficiently a company utilises its total assets in generating revenues. A higher number of turnovers suggest more efficiency in generating revenues.
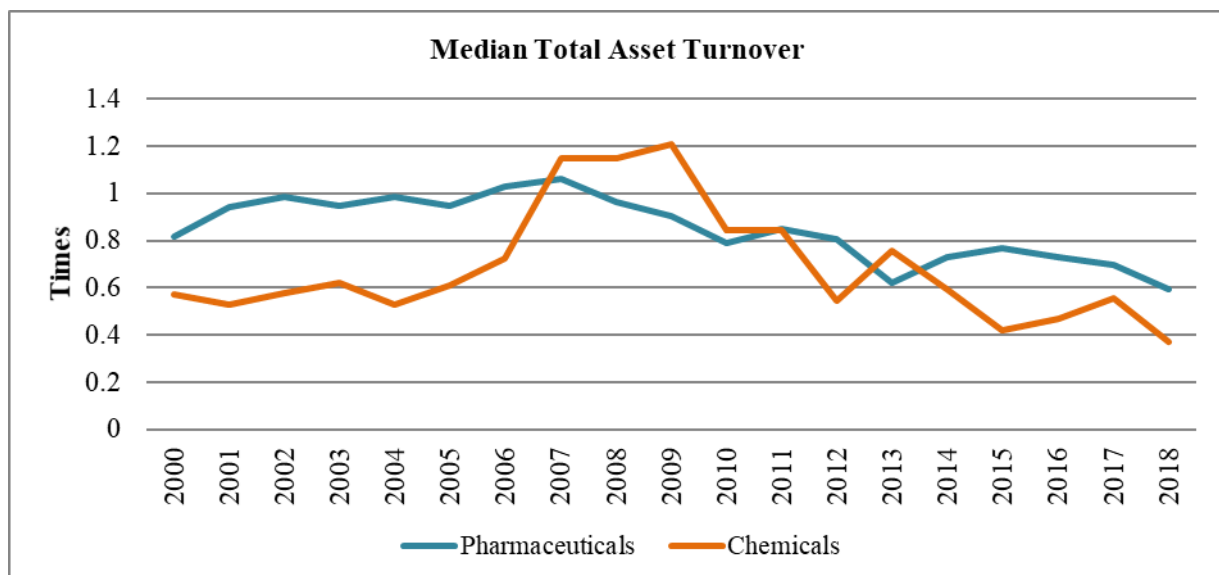
Figure 23: Total Asset Turnover of firms in Pharmaceutical and Chemical Industry

From the graph plotted above in can be understood that there is mostly a downward trend in the total asset turnovers of the firms in pharmaceutical industry. For chemicals industry the trend is a little more unstable but has been more on the downside for the recent years. This means, as the age of the companies increase, the efficiency has decreased. It means that the companies have not been able to utilise their existing level total assets in generating revenues in a satisfactory manner. There is mostly a downward trend in the recent total asset turnovers of the firms in pharm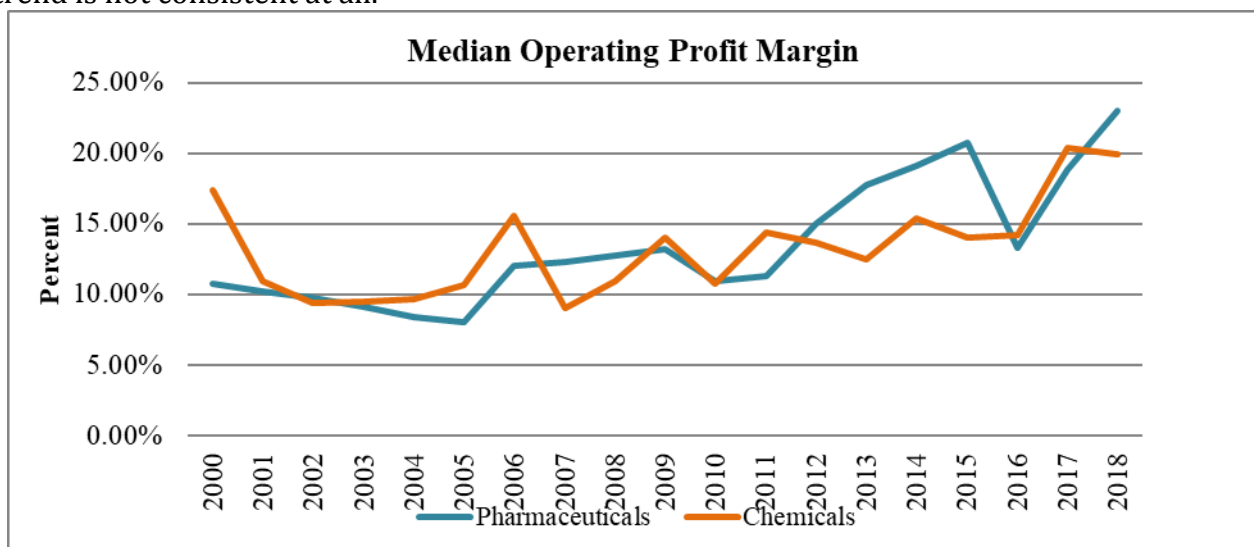aceutical and chemical industry both. This means, as the age of the companies increase, the efficiency has decreased over time.

6.2.1.5 Equity Multiplier: This component is an indication of the financial leverage in the capital structure of an entity. This is graphically plotted below based on the median values of the years:
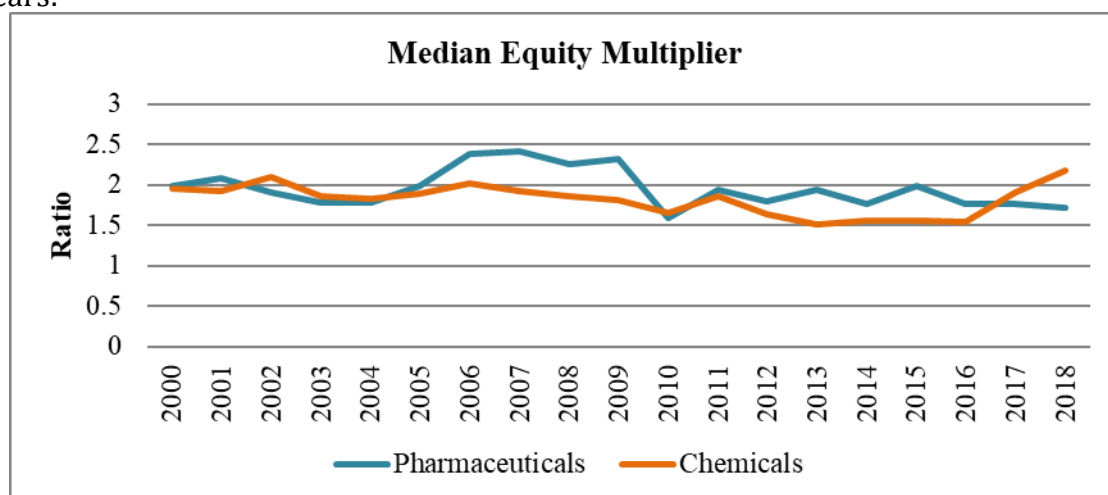
Figure 24: Equity Multiplier of Firms in Pharmaceuticals and Chemicals Industry

From the graph plotted above it can be seen that the financial leverage is comparatively high in the pharmaceutical industry for most of the years. In Chemicals industry, the trend is more stable than that of the pharmaceuticals industry. However, the graph shows that pharmaceutical firms are mostly more levered than the chemical firms. Usually, the more levered a firm is the more tax advantage it gets and the cost of capital is also lower. However, leverage comes with its own risks or possibilities of financial distress as well. Here for both

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the industries, the ratios are mostly above 1.5 and below 2.5 which indicates that the use of debt for buying assets is quite a lot.

6.3 Quartile Analysis:

6.3.1 Median BEP by CCC Quartiles: The data set has been first sorted in ascending order according to the years and then the values of Cash conversion cycles in ascending order. Each year's BEP is plotted with the respective values of the cash conversion cycle at a time. Finally, each year's Basic Earning Power (BEP) has been divided into four approximately equal quartiles. Then the median of those BEP from each quartile is calculated.

Technically, as CCC gets higher, BEP should be getting lower. That, means, CCC has a negative relationship with BEP. In this Median BEP by CCC quartiles, this relation has been seen as true in some cases and not in some cases. This means relationship between BEP and CCC do exist but it is not clear due to impact of some other factors and uneven timelines as the impact of other factors can't be controlled in quartile analysis. In this particular analysis, there is no constant pattern. Except for 2006, in almost all the years, 1st quartile has the highest BEP and 4th quartile has the lowest BEP in that year, but 2nd quartile and 3rd quartile don't maintain a consistent pattern. This shows that the negative relationship can be partially obtained.

Table 2: Median BEP by CCC Quartiles

(Percent)

Year	Cash Conversion Cycle Quartiles			
	Q1	Q2	Q3	Q4
	Shortest		Longest	
2000	18.41	12.75	3.83	11.08
2001	11.45	9.96	6.88	2.56
2002	5.27	6.44	13.62	2.96
2003	7.70	8.40	7.25	5.37
2004	10.05	8.81	6.29	6.50
2005	6.69	12.35	4.95	6.62
2006	7.97	11.93	9.22	8.11
2007	7.33	9.61	12.49	4.05
2008	8.40	14.97	11.07	5.42
2009	8.14	17.56	14.98	3.91
2010	12.54	12.31	7.65	4.65
2011	11.38	8.43	13.07	6.15
2012	8.75	9.70	9.55	7.94
2013	12.54	9.19	9.59	4.15
2014	13.62	12.53	13.82	7.04
2015	14.32	11.98	13.12	4.88
2016	14.59	13.74	14.84	3.77
2017	15.48	13.62	10.37	7.30
2018	14.25	9.64	9.45	4.40

6.3.2 Median BEP by Current Ratio Quartiles: The data set has been first sorted in ascending order according to the years and then the values of Current Ratio in ascending order. Each year's BEP is plotted with the respective values of the Current Ratio at a time. Finally, each year's Basic Earning Power (BEP) has been divided into four approximately equal quartiles.

Table 3: Median BEP by Current Ratio Quartiles

(Percent)

Year	Current Ratio Quartiles			
	Q1	Q2	Q3	Q4
	Lowest		Highest	
2000	3.54	10.80	15.00	8.52
2001	4.01	6.20	9.26	12.67
2002	4.48	4.89	12.00	9.37
2003	1.18	12.38	7.98	5.37
2004	3.51	6.29	11.91	8.04
2005	5.52	5.97	16.75	6.66
2006	8.85	6.29	14.63	8.11
2007	9.11	6.97	20.05	5.48
2008	9.76	8.67	17.27	13.06
2009	7.47	7.11	15.89	19.52
2010	6.14	7.13	7.10	12.02
2011	6.78	11.38	12.22	8.63
2012	7.51	8.55	13.35	10.27
2013	9.39	8.68	9.31	13.44
2014	11.85	14.43	10.60	13.82
2015	4.08	11.98	18.71	13.44
2016	6.74	13.90	7.15	6.74
2017	6.52	16.55	15.52	10.12
2018	5.12	15.10	10.82	9.49

Theoretically, Current Ratio has a negative relationship with BEP. An increase in current ratio means that more assets are being stocked up which in turns affects the BEP negatively. In the year 2006 and 2007 the 1st quartile shows a higher BEP and last shows a lower BEP, but the trend becomes opposite in the rest of the years and even in these years, there is inconsistency. To sum up, there is no such consistent pattern which means that relationship between BEP and current ratio exists but it is not clear due to impact of some other factors that can't be controlled in quartile analysis.

6.3.3 Median BEP by Quick Ratio Quartiles:
Table 4: Median BEP by Quick Ratio Quartiles

(Percent)

Year	Quick Ratio Quartiles			
	Q1	Q2	Q3	Q4
	Lowest			Highest
2000	3.54	12.62	12.75	8.52
2001	4.73	12.12	13.01	8.26
2002	6.44	12.00	5.32	6.27
2003	7.54	5.93	10.63	8.50
2004	4.34	7.08	6.30	15.01
2005	6.69	8.53	6.08	14.92
2006	7.97	8.07	11.75	14.44
2007	8.82	10.38	10.02	7.40
2008	5.44	11.91	11.07	17.18
2009	6.84	15.89	13.96	19.52
2010	5.18	9.79	7.10	18.30
2011	6.15	11.38	12.22	8.63
2012	7.53	9.39	11.72	10.27
2013	7.09	9.19	12.22	12.21
2014	11.36	12.53	10.60	17.21
2015	11.85	8.12	8.66	17.53
2016	6.74	10.67	5.16	14.84
2017	6.99	13.62	15.52	11.50
2018	6.28	7.63	10.31	10.08

From the quartile analysis above, it can be understood that Quick Ratio is supposed to have a negative relationship with BEP as an increase in quick ratio means that more liquid assets are being stocked up which in turns affects the BEP negatively by holding idle cash and cash equivalents. In this quartile analysis, there is no such consistent pattern which means that relationship between BEP and current ratio exists but it is not clear due to impact of some other factors that can't be controlled in quartile analysis. In some cases increase in quick ratio shows that BEP is also increasing, this can be as a result of any other variable which has a strong impact on BEP that can't be controlled in quartile analysis. In the year 2003 and 2007 the 1st quartile shows a higher BEP and 4th quartile shows a lower BEP, but the trend becomes opposite in the rest of the years and even in these years, there is inconsistency in the second and third quartiles.

Median BEP by ICP Quartiles: After sorting in ascending order according to the years and then the inventory conversion period, each year's BEP is plotted with the respective values of the ICP at a time. Finally, each year's Basic Earning Power (BEP) has been divided into four approximately equal quartiles and then the median of those BEP from each quartile is calculated to get the following table.

Technically, as ICP gets higher, BEP should be getting lower. In this analysis, in all the years, this trend is intact in case of 1st and 4th quartiles. In the 2nd and 3rd quartiles this trend seems to get inconsistent due to impact of some other factors which can't be controlled in quartile analysis.

Table 5: Median BEP by ICP Quartiles

(Percent)

Year	Inventory Conversion Period Quartiles			
	Q1	Q2	Q3	Q4
	Shortest			Longest
2000	13.65	11.26	7.53	11.08
2001	8.26	10.67	12.67	6.36
2002	10.05	3.54	13.62	6.05
2003	7.70	12.08	7.07	5.37
2004	10.05	6.59	7.85	6.50
2005	12.41	6.69	6.96	6.62
2006	11.51	8.85	10.15	6.27
2007	13.99	8.14	12.49	4.05
2008	13.33	10.94	13.20	5.42
2009	12.09	19.52	13.96	3.91
2010	12.54	8.58	7.65	4.65
2011	11.38	12.22	9.41	7.31
2012	8.64	10.41	8.87	7.44
2013	9.60	15.12	10.18	4.15
2014	18.40	13.82	12.78	5.28
2015	18.71	9.25	13.12	4.76
2016	16.13	13.90	6.74	5.27
2017	15.48	16.55	10.12	5.85
2018	18.74	12.22	6.19	4.97

6.3.5 Median BEP by DSO Quartiles:

Table 6: Median BEP by DSO Quartiles

(Percent)

Year	Days Sales Outstanding Quartiles			
	Q1	Q2	Q3	Q4
	Shortest			Longest
2000	13.65	13.07	7.53	-4.74
2001	12.06	11.92	7.81	4.78
2002	7.97	10.57	6.05	7.79
2003	8.84	12.38	5.93	-3.87
2004	10.04	13.44	5.79	4.91
2005	11.87	11.09	4.48	5.55
2006	7.97	11.93	9.22	8.11
2007	8.82	12.45	6.65	4.05
2008	14.51	10.30	8.63	13.20
2009	14.36	15.89	5.03	13.96
2010	16.39	6.71	7.22	7.00
2011	12.22	7.57	8.63	8.43
2012	13.03	9.38	8.08	9.55
2013	12.67	8.68	8.20	8.20
2014	16.44	14.43	9.93	9.16
2015	14.32	8.12	12.01	6.01
2016	16.13	5.27	13.74	6.74
2017	15.48	10.12	10.37	7.30
2018	17.47	7.95	6.57	8.37

After sorting in ascending order according to the years and then the Days Sales outstanding, each year's BEP is plotted with the respective values of the DSO at a time. Finally, each year's Basic Earning Power (BEP) has been divided into four approximately equal quartiles and then the median of those BEP from each quartile is calculated. As DSO gets higher, BEP should be getting lower. In this analysis, except for 2006, in all the years, this trend is consistent in case of the 1st and 4th quartiles. In case of the 2nd and 3rd quartiles this trend seems to get uneven due to impact of some other factors which can't be controlled in quartile analysis.

6.3.6 Median BEP by PDP Quartiles:

Table 7: Median BEP by PDP Quartiles

(Percent)

Year	Days Sales Outstanding Quartiles			
	Q1	Q2	Q3	Q4
	Shortest		Longest	
2000	-4.74	13.07	11.01	18.41
2001	5.40	12.25	9.68	8.26
2002	9.88	6.05	9.37	-1.54
2003	5.85	12.78	7.07	2.26
2004	13.44	6.38	4.22	5.09
2005	16.81	7.67	5.64	8.71
2006	13.50	6.04	8.85	4.93
2007	10.38	6.76	8.14	5.90
2008	10.94	12.17	8.00	11.07
2009	16.73	7.11	8.36	7.10
2010	12.54	6.06	7.65	6.59
2011	19.34	9.41	7.31	8.63
2012	8.69	10.69	8.66	10.15
2013	9.31	8.20	8.68	10.47
2014	11.71	12.53	11.17	14.43
2015	8.66	14.88	8.12	13.96
2016	8.00	9.75	6.74	14.59
2017	7.30	11.50	12.97	5.85
2018	9.23	7.58	7.63	17.84

As PDP gets higher, BEP should be getting higher as more payable deferral means that the payment to outside parties is delayed. A bigger PDP can result in a smaller CCC and in turns a bigger BEP. This trend has been consistent in the 1st and 4th quartiles of the year 2000, 2001,2008,2012,2013,2014,2015,2016 and 2018. The trend is opposite and in the rest of the years and inconsistent in the 2nd and 3rd quartiles of the previously mentioned ones. This inconsistency is a result of the impact of other variables on BEP which can't be minimised or controlled in this analysis.

6.4 Regression Analysis: The tables and graphs can show the impacts of single variables whereas the combined effects can be seen through regression. With the intention of finding out the impact of Working capital management on firm performance, regression analysis has been done with the help Stata software. For determining the perfect regression model for this panel data set, Hausman test has been used to see whether fixed effect or random effect regression should be used.

The regression equation is as follows based on the hypotheses to be tested:

$$BEP_{it} = \alpha_{it} + \beta_1 WC_{it} + \beta_2 Ln\ TA_{it} + \beta_3 Age_{it} + \beta_4 FATO_{it} + \beta_5 Spon_{it} + \varepsilon_{it}$$

Where, BEP = Basic Earning Power

    α = Constant

    WC= Working Capital Indicator; can be either of the following:

CCC = Cash Conversion Cycle, Cur_ratio = Current Ratio, Quick_ratio = Quick Ratio, DSO = Days Sales Outstanding, ICP= Inventory Conversion Period, PDP= Payable Deferral Period, Ln TA = Log of Total Assets, Age = Age of the company, FATO = Fixed Asset Turnover, Spon = Sponsor Shareholding , β_1= the degree of change in BEP for every 1unit of change in Working Capital Indicator, β_2= the degree of change in BEP for every 1unit of change in the log of total assets, β_3= the degree of change in BEP for every 1unit of change in the age of the company, β_4= the degree of change in BEP for every 1unit of change in the Fixed Asset Turnover of the company , β_5= the degree of change in BEP for every 1unit of change in the Sponsor Shareholding of the company

    ε=Residual

    i = Firm

    t = Time

6.4.1 Hausman Test: While analysing panel data, Hausman test is used to see if fixed effects model or random effects model is appropriate for the data set. If the p value > 0.05 then random effect model is selected. If p value < 0.05 then fixed effect model is selected. If random effects model gets selected then the alternative hypothesis is rejected and vice versa.

Table 8: Hausman Test Results

	Coefficients			
	(b) fixed	**(B) random**	**(b-B) Difference**	**Sqrt(diag(V_b-V_B)) S.E**
Ln_TA	-.0336312	-.0004836	-.0331476	.0051914
Age	.006166	.0007014	.0054646	.0009096
CCC	-.0000616	-.0000688	.00000711	-
FATO	.0001867	.003753	-.0035664	.0006852
Spon	-.0201086	-.0314682	.0113596	.0092925

The Hausman test for this panel data set indicates that Prob>chi2 = 0.0000 so Fixed Effect Regression model should be used and the Null Hypotheses are rejected.

6.4.2 Fixed-effects (within) regression: Fixed effect regression rejects the null hypothesis and selects the alternative hypothesis. In this study, six different variables have been used as an indicator of Working capital and he regression analyses are as follows:

Testing Impact of CCC on BEP: To test out if the impact of working capital management and firm performance, CCC is considered as the explanatory variable. The following fixed-effects (within) regression shows that for impact of CCC on Basic Earning Power (BEP) at confidence intervals of 95% and 90% both, Log of Total Assets (Ln TA), Cash Conversion Cycle (CCC), Age have been found to be significant in explaining the variation in BEP of Pharmaceutical and Chemical Industry. The F value = 0.0000 which is less than 0.05 and .10 and hence the model is statistically valid in 95% and 90% level of confidence.

Table 9: Fixed Effect Regression Estimates on BEP (CCC as an indicator of WC)

Variable	Coefficient	t	P>|t|
Ln TA	-.0336312	-4.94	**0.000**
Age	.006166	5.70	**0.000**
CCC	-.0000616	-4.35	**0.000**
FATO	.0001867	0.11	0.916
Spon	-.0201086	-0.75	0.451
Govt	0 (omitted)		
_Cons	.2178865	6.45	**0.000**
R-sq		F (5,288)	14.09
Within	0.1965	**Prob>F**	**0.0000**
Between	0.0317	Number of Observations	323
Overall	0.0020	Number of Groups	30

Regression shows that CCC and BEP have negative correlation for the firms of Pharmaceuticals & Chemicals industry. The relationship is significant as p value is less than .05. Here R square is 0.2% which indicates the 0.2% change in BEP can be explained by the changes in independent variable. Age has positive impact on BEP and is statistically significant. This means the firms become more efficient as they age. Ln TA has negative relationship with BEP and the impact is also statistically significant. It means as the companies grow bigger, they fail to enjoy economies of scale. FATO has a positive relationship with BEP but the relationship is insignificant. Sponsor shareholding has a negative impact on BEP and the impact is insignificant. The constant has a positive impact and is significant in a sense that there might be unobserved variables that have a great positive impact such as good CEO, goodwill, efficient human resources etc.

Further to CCC the following indicators have also been used:

Impact of Current Ratio on BEP: To test out if there is a negative impact of current ratio on BEP, the following regression analysis has been conducted. The following fixed-effects (within) regression shows that for impact of current ratio on Basic Earning Power (BEP) at a confidence interval of 95% only FATO and at 90% age along with FATO have been found to be significant in explaining the variation in BEP of Pharmaceutical and Chemical Industry. The F value = 0.0007which is less than 0.05 and .10 and hence the model is statistically valid in 95% and 90% level of confidence.

Table 10: Fixed Effect Regression Estimates on BEP (Current Ratio as an indicator of WC)

BEP	Coefficient	t	P>|t|
Age	0025331	1.72	0.086
Ln TA	-.0100333	-1.05	0.295
FATO	.005652	3.46	**0.001**
Cur_Ratio	-.003437	-1.12	0.264
Spon	.0236622	0.55	0.586
_Cons	.087651	1.78	0.077
R-sq		F (5,347)	4.35
Within	0.0590	Prob>F	**0.0007**
Between	0.0390	Number of Observations	383
Overall	0.0555	Number of Groups	31

Regression shows that Current Ratio and BEP have negative correlation for the firms of Pharmaceuticals & Chemicals industry. The relationship is insignificant as p value is greater than .05. Here R square is 5.55% which indicates the 5.55% change in BEP can be explained by the changes in independent variables.

FATO has a positive relationship with BEP but the relationship is significant as the p value is less than 0.05. It means that increase in the utilisation of fixed assets helps in increasing BEP. Age has a p value less than .10 which makes it significant at 90% confidence level. Sponsor shareholding, age and constant have a positive but insignificant relationship whereas Ln TA has a negative insignificant relationship with BEP.

Impact of Quick Ratio on BEP:

Table 11: Fixed Effect Regression Estimates on BEP (Quick Ratio as an indicator of WC)

Variable	Coefficient	t	P>|t|
Age	.0024915	1.69	0.091
Ln TA	-.0097595	-1.01	0.312
FATO	.0058073	3.57	**0.000**
Quick_Ratio	-.0028939	-0.64	0.525
Spon	.0306731	0.71	0.477
_Cons	.079132	1.62	0.106
R-sq		F (5,347)	4.17
Within	0.0567	Prob>F	**0.0011**
Between	0.0541	Number of Observations	383
Overall	0.0657	Number of Groups	31

To test out if there is a negative impact of quick ratio on BEP; the following regression analysis has been conducted. The following fixed-effects (within) regression shows that for impact of quick ratio on Basic Earning Power (BEP) at a confidence interval of 95% only FATO and at 90% age and FATO have been found to be significant in explaining the variation in BEP of Pharmaceutical and Chemical Industry. The F value = 0.0011 which is less than 0.05 and .10 and hence the model is statistically valid in 95% and 90% level of confidence.

Regression shows that Quick Ratio and BEP have negative correlation for the firms of Pharmaceuticals & Chemicals industry. The relationship is insignificant as p value is greater

than .05. Here R square is 6.57% which indicates the 6.57% change in BEP can be explained by the changes in independent variables.

FATO has a positive relationship with BEP but the relationship is significant as the p value is less than 0.05. It means that increase in the utilisation of fixed assets helps in increasing BEP. Age has a p value less than .10 which makes it significant at 90% confidence level. Sponsor shareholding, age and constant have a positive but insignificant relationship whereas lnta has a negative insignificant relationship with BEP.

Impact of DSO on BEP: The following fixed-effects (within) regression shows that for impact of DSO on Basic Earning Power (BEP) at a confidence interval of 95% DSO along with FATO have been found to be significant in explaining the variation in BEP of Pharmaceutical and Chemical Industry. The F value = 0.0000 which is less than 0.05 and hence the model is statistically valid.

Table 12: Fixed Effect Regression Estimates on BEP (DSO as an indicator of WC)

Variable	Coefficient	T	P>|t|
Age	.0026456	1.83	0.068
Ln TA	-.0067632	-0.72	0.475
FATO	.0052321	3.26	**0.001**
DSO	-.0002235	-3.78	**0.000**
Spon	.0181091	0.44	0.659
_Cons	.0741153	1.55	0.123
R-Sq		F (5,345)	7.08
Within	0.0930	**Prob>F**	**0.0000**
Between	0.0719	Number of Observations	381
Overall	0.0915	Number of Groups	31

Regression shows that DSO and BEP have negative correlation for the firms of Pharmaceuticals & Chemicals industry. This means that increase in DSO decreases BEP which is in line with the alternative hypothesis. The relationship is significant as p value is less than .05. Here R square is 9.15% which indicates the 9.15% change in BEP can be explained by the changes in independent variables. Fato has a positive relationship with BEP and the relationship is significant as the p value is less than 0.05. It means that increase in the utilisation of fixed assets helps in increasing BEP. Sponsor shareholding, age and constant have a positive but insignificant relationship whereas lnta has a negative insignificant relationship with BEP.

Impact of ICP on BEP: The following fixed-effects (within) regression shows that for impact of ICP on Basic Earning Power (BEP) at a confidence interval of 95% ICP and FATO are significant have been found to be significant in explaining the variation in BEP of Pharmaceutical and Chemical Industry. The F value = 0.0002 which is less than 0.05 and hence the model is statistically valid.

Table 13:Fixed Effect Regression Estimates on BEP (ICP as an indicator of WC)

Variable	Coefficient	T	P>|t|
Age	.0019146	1.28	0.200
Ln TA	-.007118	-0.74	0.462
FATO	.005453	3.35	**0.001**

ICP	-.0000652	-2.15	**0.032**
Spon	.0447445	1.08	0.279
_Cons	.0796615	1.64	0.102
R-Sq		F (5,345)	5.03
Within	0.0680	**Prob>F**	**0.0002**
Between	0.1153	Number of Observations	381
Overall	0.1059	Number of Groups	31

Regression shows that ICP and BEP have negative correlation for the firms of Pharmaceuticals & Chemicals industry. This means that increase in ICP decreases BEP which is in line with the alternative hypothesis. The relationship is significant as p value is less than .05. Here R square is 10.59% which indicates the 10.59 % change in BEP can be explained by the changes in independent variables.
FATO has a positive relationship with BEP and the relationship is significant as the p value is less than 0.05. It means that increase in the utilisation of fixed assets helps in increasing BEP. Sponsor shareholding, age and constant have a positive but insignificant relationship whereas Ln TA has a negative insignificant relationship with BEP.

Impact of PDP on BEP:
Table 14: Fixed Effect Regression Estimates on BEP (PDP as an indicator of WC)

Variable	Coefficient	t	P>|t|
Age	.0024065	1.63	0.104
Ln TA	-.0087132	-0.89	0.372
FATO	.0057928	3.55	**0.000**
PDP	-.0000125	-1.04	0.297
Spon	.0344202	0.83	0.409
_Cons	.0707042	1.43	0.154
R-Sq		F (5,345)	4.28
Within	0.0584	**Prob>F**	**0.0009**
Between	0.0806	Number of Observations	381
Overall	0.0854	Number of Groups	31

The following fixed-effects (within) regression shows that for impact of PDP on Basic Earning Power (BEP) at a confidence interval of 95 only FATO has been found to be significant in explaining the variation in BEP of Pharmaceutical and Chemical Industry. The F value = 0.0009 which is less than 0.05 and hence the model is statistically valid. Regression shows that PDP and BEP have negative correlation for the firms of Pharmaceuticals & Chemicals industry. This means that increase in PDP decreases BEP which is not in line with the alternative hypothesis. The relationship is not significant as p value is less than .05. This means the effect of any other variable or any unobserved variation caused the effect to show opposite direction. Here R square is 8.54% which indicates the 8.54 % change in BEP can be explained by the changes in independent variables. FATO has a positive relationship with BEP and the relationship is significant as the p value is less than 0.05. It means that increase in the utilisation of fixed assets helps in increasing BEP. Sponsor shareholding, age and constant have a positive but insignificant relationship whereas Ln TA has a negative insignificant relationship with BEP.

7. Major Findings of the research:

DSO has a negative impact which means that the more days a firm needs to collect payment for sales, the less the BEP will be. ICP on the other hand is also affecting negatively as holding inventory for a long time reduces the profitability of a business. Based on different scenarios of testing alternative hypotheses, fixed asset turnover has been found to be significant in almost all cases. CCC has a negative impact on BEP which means, as CCC grows bigger, BEP reduces. More utilisation of fixed assets to generate revenues results in greater BEP as per the findings. The study also reveals that the companies fail to enjoy economies of scale as they grow bigger and because of this Ln TA shows a negative relation with BEP. The companies seem to become more efficient as they age and age has a positive correlation with BEP under all scenarios. DSO has a negative correlation which means that the more days a firm needs to collect payment for sales, the less the BEP will be. The impact of unobserved variables causes the trends to become inconsistent in quartile analyses. The impact of payable deferral period is seen to be opposite than expected because of unobserved variations. However, the result of the test becomes insignificant. The summary of the regression analyses are given below in the table:

Table 15: Summary of Regression Variables

Variable	Expected Sign	Actual Sign	Significance
Age	Positive	Positive	Significant in most cases
Ln TA	Positive	Negative	Insignificant in most cases
CCC	Negative	Negative	Significant
Current Ratio	Negative	Negative	Insignificant
Quick Ratio	Negative	Negative	Insignificant
DSO	Negative	Negative	Significant
ICP	Negative	Negative	Significant
PDP	Positive	Negative	Insignificant
Sponsor Shareholding	Positive	Positive	Insignificant

Therefore, the study reveals that working capital management has significant impact on firm performance. The firms having good working capital management records show better firm performance.

8. Conclusion and Policy Implication:

The major objective of this study was to analyse the working capital practices and the impact of that on the operating performance of the companies in the Pharmaceuticals and Chemicals Industries listed in Dhaka Stock Exchange. The major findings of the study indicate that working capital management has significant impact on firm performance. The firms having good working capital management records show better firm performance. Variables like cash conversion cycles, days sales outstanding, inventory conversion periods and age of the company have proven to be significant in most the cases. Based on the study can be said that this study is going to be helpful for investors as it emphasises investing in firms with better mechanisms for working capital management. The stakeholders of companies will also be benefitted by this study as this study deals in depth with the impacts of working capital variables on the operating performance of the firms in Pharmaceuticals and Chemicals Industry. Stakeholders like, corporate managers, employees, policymakers and regulators, analysts and investors will be able to evaluate the impact of working capital management on firm performance based on this study. To conclude it can be said that, this study can also serve the purpose of being a secondary source of information for the upcoming researchers.

In this way, scopes for further research in this field will be created and more contribution could be made to the existing knowledge base.

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