The use of Dupont Model in the Analysis of the Company's Performance : A Case Study

SAIDI Ahlam*

Laboratoire: les Méthodes Quantitatives dans les sciences Economiques et les sciences Managériales et ses Application pour le Développement Durable « MQEMADD »

Ziane Achour University – Djelfa - (Algeria)

sahlem60@yahoo.com

BENMOUFFEKI Ali

Laboratoire: les Méthodes Quantitatives dans les sciences Economiques et les sciences Managériales et ses Application pour le Développement Durable « MQEMADD »

Ziane Achour University – Djelfa - (Algeria)

benmouaffeki@univ-djelfa.dz

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Abstract :

This study aimed to identify the extent to which Algerian corporations are aware of the importance of using appropriate mechanisms and methods when evaluating their performance, in addition to knowing the obstacles that prevent them from owning these mechanisms. The study relied on the DuPont model, which is an analysis that measures the company's performance and shows changes, if they occur, and whether they are good or bad. The model is based on the analysis of Return on Equity (ROE) & Return on Investment (ROI).

In order to achieve the objectives of the study, it was relied on a case study of an economic corporation acting at the level of the state of M'sila, where several results were reached, the most important of which is that there is a clear awareness of the importance of performance analysis in maintaining the corporation continuity, with a lack of use of some modern methods of analysis such as the DuPont model

Keywords: Return on Equity, Return on Investment, Financial Performance, Financial Analysis.

JEL classification codes: G33 ; G21

* ***Corresponding author: SAIDI Ahlam, sahlem60@yahoo.com.***

Introduction

A successful business must be both effective and efficient. Efficiency relates the results obtained to the means implemented. From a financial point of view, we talk about profitability to measure the efficiency of a business. Profitability is the ability of a business to generate profit. The information transmitted by the profitability calculation does not have the same meaning depending on whether you are a partner or an executive. This is why two indicators are calculated: economic profitability, which primarily interests managers, and financial profitability that mainly interests the shareholders.

Whether it comes to economic profitability or financial profitability, performance evaluation remains an essential task for the company for its ability to continue its activity and face competition, especially with the increased risks in recent years due to the spread of the Corona pandemic.

It is necessary to monitor performance, because it is a source of growth, development and excellence. Monitoring performance is a great way to quickly spot underperformance and put action plans in place to improve.

1.The problematic of the study: Based on the above, this study seeks to answer the following main question: **To what extent are Algerian economic corporations aware of the importance of evaluating financial performance? And what are the adopted mechanisms?**

To address this problematic, the following sub-questions can be asked :

- What is meant by financial analysis and what is its relationship to measuring and evaluating financial performance ?
- What is Dupont model ? and what is its role in financial analysis and the prediction of the financial performance of enterprises ?
- How aware is the institution under study of the importance of using modern methods in financial analysis?

2.Study Hypotheses: In order to answer the main problem of the study and its sub-questions, the following hypotheses were put forward:

- Financial analysis is a key element in measuring and evaluating the financial performance of a corporation
- The Dupont model plays a key role in the financial analysis and forecasting of the financial performance of the corporation
- There is awareness among the Algerian economic corporation of the importance of using modern methods in financial analysis.

3.The importance of the study: The importance of this study lies in clarifying the impact of using modern methods of financial analysis such as the DuPont model in analyzing and evaluating the performance of the corporation and predicting its future status.

4.Study scope and methodology :

The research paper covers both theoretical and empirical parts. The theoretical side includes defining the financial performance, financial analysis and DuPont model. While, the empirical side includes the study of financial performance values, such as the return on assets (ROA), and the return on equity (ROE). Different materials, articles, reports, and sites have been used to assist the research paper.

Thus the proposed study attempts:

- To define the financial performance values according to the suggested model.
- To measure financial performance values according to DuPont model.
- To show the awareness of the corporation under study of the importance of performance measurement.

I. Financial analysis and performance measurement:

Financial Statement Analysis is a method of reviewing and analyzing a company's accounting reports (financial statements) in order to gauge its past, present or projected future performance. This process of reviewing the financial statements allows for better economic decision making. (Mashkour, 2018). As it is known, the the main goal of a company is the generation of profit and maximization of shareholders' equity.

The appropriate performance measurement must quantify the effectiveness with which a firm meets the needs of its customers, in other words it does the "right thing". In order the firm to survive and prosper must serve its customer with profit which means that it has to use its resources efficiently and operate economically i.e. "It does things right" (Courtis, 2003).

II. Concept of the DuPont Model:

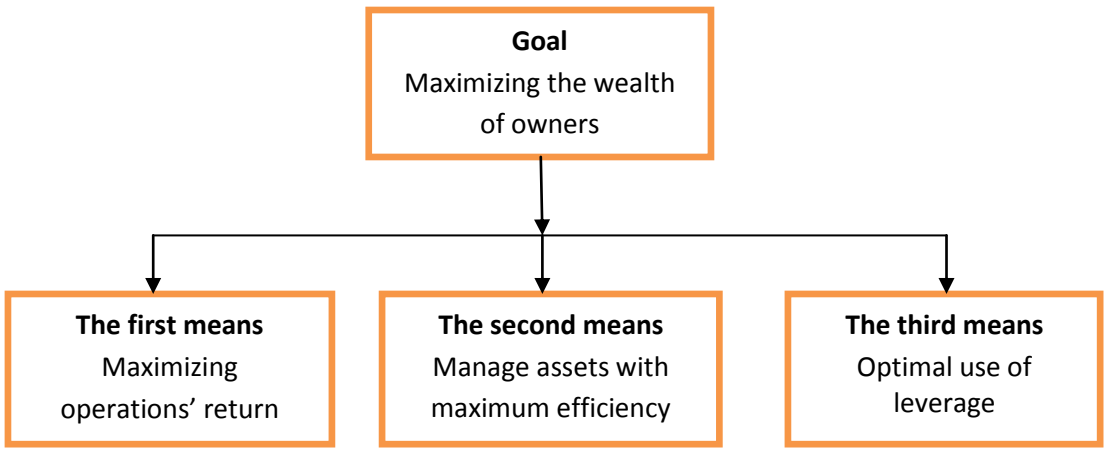
For any business in the private sector there are numerous of models to describe how well the business is running. Among these, there is the DuPont model. In the 1960s, DuPont de Nemours Company created a system based on ratio analysis that allows it to quickly determine whether a company is using all the means at its disposal to achieve its financial objective.

The financial objective of any company should be to maximize the wealth of the shareholders. Thus, it can be said that a company whose shareholders' wealth increases according to the risk they bear is a company that is financially healthy. As for the means that it uses to achieve this goal, they can be summarized in three types:

- Maximizing operations return;
- Manage assets with maximum efficiency;

❖ Optimal use of leverage.

Figure 01 Means of Maximizing the Wealth of Owners



Source : By the researchers based on past litterature

DuPont Model is used to evaluate the component parts of a company's return on equity (ROE). This allows the investor to identify the financial activities that contribute the most to changes in return on equity (ROE). An investor can use such an analysis to compare the operational efficiency of two similar companies. Managers can also use DuPont analysis to identify strengths and weaknesses that need to be addressed.

1.DuPont model illustration

1.1.The basic model (level 1):

The rate of return on equity is undoubtedly the best accounting indicator for measuring the level of owners' wealth increase.

The basic DuPont model consists of the following formula :

$$ROE = Net\ Profit\ Margin \times Assets\ Turnover \times Equity\ Multiplier$$

When we represent theses elements as ratios, we get :

$$ROE = \frac{Net\ Income}{Sales} \times \frac{Sales}{Average\ Assets} \times \frac{Average\ Assets}{Shereholders'\ Equity}$$

The first ratio corresponds to the equation of Net profit margin ratio $\frac{Net\ Income}{Sales}$, which is considered as the best accounting indicator for measuring the overall profitability of operations. The second corresponds to the equation of Assets turnover $\frac{Sales}{Average\ Assets}$, is the best way to measure the efficiency of managing all assets and to calculate the turnover of each monetary unit invested in the

assets. And the third ratio provides the same information as that conveyed by the debt ratio, the equation is $\frac{Total\ Debt}{Total\ Assets}$. The last ratio, called "leverage", reflects the degree to which debt is used to finance the assets in place. The higher the value of this ratio, the higher the value of the assets compared to equity, and with a simple logical conclusion, the higher the level of debt. In this case the focus is on optimising leverage rather than maximizing it. The massive use of debt is a double-edged sword. Of course, it can increase the profitability of equity, which in turn increases the risk of bankruptcy (Yahia, 2020/2021).

1.2.Interpretation of DuPont Model :

With the DuPont method, when we analyze the ROE, we can deduce the aspect of the management of the company that has a positive or negative impact on this ratio. Also, the comparison with a benchmark company in order to position itself against the competition can be based on a triple comparison. We will then have to interpret the deviation from the norm through the differences that exist between the three components of the company's ROE and those of the industry's average ROE. If the ROE of the analyzed company is higher than that of the benchmark company, we can conclude that it stands out from the competition by a higher profitability for one of the following reasons, or by the conjunction of all these reasons (Sedzro, 2019) :

- The company can afford a higher net profit margin without losing market share, probably because it differentiates itself from the competition by offering a better quality product, a service more valued by its customers, a brand image more connected, etc.
- The company can achieve high asset turnover because its turnover is substantial enough to reflect more efficient use of assets than the competition.
- The third ratio is leverage, which is the ratio of total assets to equity. The higher this ratio, the lower the share of equity in the financing of company assets. The heavy use of debt has a dual purpose: reducing the weighted average cost of capital (WACC) and increasing the return on equity.

Thus, it becomes clear that the institution whose net margin, asset turnover rate and leverage effect are at their maximum will be in a comfortable financial position and will inevitably reach its established goal of maximizing the wealth of owners. But if we look closely, an important observation can be reached, which is that the relationship between the lined goal and the means used is not only logical, but also mathematical. Because in the case of calculating the product of the net margin rate, the asset turnover rate and the financial leverage rate, we get the rate of (ROE).

This is a major conclusion. First, we now know that the effect of the means used on the goal is not cumulative, but multiplier. Second, we can accurately measure the effect of the use of any method by the managers on the profitability of the owners in order to improve the financial performance of the company. It would be possible, for example, to measure the effect of selling a not necessary fixed asset in order to reduce debt on the profitability of equity But it is not only the owners who are interested in diagnosing the company but everyone who has a relationship with it, such as suppliers, banks who are particularly interested in the profitability of all invested capital. Thus, we are facing the return on assets (ROA) (Yahia, 2020/2021).

$$ROA = \frac{Net\ Income}{Sales} \times \frac{Sales}{Total\ Assets} = \frac{Net\ Income}{Total\ Assets}$$

Economic profitability (ROA) is an indicator that measures the extent of the firm's ability to create value. It allows measuring the performance of total economic resources regardless of their source and method of financing. The economic profitability ratio allows us to know whether the enterprise is able to generate revenue in its current business from the sources of financing available to it. In other words, has the entity been able to generate compensation for its used capital or not.

If the (ROA) is negative, this means that the corporation is not able to continue and has to find solutions quickly if it does not want to go into bankruptcy. But if the (ROA) is better, this means that the performance of the corporation is good. With the necessity of always comparing the corporation under study with its counterparts from the same sector. It is a good indicator of the efficiency of the corporation, yet it is not used much in the decision-making process because it does not take into account the risk factor (Yahia, 2020/2021).

So the rate of (ROA) measures the return of all financiers, whether they are owners or creditors, while the rate of (ROE) only measures the return of owners. As we note that the difference between the two rates is only the effect of financial leverage. The leverage effect explains a company’s return on equity in terms of its return on capital employed and cost of debt (LeFur, 2005).

$$ROE = ROA \times Effect\ of\ Financial\ Leverage$$

Financial leverage reflects the effect of an increase in the level of (ROE) as a result of the increase in the volume of debt. The previous equation takes the following form (Bruslerie, 2010):

$$ROE = \left[ROA + (ROA - i) \times \frac{D}{E}\right] \times (1 - T)$$

Where :

$D = Debts$
$E = Equity$
$i = Interest\ rate$
$T = Tax$
$NI = Net\ Income$
$IBIT = Income\ Before\ Interest\ and\ Tax$

$$ROE = \frac{NI}{E} = \frac{IBIT - Interest - Tax}{E} = \frac{IBIT - Di - (IBIT - Di)T}{E} = \frac{(IBIT - Di)(1 - T)}{E} \times \frac{T.Assets}{T.Assets}$$

$$= \left(\frac{IBIT \times T.Assets}{T.Assets \times E} - \frac{Di \times T.Assets}{T.Assets \times E} \times (1 - T)\right.$$

$$ROE = \left[\left(\frac{D + E}{E}\right) - \frac{Di}{E}\right] \times (1 - T) = \left[ROA\left(1 + \frac{D}{E}\right) - \frac{Di}{E}\right] \times (1 - T)$$

$$\Rightarrow \boldsymbol{ROE = \left[ROA + (ROA - i) \times \frac{D}{E}\right] \times (1 - T)}$$

1.3.DuPont model (level 2)

The model we have seen so far is called the DuPont Level 1 system, because it only allows us to make an overall diagnosis and, if possible, identify the major problem(s). Thus, we can note, for example, that the (ROE) is weak only because the efficiency of asset management (asset turnover) is weak. Here it comes to a level one diagnosis. In order to make a more accurate diagnosis, (the level two), the turnover ratio of each component of the assets owned by the company must be calculated in order to identify the asset or assets that cause(s) the problem, as it is showen in the following figure.

Figure 02 DuPont Model Level Two

Return On Equity (ROE)

Net Income	×	Assets Turnover	×	Financial Leverage
Analysis of operating margin and its components: • operating margin • Gross profit margin • operating expenses on sales		**Asset management efficiency analysis :** • In the short term (turnover and collection period for customer accounts, and inventory turnover). • In the long term (fixed asset turnover)		**Debt Management Analysis and Risk of Insolvency:** • Financial risk • Risk of insolvency

Source : Louise St-Cyr & al, **L'Analyse Financière à L'aide des Ratios : Le Modèle de DuPont**,

From the above figure, we notice that the operating margin shows the relationship between the operating earnings (which is the earnings before interest and tax (IBIT)) and sales i.e. $\frac{IBIT}{Sales}$. The gross profit margin ration is equal to $\frac{Gross\ Profit}{Sales}$, and the last ratio $\frac{Operating\ Expenses}{Sales}$.

As far as the asset management efficiency is concerned, and in order to judge the effectiveness of the day-to-day management of financial operations, the pace of inventory flow remains a crucial element. To know the efficiency of a company's inventory management, we calculate the inventory turnover ratio which is equal to $\frac{Cost\ of\ goods\ sold}{Average\ stock}$. In addition to that, the accounts receivable turnover ratio, used in calculating the payback period, is as important as the ratio involving inventory. it is equal to $\frac{Sales}{Accounts\ receivable}$. It affects a company's efficiency in two ways. First, in the event that the company under study does not tolerate its customers and therefore a rapid turnover rate could impede the development of the company's business and even negatively affect its profitability. In the case of great leniency with customers, the turnover rate is weak and can lead the company to deal with unreliable customers (LeFur, 2005).

Finally, concerning the financial leverage, and its use in debt management and the risk of default, we notice that the corporations' resort to debt has several benefits, including the owners paying the interests to creditors, and since these debts are considered of a low degree, they have a lower cost than the cost of equity. In addition, interests are deducted for tax purposes. But it should also not be neglected that resorting to debt leads to the existence of financial risk and the risk of default. Financial risk here means the fluctuation of net profits as a result of the use of debts. The leverage ratio is equal to $\frac{Total\ Assets}{Equity}$.

1.4.Advantages and disadvantages of the DuPont Model

1.4.1.Advantages

The main advantage of DuPont's analysis is the more complete picture of a company's overall financial health and performance that it provides, compared to more limited stock assessment tools (Smirnov).

- The model can be used by the purchasing department or the sales department of a company to demonstrate why, for example, economic profitability has increased or decreased;
- Compare companies with each other;
- Analyze changes over time;
- Teach anyone interested in financial analysis the basics and how these can impact business results;
- Show the impact of the professionalization of the purchasing function.

1.4.2.Disadvantages

The main drawback of the DuPont model is that it relies heavily on accounting data from a company's financial statements, some of which can be manipulated by companies, so they may not be accurate.

III. The Case of SAIDAL Group:

1.An overview of the Group:

In order to achieve the main goal of this study, data was collected for the Group Saidal. Saidal is an Algerian pharmaceutical group created in 1982, with a share capital of 2,500 BAD (Billion Algerian Dinar). The main mission of the Group is the development, production and marketing of pharmaceutical products for human and veterinary use. The share capital is controlled by the Algerian state (80%).The remaining 20% of free float is held by private Algerians (16%) and by Algerian institutions (4%). It achieved a turnover of 10,223 BAD in 2016 and employs a staff of 3,061 agents.

The group's portfolio is made up of:

- of 8 production units
- 3 business units of a 100% subsidiary
- of 9 participations of which only one majority.

The data consists of five variables, namely: Net Income, Sales, Total Assets, Shareholders' Equity, Total Debts. The collected data covers the period of five years, from 2016 to 2020. The data was collected from the published financial statements (i.e. : Balance sheet and Income statement) of the Saidal Group on its internet site.

The unit of measure of the variables is either dinar amounts or percentages.

2.Data & Analysis

Table 01
Data from the Saidal Group Financial Statements

	2016	2017	2018	2019	2020
Net Income	1 509 161 605,06	1 376 295 647,88	1 174 214 390,98	793 514 004,08	189 936 341,33
Sales	10 489 075 107,79	9 707 567 809,90	10 589 699 874,49	10 478 685 942,18	10 074 461 229,38
Total Assets	46 390 536 657,41	48 318 944 590,23	48 003 913 701,49	40 434 178 877,27	40 687 550 476,43
Shareholders' Equity	27 464 009 197,27	27 931 531 057,74	28 369 775 097,27	21 776 278 416,42	22 234 554 786,95
Total Debts	18 926 527 460,14	20 387 413 532,49	19 634 138 604,22	18 657 900 460,85	18 452 995 689,48

Source : Saidal Group Financial Statements period : 2016 - 2020

2.1.Return On Equity

Return on equity (ROE) is a measure of financial performance calculated by dividing net income by shareholders' equity.

Table 02 Calculation of Return On Equity (ROE)

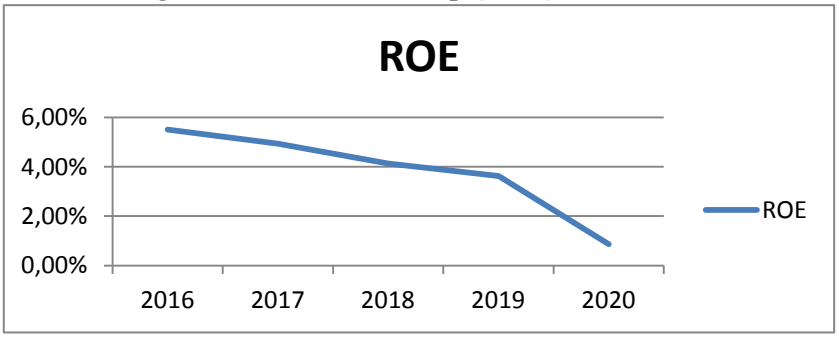
$$ROE = \frac{Net\ Income}{Sales} \times \frac{Sales}{Total\ Assets} \times \frac{Total\ Assets}{Shareholders'Equity}$$

ROE_{2016}	$\frac{1\ 509\ 161\ 605,06}{10\ 489\ 075\ 107,79} \times \frac{10\ 489\ 075\ 107,79}{46\ 390\ 536\ 657,41} \times \frac{46\ 390\ 536\ 657,41}{27\ 464\ 009\ 197,27}$	14,39 % × 22,61% × 1.69	5,5 %
ROE_{2017}	$\frac{1\ 376\ 295\ 647,88}{9\ 707\ 567\ 809,90} \times \frac{9\ 707\ 567\ 809,90}{48\ 318\ 944\ 590,23} \times \frac{48\ 318\ 944\ 590,23}{27\ 931\ 531\ 057,74}$	14,18% × 20,10% × 1.73	4.93 %
ROE_{2018}	$\frac{1\ 174\ 214\ 390,98}{10\ 589\ 699\ 874,49} \times \frac{10\ 589\ 699\ 874,49}{48\ 003\ 913\ 701,49} \times \frac{48\ 003\ 913\ 701,49}{28\ 369\ 775\ 097,27}$	11,09% × 22,06% × 1,69	4.13 %
ROE_{2019}	$\frac{793\ 514\ 004,08}{10\ 478\ 685\ 942,18} \times \frac{10\ 478\ 685\ 942,18}{40\ 434\ 178\ 877,27} \times \frac{40\ 434\ 178\ 877,27}{21\ 776\ 278\ 416,42}$	7,57% × 25,91% × 1,85	3.63 %
ROE_{2020}	$\frac{189\ 936\ 341,33}{10\ 074\ 467\ 229,38} \times \frac{10\ 074\ 461\ 229,38}{40\ 587\ 550\ 476,43} \times \frac{40\ 587\ 550\ 476,43}{22\ 223\ 554\ 786,95}$	1.90% × 24,82% × 1.83	0.86 %

Source : By the researchers based on the data of table 01

Despite the relative stability of the debt volume during the period of the study, which makes the effect of the leverage slight, the (ROE) decreased significantly during the relevant period by about 84,36 %. Where during the year 2016 was it estimated at 5,5 % to drop to 0,86 % during 2020.

Figure N° 01 Saidal Group (ROE) 2016 – 2020



Source : By the researchers based on table 02

2.2.Return On Assets

Table 03 Calculation of Return On Assets (ROA)

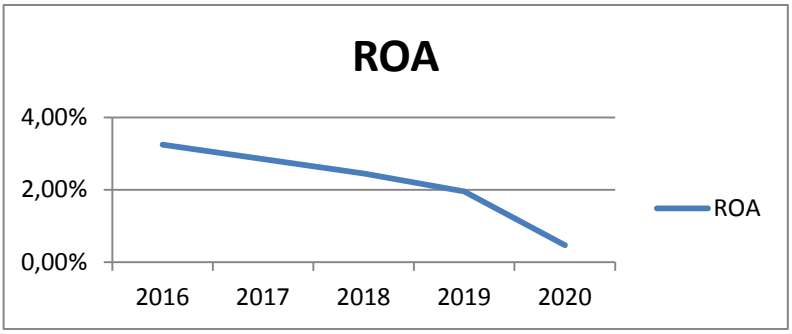
$$ROA = \frac{Net\ Income}{Sales} \times \frac{Sales}{Total\ Assets} = \frac{Net\ Income}{Total\ Assets}$$

ROA_{2016}	$\frac{1\ 509\ 161\ 605,06}{10\ 489\ 075\ 107,79} \times \frac{10\ 489\ 075\ 107,79}{46\ 390\ 536\ 657,41}$	14,39 % × 22,61%	3,25 %
ROA_{2017}	$\frac{1\ 376\ 295\ 647,88}{9\ 707\ 567\ 809,90} \times \frac{9\ 707\ 567\ 809,90}{48\ 318\ 944\ 590,23}$	14,18% × 20,10%	2.85 %
ROA_{2018}	$\frac{1\ 174\ 214\ 390,98}{10\ 589\ 699\ 874,49} \times \frac{10\ 589\ 699\ 874,49}{48\ 003\ 913\ 701,49}$	11,09% × 22,06%	2.45 %
ROA_{2019}	$\frac{793\ 514\ 004,08}{10\ 478\ 685\ 942,18} \times \frac{10\ 478\ 685\ 942,18}{40\ 434\ 178\ 877,27}$	7,57% × 25,91%	1.96 %
ROA_{2020}	$\frac{189\ 936\ 341,33}{10\ 074\ 467\ 229,38} \times \frac{10\ 074\ 461\ 229,38}{40\ 587\ 550\ 476,43}$	1.90% × 24,82%	0.47 %

Source : By the researchers based on table 01

The segmentation of the (ROA) allows to know the source of the change that occurs from year to year. In the Saidal case it dropped from 3,25 % in 2016 to 0,47 % in 2020. This is mainly due to the sharp decrease in the net income, which dropped during the period 2016 to 2020 by nearly 87,41%.

Figure N° 02 Saidal Group (ROA) 2016 – 2020



Source : By the researchers based on the data of table 03

In addition to the above results we can calculate the following ratios in order to better evaluate the financial performance of the concerned corporation under study.

2.3.Assets Turnover Ratio

A financial analyst should be as attentive to operational profitability as he is to the efficiency of the management of the assets in place. This can be measured by comparing sales to total assets, as shown in the following table:

Table 03Assets Turnover Ratio

$Asset\ Turnover\ Ratio = \frac{Sales}{Total\ Assets}$		
Assets Turnover Ratio $_{2016}$	$\frac{10\ 489\ 075\ 107,79}{46\ 390\ 536\ 657,41}$	22,61%
Assets Turnover Ratio $_{2017}$	$\frac{9\ 707\ 567\ 809,90}{48\ 318\ 944\ 590,23}$	20,10%
Assets Turnover Ratio $_{2018}$	$\frac{10\ 589\ 699\ 874,49}{48\ 003\ 913\ 701,49}$	22,06%
Assets Turnover Ratio $_{2019}$	$\frac{10\ 478\ 685\ 942,18}{40\ 434\ 178\ 877,27}$	25,91%
Assets Turnover Ratio $_{2020}$	$\frac{10\ 074\ 461\ 229,38}{40\ 587\ 550\ 476,43}$	24,82%

Source : By the researchers based on table 01

We notice that the asset turnover rate of the company under study is very weak. As it is much less than one during the whole period of the study. This indicates that the exploitation cycle is very long as well as inefficiency in exploiting the assets of the corporation.

2.4.Net Margin Ratio

The competitiveness of a company can be measured by its ability to generate profits, net of all operational, financial and tax charges, in proportion to the turnover raised.

Table 04 Net Margin Ratio

$Net\ Margin\ Ratio = \frac{Net\ Income}{Sales}$		
Net Margin Ratio $_{2016}$	$\frac{1\ 509\ 161\ 605,06}{10\ 489\ 075\ 107,79}$	14,39 %
Net Margin Ratio $_{2017}$	$\frac{1\ 376\ 295\ 647,88}{9\ 707\ 567\ 809,90}$	14,18%
Net Margin Ratio $_{2018}$	$\frac{1\ 174\ 214\ 390,98}{10\ 589\ 699\ 874,49}$	11,09%
Net Margin Ratio $_{2019}$	$\frac{793\ 514\ 004,08}{10\ 478\ 685\ 942,18}$	7,57%
Net Margin Ratio $_{2020}$	$\frac{189\ 936\ 341,33}{10\ 074\ 467\ 229,38}$	1.90%

Source : By the researchers based on table 01

From the previous table, we note that there is a terrible drop in the level of the net margin rate. Where it represented during the year 2016 about 14,39 %, and then dropped to 1.9 % in 2020.

IV. Conclusion

The DuPont model is a very useful tool used in measuring the performance of a corporation. Moreover, the analysis of financial statements connects different accounting elements using the calculation of different ratios. On the one hand, the examination of the ratios is done over time and highlights the temporal trend which would reflect either an improvement in the situation or a deterioration giving an idea about the management of the company. On the other hand, the examination of ratios is done by referencing to a benchmark, often the sector average. In particular, it is a means of establishing the competitive position of the company and of identifying its strengths and weaknesses in terms of management efficiency, level of indebtedness and return on capital employed.

The study reached several results that can be summarized in the following points:

- We found that the amount of debt is almost unchanged from year to year. Debt constitutes about 40% of the funds used to raise the total assets in place
- The asset turnover rate of the company under study is very weak during the study period it varied between 22,61 % in 2016 and 24,82 % in 2020 with a slight increase during the last year.
- The net margin ratio of the Saidal Group although it was steady during the first three year of the study period (14,39 % - 14,18 % - 11,09 %), it dropped very sharply during the following two where it reached 1,9 % in the year 2020.
- In order to maximize the return on assets, it is necessary to increase the net profit margin to a level which does not lead to a loss of market share, or to improve the turnover ratio of the assets to a level which does not require undue disbursements. Which is not the case for Saidal Group.
- The return on equity (ROE), must be high and above the sector benchmark. However, it is very weak in the case of Saidal Group.

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