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THE APPLICATION OF EXCEL IN FINANCIAL STATEMENT ANALYSIS -- CONSTRUCTING DUPONT ANALYSIS SYSTEM MODEL

Junda Yang, Yun Xia*, Xiaomei Chen, Liu Yang and Zhongtao Zhang

*Associate Professor in Financial Management, Finance Department of International Business School, Jinan University, China (corresponding author)
E-mail: 13676097885@163.com

ABSTRACT; *Financial statements are an important part of corporate financial management. Through analysis of corporate financial statements, management can timely identify the strengths and weaknesses of the company and make appropriate financial adjustments in a timely manner. Excel is a powerful tabular analysis tool that sorts, filters, and aggregates large amounts of data, simultaneously. Taking the financial statements of By-Health Co., Ltd as an example, this paper constructs DuPont analysis system through Excel to analyze financial statements and explore the application of Excel in financial statements.*

KEYWORDS：Excel, Financial Statement Analysis, DuPont Analysis System

INTRODUCTION

Excel Overview and Application

With its intuitive interface, powerful data processing function and simple operation skills, Microsoft Excel has met the different requirements of financial management for financial staff. It is the most widely used data analysis tool for modern financial staff in daily financial work (Degui Guo,2012). Its special tools, functions and so on, gradually in the enterprise accounting and financial work is indispensable (Wenjing Xu,2015). It can automatically calculate the data and quickly sort, filter, and automatically summarize a large amount of data, completing relatively complex data analysis. At the same time, it can be used to make bar chart, line chart, scatter chart and other charts (Sijia Guo,2015). Excel integrates common table calculation, abundant chart display and convenient data analysis. It has simple operation mode, powerful function and perfect report system, and is widely used in financial management operation. Therefore, excel can play an important role in the analysis of corporate financial statements. In-depth study of the application of excel in corporate financial statements can effectively help financial staff reduce errors and save time, thus improving efficiency.

Excel is widely used in modern life. Shangchu Li and Hong Zhao (2017) proposed that Excel could be used for teaching and statistical analysis of students' grades. Mingliang Ma (2013) believed that Excel could be used for the input, statistics and analysis of information of teachers in colleges and universities. In addition, it can also be used to build comprehensive archives database, facilitating the construction of enterprise archives informatization (Jianhua Liu,2017). Excel also plays a powerful role in the statistical analysis of tax data (Baochun Xu,2013) and health statistics (Xiaodong Yu,2013).

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Specifically, in terms of financial management and financial statement analysis, Aijun Zhong and Dan Zou (2018) used Excel to conduct regression analysis and financial forecast of enterprise financial data with examples. According to the financial statements of the company, Excel can be used for sales forecasting, cost calculation and profit management (Hang Zhou, 2014), and the company's operating status and financial status can be examined in terms of profitability, solvency, operating efficiency and cash flow (Yu Li, 2008). It can be seen that Excel is also very popular in financial statement analysis because of its intuitive interface, the power of data analysis and the simplicity of operation skills.

Financial Statement Analysis and DuPont Analysis System

Financial statement analysis is a management work to comprehensively compare and evaluate the financial status, operating results and cash flow of an enterprise by collecting and sorting out relevant data in the enterprise's financial and accounting reports and combining with other relevant supplementary information, so as to provide the users of financial and accounting reports with the basis of management decision-making and control. The purpose of financial statement analysis is to transform financial statement data into useful information to help information users improve their decision-making. Among them, DuPont Analysis is one of the most commonly used financial statement analysis tools. DuPont Analysis system is a systematic method of comprehensive and systematic evaluation of the company's financial status and operating results by using the internal relations among major financial ratios. The system is based on ROE, and decomposes ROA and equity multiplier, with the focus on revealing the impact of the company's profitability and leverage level on ROE as well as the interaction between various related indicators. DuPont Analysis can help enterprise management more clearly see the determinants of return on equity, and operating net profit margin and total asset turnover, the correlation relationship between the debt ratio, provides a clear overview to management whether the company assets management efficiency and maximize shareholder returns roadmap. Among them, the calculation formula and significance of several core indicators are as follows:

ROE=Operating net profit margin*Total assets turnover* Equity multiplier. ROE is the core of the DuPont Analysis System, which reflects the level of compensation paid to owners' equity and is often used for comparisons between different companies

Total assets turnover= Operating income/ Total assets. Total assets turnover reflects the flow rate of all assets from input to output during the operation of the enterprise, and reflects the management quality and utilization efficiency of all assets of the enterprise.

Equity multiplier=Total assets/ Total of owner's equity=1 / (1- Total liabilities/Total assets). Equity multiplier reflects the size of corporate financial leverage. The larger the equity multiplier, the smaller the proportion of capital invested by shareholders in assets, and the larger the financial leverage. The following part takes part of the accounting and financial indicators of By-Health Co., Ltd from 2012 to 2015 as an example to establish DuPont Analysis System.

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Table1. Part of accounting indicators of By-Health Co., Ltd from 2012 to 2015

	Total assets	Total liabilities	Operating income	Net profit
2012	2,104,730,577.05	177,612,966.58	1,066,692,093.53	280,354,339.42
2013	2,455,327,971.30	222,549,545.85	1,482,241,903.64	421,686,349.16
2014	2,701,174,365.96	253,478,366.15	1,704,980,536.89	502,594,966.94
2015	4,905,409,684.72	351,551,060.45	2,266,043,013.70	620,340,386.91

Table 2. Main financial indicators of By-Health Co., Ltd for 2012-2015

	2012	2013	2014	2015
Working capital	14.51	16.46	16.67	28.05
Current ratio	9.54	8.69	7.86	9.37
Quick ratio	8.30	7.60	6.92	8.45
Cash ratio	7.40	7.15	6.34	4.30
Cash flow ratio	0.66	2.93	2.31	1.90
Asset-liability ratio	8.44%	9.07%	9.37%	7.17%
Equity ratio	0.09	0.10	0.10	0.08
Equity multiplier	1.09	1.10	1.10	1.08
Debt-to-long capital ratio	0.46%	0.37%	0.41%	0.37%
Times interest earned	-8.30	-13.64	-12.51	-13.44
Cash flow interest coverage multiple	-3.12	-18.23	-12.79	-12.39
Ratio of net cash flow from operating activities to total of liabilities	62.35%	281.17%	221.74%	180.40%
Receivables turnover ratio	36.11	38.49	40.75	47.64
Inventory turnover ratio	6.60	6.67	7.33	8.44
Current assets turnover	0.66	0.85	0.90	0.90
Working capital turnover rate	0.72	0.96	1.03	1.03
Non-current assets turnover	2.85	2.74	2.45	1.77
Total assets turnover	0.51	0.60	0.63	0.46
Operating net profit margin	26.28%	28.45%	29.48%	27.38%
Total net asset interest rate	13.40%	17.07%	18.57%	12.59%
Net interest rate	14.61%	18.78%	20.43%	13.62%
Ratio of cash received from goods and services to sales revenue	1.07	1.15	1.11	1.13
Net cash flow from operating activities (Unit:100,000,000)	1.11	6.27	5.61	6.35
Ratio of net operating cash flow to net profit	39.64%	148.58%	111.53%	102.42%

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Table 3. DuPont Analysis table

	2012	2013	2014	2015
Equity multiplier	1.09	1.10	1.10	1.08
ROA	0.51	0.60	0.63	0.46
Operating net profit margin	26.28%	28.45%	29.48%	27.38%
ROE	14.61%	18.78%	20.43%	13.62%

According to the formula of DuPont Analysis System, ROE=ROA * Total assets turnover * Equity multiplier. In this way, part of the financial indicators of By-Health Co., Ltd from 2012 to 2015 are integrated into DuPont Analysis, which can be used for specific financial analysis.

Research Contents

Establishing DuPont Analysis System framework in Excel

For the sake of simplicity, only the consolidated balance sheet and the consolidated income statement in the 2015 annual report of By-Health Co., Ltd is selected as an example.

First step: Create a new Excel file, rename sheet1 to Consolidated Income Statement and import the relevant data. Sheet2 is renamed to Consolidated Balance Sheet and import relevant data. Sheet3 is renamed to Basic Framework of DuPont Analysis System and DuPont Analysis System is drawn by establishing project frame and connection. The basic frame diagram, each project box includes the project name and calculation formula (calculation result). As shown below:

Consolidated Income Statement	
Item	**Amount incurred in current period**
Total Operating income	2,266,043,013.70
Operating income	2,266,043,013.70
Total Operating Cost	1,577,014,162.17
Operating costs	764,210,836.26
Selling expenses	618,608,812.36
Administrative expenses	213,392,919.55
Financial expense	-51,248,755.59
Operating Profit	720,833,674.67
Net Profit	620,340,386.91

Figure 1. Consolidated income statement of By-Health Co., Ltd 2015 annual report

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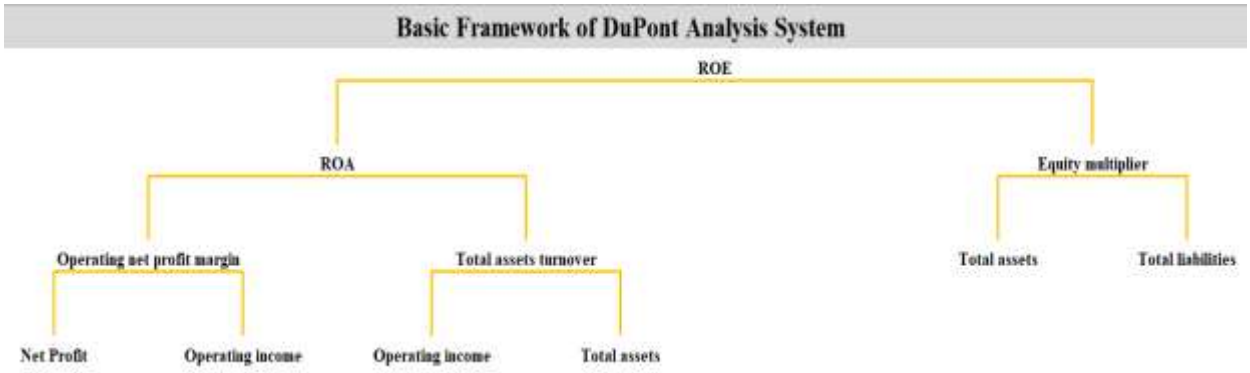
Consolidated Balance Sheet	
Item	**Closing balance**
Cash and cash balances	1,443,638,330.31
Accounts receivable	51,831,650.22
Other receivables	8,032,830.42
Inventories	309,337,865.21
Total current assets	3,135,107,058.15
Total non-current assets	1,770,302,626.57
Total assets	4,905,409,684.72
Total current liabilities	334,793,025.00
Total non-current liabilities	16,758,035.45
Total liabilities	351,551,060.45
Total shareholders' equity	4,553,858,624.27

Figure 2. Consolidated balance sheet of By-Health Co., Ltd 2015 annual report



Figrue 3. Basic framework of DuPont Analysis System in Excel sheet

Step 2: Define the data link and enter the relevant formula. Part of the data in the frame diagram is directly derived from the consolidated income statement and the consolidated balance sheet. Therefore, the data connection can be established directly through the method referenced between the tables in the workbook. Other data that cannot be directly obtained is calculated by the formula definition. The specific steps are as follows:

Net profit='Consolidated Income Statement'!B12

Operating income='Consolidated Income Statement'!B5

Total assets='Consolidated Balance Sheet'!B10

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Total liabilities='Consolidated Balance Sheet'!B13

After all the accounting indicators have been confirmed, the results of the produced Excel table are shown below:

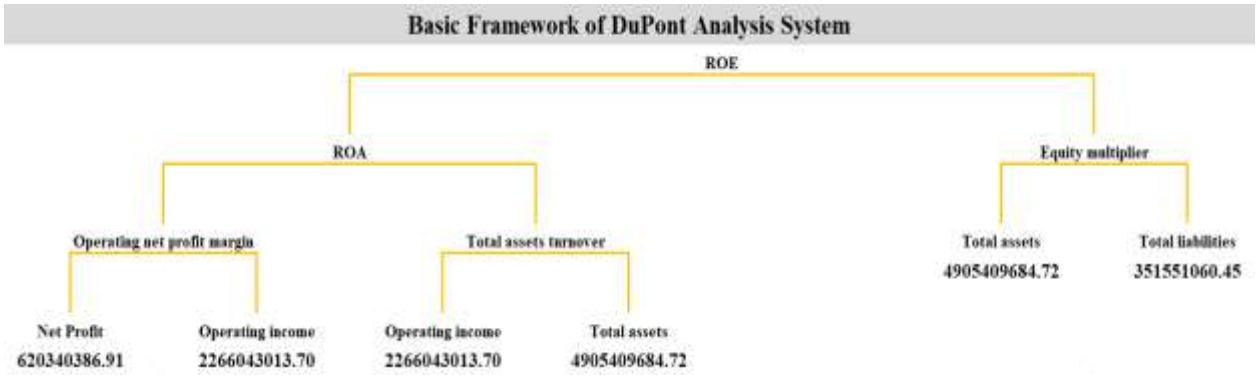

Figure 4. Basic framework of DuPont Analysis System in Excel sheet

The following are the financial indicators needed to calculate the DuPont Analysis.

Operating net profit margin C10 = Net profit B13 / Operating income D13 = 0.2738

Total assets turnover G10 = Operating income F13 / Total assets H13 = 0.4619

ROA E7 = Operating net profit margin C10 * Total assets turnover G10 = 0.1265

Equity multiplier M7 = 1 / (1 - Total liabilities N10 / Total assets L10) = 1.0772

ROE I4 = Operating net profit margin C10 * Total assets turnover G10 * Equity multiplier M7 = 0.1362

After the completion of all the items, the output of the DuPont analysis table is shown in the following figure:

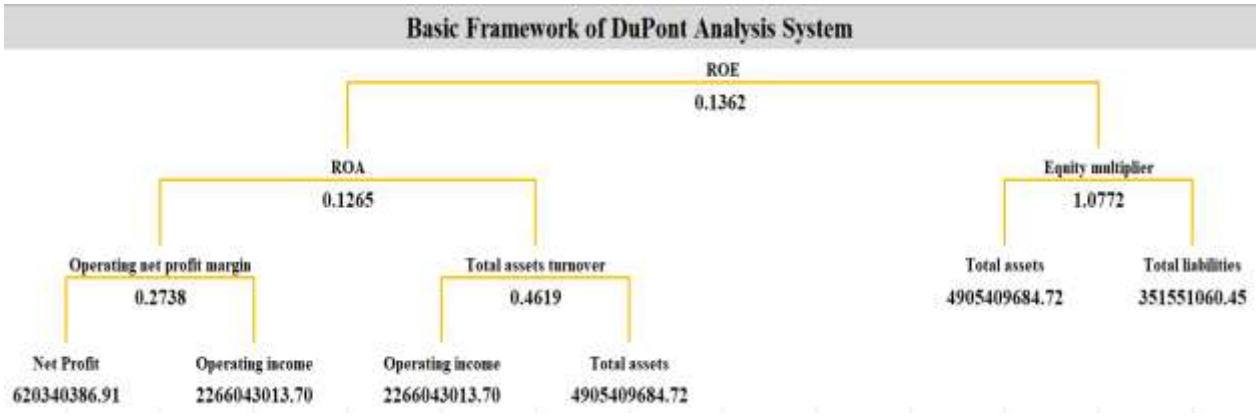

Figure 5. Basic framework of DuPont Analysis System in Excel sheet

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So far, all indicators of the company's DuPont Analysis in 2015 have been completed. Repeat the above steps to complete the data for 2012-2014. After that, when DuPont Analysis is carried out every year, it only needs to change the data of annual accounting statement, and the framework diagram of DuPont Analysis will be generated automatically, which can greatly improve the work efficiency.

The application of DuPont Analysis

The first step is to analyze the financial indicators of By-Health Co., Ltd in two years with 2012 as the comparison standard.

In the second step, the factor analysis method is used to determine the direction and extent of the impact of changes in relevant factors on ROE. The serial replacement is based on the calculated data of the relevant financial indicators of the DuPont System.

26.28% * 0.51 * 1.09 = 14.61%

28.45% * 0.51 * 1.09 = 15.82%

+1.21% Impact of changes in operating net profit margin

28.45% * 0.60 * 1.09 = 18.61%

+2.79% Impact of changes in total assets turnover

28.45% * 0.60 * 1.10 = 18.78%

+0.17%Impact of changes in equity multiplier

4.17% Comprehensive impact

The third step is to analyze the reasons for the changes in indicators such as ROE.

By-Health Co., Ltd in 2013, ROE increased by 4.17% compared with 2012. The main reason for the increase in ROE is the increase in total assets turnover and the increase in operating net profit margin. Operating net profit margin increase of 2.17% increased the return on equity by 1.21%, and total assets turnover rate of 0.09 increased the return on equity by 2.79%. Operating net profit margin represents the company's profitability, and total assets turnover represents the company's comprehensive asset management capabilities. The combination of the two represents the company's operating efficiency. This shows that the operating efficiency of By-Health Co., Ltd has improved.

By-Health's 2012 annual total assets turnover was 0.51, and that in 2013 was 0.60. The reason for the accelerated asset turnover rate in 2013 was that the increase in operating income (up 39%) was faster than the increase in asset occupancy (up 17%), and the efficiency of the company's use of its total assets to generate operating income was increasing.

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The company's 2013 equity multiplier increased by 0.01 because the asset-liability ratio increased from 8.44% to 9.06. When the company's profitability is higher than the cost of capital, the asset yield will increase. It shows that it has achieved certain effects in the effective use of debt management.

CONCLUSION

DuPont Analysis method can use the internal relationship between financial indicators to systematically analyze and evaluate the company's comprehensive management wealth and economic benefits, effectively reflect the interrelationship between various indicators of corporate profitability, and make a reasonable analysis of the financial results of enterprises. It takes ROE as the core indicator, decomposes at different levels, analyzes and evaluates the profitability, management ability and solvency of the enterprise in a certain period of time, and constitutes a completed system. Therefore, it can better help managers to discover problems in the company's financial and operational management, provide valuable information for enterprises to improve their management level, facilitate enterprises to expand sales, save costs, accelerate capital turnover, rationally arrange capital structure, and effectively prevent financial risk. At the same time, the combination of financial statement analysis and Excel's chart data processing capabilities enables a complete analysis of the financial indicator system. Excel can help the accountant quickly enter the company's financial statement data and calculate the company's financial indicators. It can also help company managers use Excel to quickly build a financial indicator system analysis such as the DuPont analysis system, analyze the company's financial structure, and find information that is conducive to improving corporate governance. It not only simplifies the complicated financial management work, but also greatly improves the work efficiency. It also enables the company's management personnel to arrange funds reasonably, improve the company's performance, and effectively prevent risks. All in all, Excel's intuitive interface, powerful data processing functions, and simple operation skills meet the different needs of financial personnel for all aspects of financial management. It is an indispensable data analysis tool for modern financial personnel in daily accounting work. Skilled use of Excel is a must-have skill for modern financial managers.

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