

Financial Analysis and Net Profit Prediction about Shanghai Jahwa Corporation

Tianyi Chen

School of Finance and Economics, Southwest Petroleum University, Nanchong, China

*Corresponding author: 201931766121@stu.swpu.edu.cn

Abstract. Implementing financial analysis by financial ratios is a reliable approach to comprehend a firm's condition. Besides that, Dupont analysis is a way which regards return on equity as the core ratio of the system and decompose the core into an equation that consists of three other ratios. Forecast of net profit can assist investors in making investment decision. In this work, representative financial ratios are selected and divided into four groups that indicate four main abilities severally. Line charts are produced to show variation tendency of the enterprise's four main abilities. Dupont analysis of the company is expressed by frame diagram and factor analysis is used to measure different ratios' degree of influence on return on equity respectively. This research applies weighted average growth rate and average increment speed to increase rate's calculation. After calculating, two results of predicted net profit are attained and compared with average predicted net profit of authorities. On the whole, Jahwa's condition worsened in the first three years, but it bottomed up and rose in the latest year. Net profit margin on sales is the main factor that cause return on equity's rise through the latest two years while equity multiplier has no impact on its change. As for net profit forecast, using weighted average growth rate to calculate has closer result with authorities' prediction than using average increment speeds.

Keywords: Financial Ratios, Dupont Analysis, Net Profit Forecast.

1. Introduction

Financial analysis is a significant economic management activity which is based on accounting calculation, report forms and other relevant information. Financial analysis plays an important role in helping investors, creditors and operators understand a firm's past accomplishment along with its business forecast, so that they can make decisions that are in their best interests [1]. Financial forecast is another necessary activity for people to foresee state the firm will be in 1 years or so. Financial Forecast has many beneficial functions, such as predicting the profits of alternatives to offer decision-makers reliable evidence for financial decisions, estimating future cash flow to prevent the shortage of funds and set realistic operation objectives, knowing possible spending in different departments to regard it as the foundation of operations plans [2].

Financial Analysis requires one to use a series of specialized analysis methods and technologies. It is mainly used to evaluate and analyze financing activities, operating activities and assigning activities of an enterprise. Company's condition can be known through 4 dimensions by financial ratios. Besides that, a comprehensive analysis which combines the four respective dimensions with their internal connections can be done in certain approaches. For instance, DuPont analysis is a common way used to evaluate a company's status comprehensively. The basic idea is to decompose return on equity (ROE) which is the core of the system into the product of multiple financial ratios step by step. The system helps managers to clarify the determinants of ROE, as well as the correlation between net profit margin on sales, total assets turnover, and debt ratio [3]. The methods to do Financial Forecast can be divided into 2 categories. Qualitative forecast considers a company's attribute and influential factors that have impact on the company's condition. It is mainly based on subjective and logical judgment. Personal experience matters in qualitative forecast, too. Quantitative analysis takes advantage of previous mathematics information and use these numbers to do mathematics then have the result of quantitative prediction.

The basic structure of financial analysis has become quite mature through many years of development. Financial ratios are in fact industry-specific. This means that to evaluate company

performance and position, one should evaluate the company against benchmarks within its industry instead of using economy-wide measures [4]. The decomposition analysis almost does not beat the a priori probability model and is no better than multiple discriminant analysis using simple financial ratios [5]. With the rapid development of computer science, there are more and more prediction models that are operated by computers. These models can do more effective forecast with financial ratios. Computer software was effective for teaching techniques of profitability analysis contained within the DuPont profitability analysis model [6]. Some researches do financial analysis that contain specific Chinese industries. A paper about Principal component analysis (PCA) approach case study on China telecoms industry concludes how financial performance can be analyzed using 12 ratios instead of the costly analysis of too many ratios that may be complex to interpret. The results also showed that ratios are all related as they come from the same statements, hence, the authors can use a few to represent the rest with limited loss of information [7]. However, the conclusion cannot not be used to analyze a specific firm to make it more reliable.

In this paper, Jahwa Corporation was selected as the sample and its corresponding information was used to do analysis and forecast. Shanghai Jahwa Corporation is a daily chemical enterprise which has one of the longest histories of development in China, its products cover many areas which include beauty, skin care, perfume etc. Because Jahwa was floated on the Chinese stock market in 2001, much data and information are public and accessible. According to the financial ratios and 4 dimensions' analyses between 2018 and 2021, this paper does financial analysis, DuPont analysis. The study also make prediction upon its net profit in 2022 by quantitative analysis. The result indicates that Jahwa' s condition become better in 2021 compared with 2020 and the outcome of predicted net profit by weighted average growth rate is quite close to mean net profit which was made by authorities.

2. Method

2.1 Dataset description and preprocessing

Some of the financial ratios and frame diagram of Dupont analysis are extracted straightly from financial indicator websites [8-12] while others are calculated by equations. The equations' variables are extracted from Jahwa' s annual report [13-16] from 2018 to 2021. Needed variables for net profit forecast are also selected from the firm's annual report.

To measure Jahwa's financial performance through 4 dimensions, representative financial ratios are selected straightly from financial websites, so the study references the firm's annual report to acquire necessary numbers and finally have the results by calculation formula. As for DuPont analysis, clear data can also be founded in the financial websites, the study chooses the year 2021 as the basis of DuPont analysis. To predict Jahwa 's net profit in 2022, the paper selects the enterprise's relevant numbers from profit statement between 2006 and 2021. Relevant numbers refer to operating profit, nonbusiness income, nonbusiness expenditure, income tax expense and total profit.

On the whole, the research collects 22 kinds of financial ratios from 2018 to 2021. And chooses 16 years of recorded numbers which are connected to the calculation of net profit. The needed 5 ratios for DuPont analysis are included in the 22 kinds of financial ratios except for ROA. Table 1 presents some detailed information for features.

Table1. Feature information on the collected dataset.

Feature name	Description	Calculation formula
1.Current Ratio (CR)	Payment guarantee of current assets for each current liability.	current assets/current liabilities
2.Quick Ratio (QR)	Measure of the ability that current assets which can be immediately realized to repay current liabilities.	quick assets /current liabilities

3. Interest Coverage Ratio	It reflects degree of assurance that the profitability can provide for repayment of due debts.	Earnings Before Interest and Tax (EBIT) / interest expense
4. Equity Multiplier (EM)	It shows the scale which stockholders support the investments.	total assets / total stockholders' equity = 1 / (1 - asset liability ratio)
5. Cash Ratio	Compared with QR and CR, it only considers currency fund that can directly indicate ability to pay cash immediately.	currency fund / current liabilities
6. Cash Coverage Ratio	It indicates whether a company is capable to repay its short-term debts with its cash which generate from its operating activities.	annual net operating cash flow / annual mean current liabilities
7. Debt to Asset Ratio	The ratio reflects proportion of funds that are provided by creditors and illustrates the creditors degree of risk for offering the firm credit funds.	total liabilities / total assets
8. Operating Profit Ratio	It comprehensively reflects the operating efficiency.	operating profit / total business income
9. Ratio of Profits to Cost and Expense (RPCE)	The ratio shows how much profit can be obtained for each unit of cost.	total profit / total cost
10. Return on Total Assets Ratio (ROTA)	ROTA illustrates a firm's assets utilization and fully reflects the profitability of a company.	Earnings Before Interest and Tax (EBIT) / average total assets
11. Return on Equity (ROE)	It is the core indicator which reflects profitability. ROE not only directly shows ability to fork out more capital, but also influences shareholder value.	net profit / average total net assets
12. Net Profit Margin on Sales	It reveals the relationship between net profit and sales revenue.	net profit / sales revenue
13. Security Surplus Cash Multiple (SSCM)	It reflects the degree of assurance that cash income in the current net profit of the company and truly reflects the quality of the company's earnings.	net operating cash flow / net profit
14. Receivables Turnover	It explains how many times receivables turn over yearly.	operating revenue / annual mean receivables
15. Total Assets Turnover	It explains how many times total assets turn over every year.	operating revenue / annual mean total assets
16. Current Assets Turnover	The indicator shows pure current assets' turnover speed and benefits of current assets' utilization.	operating revenue / annual mean current assets
17. Stock Turnover	It reflects the level of enterprise stock management.	operating cost / annual average inventory balance
18. Increase Rate of Business Revenue	It measures the operating status and market share of an enterprise.	(this year's figure – last year's figure) / last year's figure
19. Increase Rate of Operating Profit	It reflects increase and decrease of the operating profit.	
20. Increase Rate of Total Assets	It reflects increase and decrease of the total assets.	

21.Capital Hedging and Proliferating Ratio	It measures an enterprise’s operating benefit and security status.	Owner’s equity at the end of the year/ owner’s equity at the beginning of the year
22.Technical Input Ratio	The indicator explains an enterprise’s development potential and sustainable development capacity.	This year’s research and development expenditure/operation revenue

22 kinds of financial ratios are divided into 4 groups to evaluate Jahwa’s 4 abilities, concrete groupings are showed as follow:

1) Debt paying ability: Current Ratio (CR), Quick Ratio (QR), Interest Coverage Ratio, Equity Multiplier (EM), Cash Ratio, Cash Coverage Ratio, Debt to Asset Ratio

2) Ability of making profit: Operating Profit Ratio, Ratio of Profits to Cost and Expense (RPCE), Return on Total Assets Ratio (ROA), Return on Equity (ROE), Net Profit Margin on Sales, Security Surplus Cash Multiple (SSCM)

3) Operating capacity: Receivables Turnover, Total Assets Turnover, Current Assets Turnover, Stock Turnover

4) Developing capacity: Increase Rate of Business Revenue, Increase Rate of Operating Profit, Increase Rate of Total Assets, Capital Hedging and Proliferating Ratio, Technical Input Ratio

The research construct DuPont analysis system through the equation (1).

$ROE = ROA \times \text{Equity Multiplier} = \text{Net Profit Margin on Sales} \times \text{Total Assets Turnover} \times \text{Equity Multiplier}$ (1)

To forecast Jahwa’s net profit in 2022, the relevant number’s weighted average growth rates and average increment speeds are calculated. The study ascribes heavier weights to recent years’ figures as they have closer connection to the firm’s present condition.

2.2 Analysis methods

It is universally accepted that some of the financial ratios have established standards to estimate whether a firm’s financial performance is normal, so the study considers regular standards along with the changing trends of the indicators over a 4-year period to evaluate Jahwa’s 4 abilities. The figure 1 presents the workflow of this study. As for DuPont analysis, the research use frame diagram to find the degree of influence that Net Profit Margin on Sales, Total Assets Turnover, Equity Multiplier in ROE respectively.

The study applies weighted average growth rates that were calculated in advance, and then use the equation (2) to acquire net profit forecast for 2022. Eventually, the predicted net profit is compared with other forecasts that are made by authoritative financial institutions to see whether obvious differences exist.

$\text{Net profit} = \text{Total Profit} - \text{Income Tax Expense} = \text{Operating Profit} - \text{Nonbusiness Income} - \text{Nonbusiness Expenditure}$

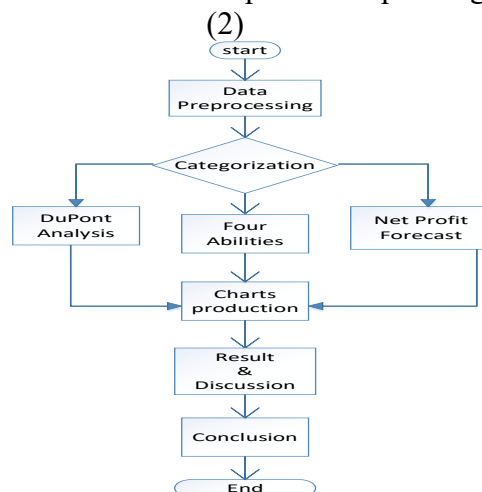


Figure 1. Workflow

3. Result & Discussion

3.1 Debt Paying Ability

Debt paying ability can be divided into short-term solvency and long-term solvency. Short-term solvency represents a company's ability of paying due debts on time. Long-term solvency represents guarantee level of debt repayment and capacity to undertake debts. Figure 2 and Figure 3 represent the ratio of short-term and long-term solvency, respectively.

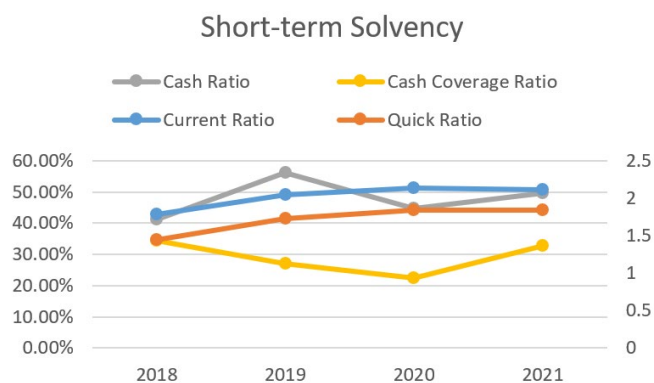


Figure 2. Short-term solvency

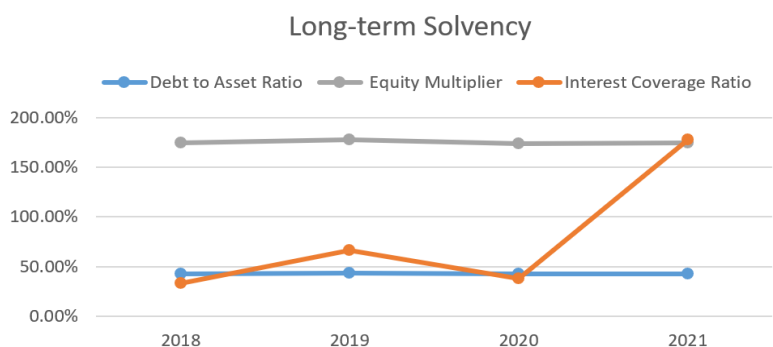


Figure 3. Long-term solvency

1) Short-term Solvency: Current ratio and quick ratio had very similar variation trend over a four-year period shown in Figure 2. Current ratio exceeded 2 from 2019 to 2021 while the ratio only reached to 1.78 in 2018. Quick ratio slightly rose between 2018 and 2020 and the figure in 2021(1.84) is equal to 2020. Cash ratio increased drastically from 2018 to 2019 (56.16%) and reached the top in these 4 years. After peaking, cash ratio dropped and then rose again in 2021(49.76%). Cash coverage ratio experienced an ever-decreasing trend in the first 3 years and went up to 32.64% in the last year.

2) Long-term Solvency: Interest coverage ratio did not grow dramatically until 2021, it increased by 48.74 during the last 2 years shown in Figure 3. Equity multiplier and debt to asset ratio were relatively steady. Equity multiplier were the same in 2020 and 2021(1.74). A slight fluctuation could be seen in debt to asset ratio, it floated between 42% and 43% during the 4 years.

It is universally accepted that if cash ratio exceeds 20%, the company's ability of direct repayment will be fine. However, if the ratio is too high, it will mean that current assets are not been properly used. Jahwa's cash ratios are much higher than 20%, its capacity of direct repayment is fine but current assets utilization efficiency is low. If cash coverage ratio exceeds 1, repayment of current liabilities has a reliable guarantee. The firm's cash coverage ratios never reach to 1 which means that annual net operating cash flows can't repay all of current liabilities but still can maintain its daily operation.

Appropriate standard for current ratio is over 2. Jahwa's current ratio in 2018 was less than 2 and the other 3 years' ratios were more than 2, so the variation showed that the company's short-term solvency increasingly enhances. Exceeding 1 for quick ratio represents good short-term liquidity. Jahwa's QR showed an ever-rising tendency and in the last 2 years the ratios were even close to 2 which means that ability of current assets that can be immediately realized to repay current liabilities

is fine. However, such high quick ratios may have negative impact on profitability because of opportunity costs that stem from circulating fund's insufficient usage.

The general standard for debt to asset ratio is 40%~60%, if the ratio of a firm is beyond 100%, the firm is on the verge of insolvency. Jahwa's capital structure can be regarded as reasonable one because its debt to asset ratios are stable and fluctuate within general standard. The larger equity multiplier is, the smaller proportion of capital invested by stockholders in assets, and the greater the financial leverage is. Equity multipliers of Jahwa are steady and it slightly dropped in 2020 which indicates proportion of capital invested by stockholders increased and financial leverage decreased. A sharp growth can be seen in interest coverage ratio from 2020 to 2021, the change enhances long-term solvency and degree of assurance that profits can provide for repayment of due debts significantly.

3.2 Profitability

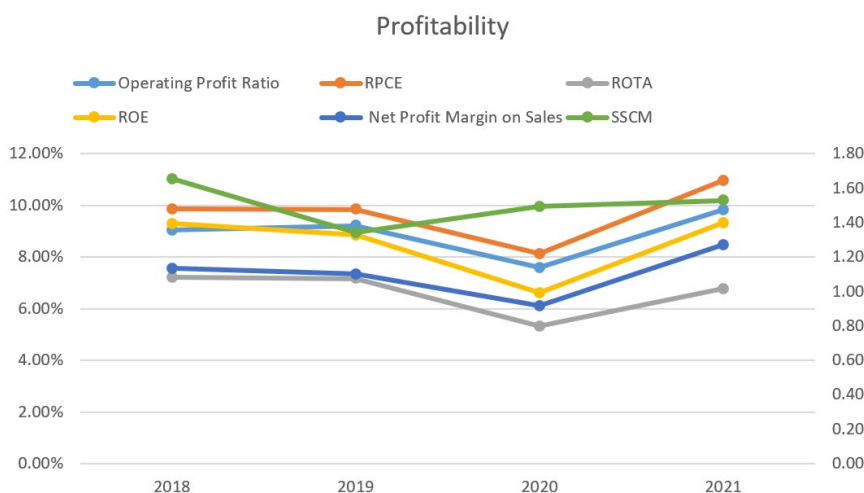


Figure 4. Profitability

According to the Figure 4, every category of ratio's variation tendency resembles each other except for SSCM. As for operating profit ratio, net profit margin on sales, RPCE, ROA and ROE, they all hit the bottom in 2020. Then the 5 ratios went up in 2021 and reached the peak except for ROA. The highest SSCM appeared in 2018(1.66), then it fell to 1.34 which was the lowest one. After bottoming out, SSCM rose gently in the following 2 years and reached to 1.53 in 2021.

Profitability is closely connected to different categories of profits, operating revenues boost profits' growth while costs and expenses decrease profits. Jahwa's annual reports explain these 3 factors' variation clearly. COVID-19 was the main reason which triggered the drop of operating revenues and Chinese three-child policy slightly stimulates operating revenue's growth of mother and baby products in 2020. From an economic perspective, Chinese economy recovered from negative impact of COVID-19. From an enterprise perspective, Jahwa's innovative business strategies generated positive influence. As a result, repurchase rates of star products and operating revenues went up in 2021. The 2 factors also made costs and expenses fall in the last year.

Regular standard of ROE is 15%~30%. Although Jahwa's ROE in 2021 was larger than that in 2020, recent 4 years' ROE actually never reached to the regular standard. This situation illustrates that equity capital was used improperly and shareholders' profits were low. SSCM in the following 3 years were lower than that in the first year, but they were all beyond 1 which indicates that net operating cash can totally assure net profit's generation.

3.3 Operating Capacity

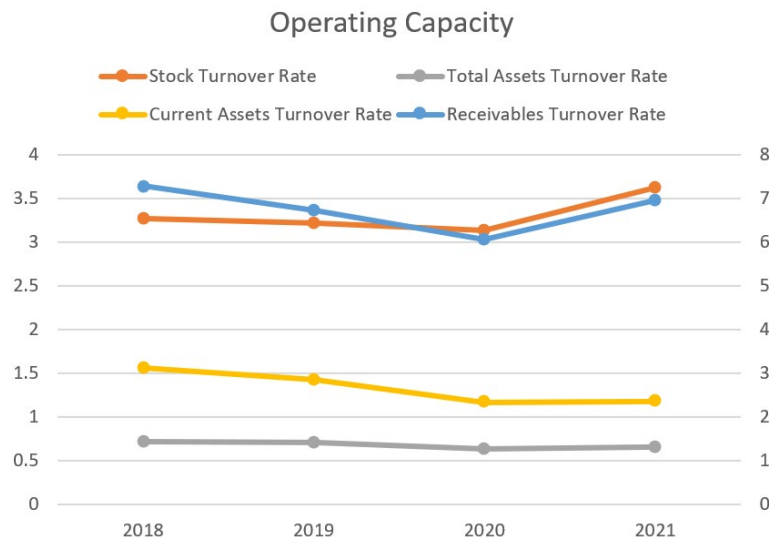


Figure 5. Operating capacity

In the first 3 years, these 4 categories of rates were keeping on dropping and they gently increased in 2021 shown in Figure 5. Stock turnover rate reached the peak during the fourth year (3.63 times). What is noteworthy is that total assets turnover rates were under 1 from 2018 to 2021.

Each category of turnover rate bottomed out and rose over a four-year period. The variation trend indicates that Jahwa’s operating capacity improved in 2021. However, total assets turnover rates were lower than 1 during the 4 years which illustrates the firms’ sales ability is weak. In that case, selling products with lower prices will make more profits and eventually boost the rate.

3.4 Developing Capacity

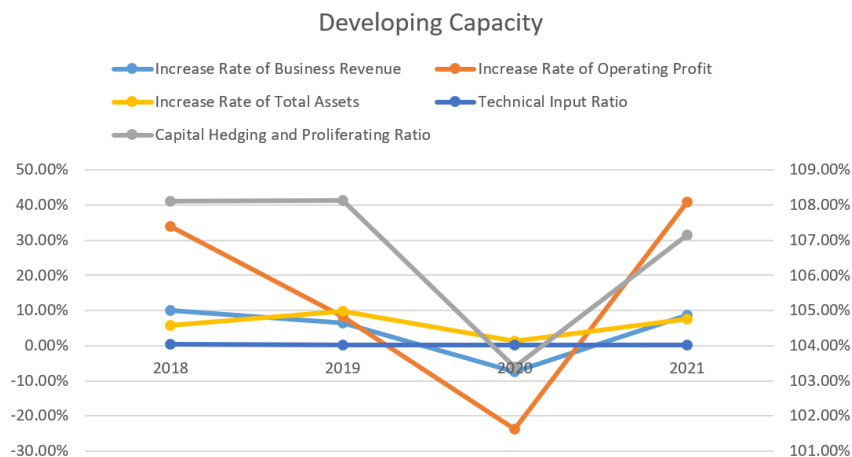


Figure 6. Developing Capacity

The highest technical input ratio (0.4%), Capital hedging and proliferating ratio (108.12%) and increase rate of business revenue (10.01%) showed up in 2018 shown in Figure 6. Increase rates of business revenue (-7.43%) and operating profits (-23.77%) occurred negative growth only in 2020. A rising tendency can be seen in all kinds of rates and increase rate of operating profit (40.94%) reached the top from 2020 to 2021.

If capital hedging and proliferating ratio is more than 100%, the firm has economic benefit and realize capital appreciation. Economic benefit of Jahwa can be realized and its ability to appreciate capital are fine during the 4 years. The higher technical input ratio a firm has, the more promising prospect it gains. Although Jahwa’s technical input ratio didn’t exceed 0.4% between 2019 and 2021, the company still continually invested funding in research and development. Constant investment

finally showed initial success in 2021. In 2021, Jahwa launched new products and added innovative formulas in former products to update them. The actions contributed to growth of business revenue and mediately increased profits.

3.5 Dupont Analysis of Jahwa in 2021

Table 2. Factor Analysis of ROE from 2020 to 2021

Return on Equity= Net Profit Margin on Sales × Total Assets Turnover × Equity Multiplier				
Indicator Item	Net Profit Margin on Sales	Total Assets Turnover Rate	EM	ROE
2020	6.12%	0.63	1.74	6.71%
2021	8.49%	0.65	1.74	9.60%
Differential	2.37%	0.02	0	2.89%
Sequential Substitution				
Replace net profit margin on sales		$(8.49\%-6.12\%) \times 0.63 \times 1.74=2.60\%$		
Replace total assets turnover rate		$8.49\% \times (0.65-0.63) \times 1.74=0.30\%$		
Replace equity multiplier		$8.94\% \times 0.65 \times (1.74-1.74)=0$		
Total Differential		2.90%		

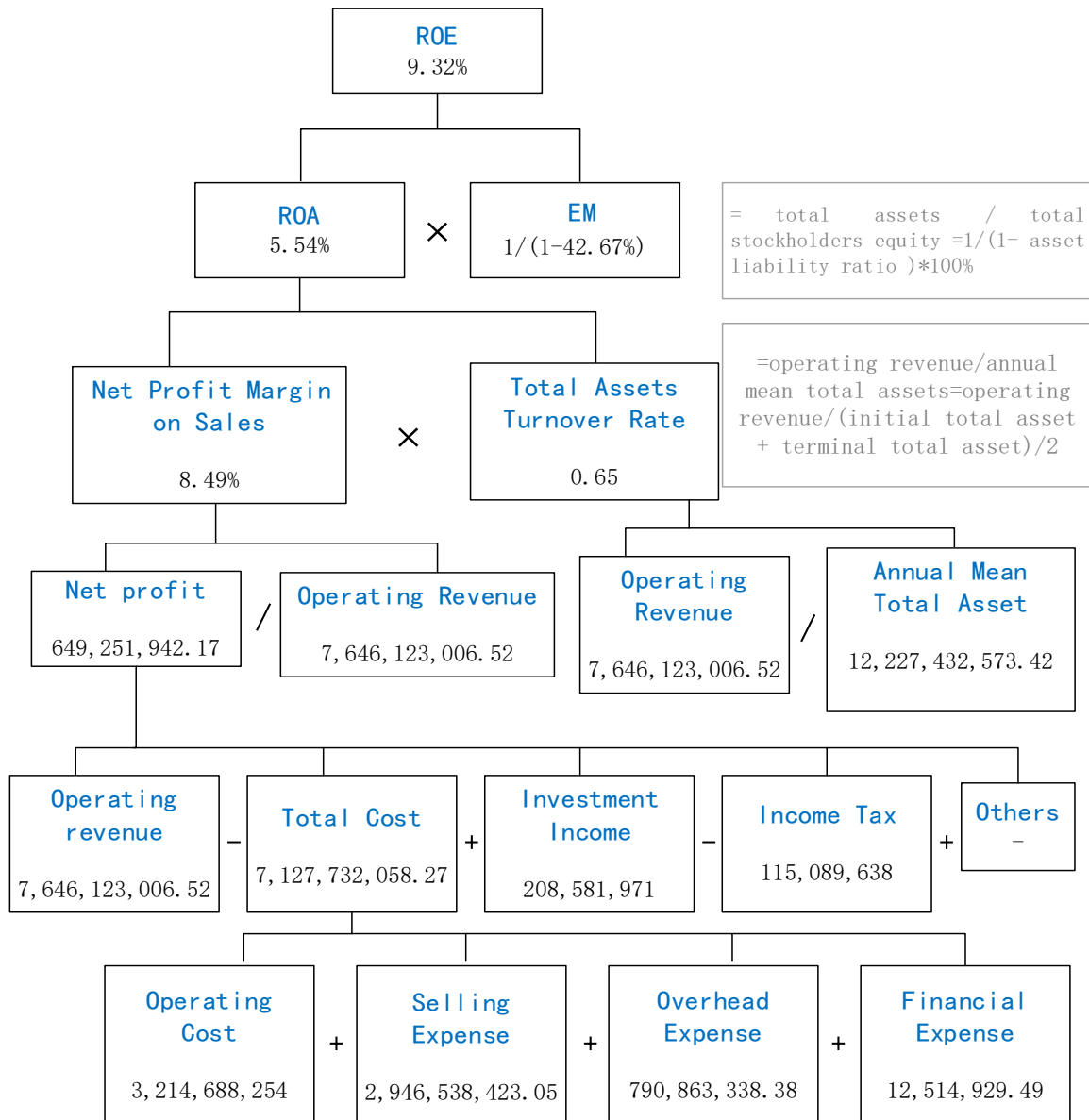


Figure 7. Dupont analysis frame diagram in 2021

3.6 Forecast of Net Profit in 2022

Table3. Net profit forecast in 2 different ways

	Weighted Average Growth Rate	Predicted Data(million)	Average Increment Speed	Predicted Data(million)
Increase Rate of Gross Profit	25.26%	957.39	14.24%	873.21
Increase Rate of income tax	15.70%	133.15	8.92%	125.35
Predicted Net Profit	-	824.24	-	747.86
Difference (authorities' prediction: 820.05million)	-	0.51%	-	-8.80%

The research gets 2 figures of predicted net profit by severally applying weighted average growth rate and average increment speed to Increase Rate of Gross Profit and Increase Rate of income tax. After having the forecasts, the 2 results are compared with mean figure which is the average of 34 Chinese financial authorities. The first approach's result increases by 0.51% while another method's outcome decreases by 8.8% compared with authorities' forecast. The differences indicate that weighted average growth rates have more reliable forecast than average increment speeds.

4. Conclusion

In this paper, categorized financial ratios was adopted to understand the company's status through four dimensions and Dupont analysis system was applied to obtain insight of return on equity. This paper conducted quantitative analysis with two increase rates' calculational methods to predict net profit. The firm's distinct status can be seen from mathematic results and corresponding charts. Compared with 2020, rise of return on equity in 2021 was mainly triggered by growth of net profit margin on sales. Results of net profit forecast were relatively close to professional institutions' average and predicted number which used weighted average growth rate to calculate increase rates had smaller differential than another one which adopted average increment speed.

However, preprocessing of massive financial ratios requires much calculation and time. Dupont analysis system actually do not consider developing capacity. To some degree, both this paper's and professional institutions' predict methods involve subjective factors. In the future, ratios that show similar variation trend and represent the same ability will be partly omitted. More comprehensive approaches that can assist in long-term management will be applied to analyze return on equity. Predict method will be improved to make degree of subjectivity as low as possible.

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