TOOLS AND MODELS FOR RATIO ANALYSIS BASED ON GEORGIAN COMPANIES DATA

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Abstract
The main purpose of the research is to identify two types of benchmarks required for the financial ratios analysis based on Georgian data. To obtain the benchmarks of the first type - industry average, the financial statements for 2018-2019 years of 131 companies in the manufacturing industry were processed. Due to absence of financial market data, a market imitation study was conducted to obtain the second type of benchmarks – ratios of the high performance companies. To achieve this, a survey of 26 representatives of financial industry companies was conducted through a questionnaire, containing the financial ratios of 9 companies from manufacturing industry. Respondents selected companies whose stock prices, in their opinion, would increase or decrease according to their financial ratios. To check the validity of the results we conducted: a follow-up interview with several respondents, a regression analysis of results, and a financial analysis of two high-rating and three low-rating companies using forecasts and free cash flow valuation.
As a result of the research, we obtained two types of benchmarks - industry averages and a set of ratios of "high performance" companies. We saw that none of the coefficients taken separately explain the respondents' choices, and that the survey results are consistent with the forecasts and the analysis of the value of the company. During the research, we developed a methodology on how to identify high-performing companies despite virtually non-existent capital market in Georgia. The methodology can be used for other, similar studies. The results are important for anyone who uses financial analysis. It will be interesting for researchers, for example, to study current processes in economics and companies and, hopefully, will contribute to capital market development in Georgia.

Key words: *financial analysis, financial benchmarks, Georgian industry average ratios, imitational model of capital market*

JEL Classification: *G17, G32, M41*

I. INTRODUCTION

It is commonly known that financial statement analysis is used in any direction of business activities at any stage of company development. Statements analysis is important for both existing and start-up businesses. For startups, these will be forecast (pro-forma) financial statements, while an active company will also have historical statements (Laitinen, 2017).

Almost all analysts agree that a full-fledged analysis requires analyzing the company's economic environment, studying industry data and comparing company data with it, considering competitors' data, and finally, most importantly, studying the company's own historical and forecast data (Bernstein & Wild, 1998).

One of the most important stages of financial statement analysis is the analysis of financial ratios. Financial ratios allow otherwise specific data to become standardized, condensed, therefore readable and perceptible, and comparable. Ratios are the numerical basis for planning, evaluating the validity of a company's plans, and determining the value of companies (Nissim & Penman, 2001).

To compare the ratios, we need to have the values with which it will be compared. Various benchmarks are used for this purpose. The most common benchmarks are the average ratios of the relevant industry and the ratios of high-performance (we might also call them “strong” or “good”) companies in the capital market, i.e. those whose shares are rising and the market capitalization is increasing (Lev, 1969).

When we use only industry average financial ratios as a benchmark, we know how much better or worse this company is compared to industry companies, but we do not know if its condition and ratios are good. Sometimes, better than bad does not mean good, it can be less bad. Good or bad state is determined by the capital market by a corresponding change in the share price. That is why the financial ratios of the companies that the capital market considered "good" are used for comparison.

Unfortunately, unlike many countries in the world, Georgia does not have average industry ratios available, with a few exceptions for several industries, such as the average ratios for 2017-2018 (Berishvili & Berishvili, 2020) and ROE and ROA ratios for 2018 (Pirveli, Shugliashvili, & Machavariani, 2021), especially the financial data of successful (or unsuccessful) companies in the capital market. It has its objective reasons.

Free access to financial data of companies in Georgia was not available until 2016, with a few exceptions. Legislation came into force in 2016, requiring companies to publish financial statements on the website reportal.ge, specially created by the Service for Accounting, Reporting and Auditing Supervision (SARAS). From 2020, financial statements of all four categories of companies are available. Given the quality of the statements and the format of publication, data processing of all companies remains a problem, but data from the first and second category companies can be readily processed (Pirveli & Shughliashvili, 2019).

Due to the underdevelopment of the capital market in Georgia and since the stock Exchange practically is not used, it is impossible to determine the stock prices or price changes and identify successful or unsuccessful company (Georgian Stock Exchange, n.d.) (Aslanishvili, 2020); (Pirveli & Zimmermann, 2015).

1) Objectives

The goals and objectives of the present study, are:

- To determine if and how it is possible to calculate Georgia specific two types of benchmarks: the industry average, and high-performance companies' financial ratios, necessary for financial analysis, using the available industry data;
- Acquire and develop the methodology and/or model required to produce these calculations;
- Carry out the above calculations and prepare benchmarks;

2) Design

The study consists of three parts: determining the industry average financial ratios, in-depth interviews with experts, and determining the capital market benchmarks.

For the preparation of two types of benchmarks, two types of data are required for the study: first - financial statements of the pilot industry companies operating in Georgia for at least two consecutive years with minimum satisfactory quality and details; Second - capital market data, which is not available in Georgia. The industry average financial ratios were prepared through the processing of existing data. But in order to obtain the financial ratios of the "high-performing" company from the point of the capital market (the third part of the study), it became necessary to develop and use a different approach.

Based on primary data review, expert opinion and Berishvili and Berishvili 2020 study (Berishvili & Berishvili, 2020) manufacturing industry was chosen.

In order to determine the market benchmarks, study of an imitational market was conducted and the obtained results were tested.

II. LITERATURE REVIEW

In financial analysis the average industry financial ratios are used as a benchmarks. Also of great importance has financial ratios of companies that show high performance in terms of their stock price growth (Soffer & Soffer, 2003); (Bernstein & Wild, 1998).

Investors have been analyzing companies' financial information even in the last decade of the nineteenth century. Ratio analysis emerged during this period. The use of financial ratios became almost universal in the early twentieth century. At this time various organizations (associations, universities) started to process and publish industry data. Information on the average financial ratios of the industry is generated since then. The topic moves to the next stage of development in the 50s and 60s, when the use of computers begins, which allows the collection of large amounts of information and fast processing (Horrigan, 1968).

In the late sixties, several researchers explored the possibility of predicting companies' success (failure) using financial ratios and identified practical patterns. Even then, the importance of the quality of financial information was emphasized (Beaver, 1966).

During this period Altman published a paper that still finds practical application in finance and company management. In his research, the author examines the practice of financial ratio analysis, examines data from bankrupt and successful companies in the US, and uses discriminant analysis to create a bankruptcy forecast model (Z score) and a function that uses financial ratios as independent variables (Altman, 1968). This function is still used extensively by companies and financial organizations (Saunders & Cornett, 2018). Many researchers have studied similar relationships in different countries and created functions in which coefficients and financial ratios are derived taking into account country specifics. (Ko, 1982); (Breeman, 1976); (Tisshaw & Taffler, 1977); (Altman & Narayanan, 1996).

According to a study by Falk and Heinz (1975), the success or problems of companies depend not only on them but also on the state of the industry as a whole. Therefore, studying industry data allows us to measure the risk of companies operating in these industries (Falk & Heintz, 1975).

Important conclusions were provided by Lev (1969). According to his research, company ratios are changing and approaching industry averages (Lev, 1969). These findings have found application in the practical field - industry averages are used as targets for long-term forecasting in the financial analysis process. (Subramanyam, 2014).

Ratio analysis has been used to analyze not only commercial but also non-profit organizations (Chabotar, 1989). It is also used to assess the financial condition of households and individuals (Greninger, 1996). Using coefficients in terms of risk detection and proper planning, we get significant results for startups as well. (Laitinen, 2017).

The analysis of financial statements has entered a new phase through the use of artificial intelligence. Analyzing reports with these methods allows to forecast profitability of the company (Baranes & Palas, 2019). It became possible to detect intentional distortion of account information and fraud (Perols, 2011); (Roxas, 2011).

The general principles of financial ratio analysis are similar in different countries, especially since the application of the International Financial Reporting Standards is becoming more and more widespread. (Robinson, 2015).

Several interesting studies on financial analysis and financial ratios have been conducted in Georgia as well. Lomidze (2016) studied the operations performance levels in a construction companies with the help of several ratios (Lomidze, 2016). Pirveli et al conducted a survey of the year 2018 financial data of 1,886 companies of the first, second and third categories and public interest entities of eight industries in Georgia. Among other indicators, the industries' average ROE and ROA are calculated (Pirveli, Shugliashvili, & Machavariani, 2021).

Over the last ten years, several studies on financial analysis and ratios have been published in Georgian scientific journals (Chiladze, 2010); (Lomidze, 2011); (Papaskiri, 2011); (Kharkhelauri, 2016). The articles discuss the analysis methodology and existing practices. The authors emphasize the importance of the issue and the need for further research in this area. The quality of published financial reporting has been studied as well (Pirveli, 2019).

III. METHODOLOGY

In its essence, the paper is descriptive in nature. Most of the research is qualitative, some parts use quantitative methods to calculate statistical indicators and to study the properties of these indicators.

One of the main aims of the paper is to develop a methodology that will help future researchers, or, more importantly, practitioners, who use benchmarks in financial analysis. The established methodology and description of the research will enable the interested persons to calculate the benchmarks needed for them, tailored to the specific activity, as well as to modify the described methodology. Of course, they have every opportunity to use the results of the research unaltered.

1) Calculation of industry average financial ratios

To calculate the average financial ratios of the industry, we used desktop research with secondary data processing.

We took the data from reportal.ge in pdf-files format, we then transferred the data of each company to the spreadsheets. During the processing, it was found that most company statements contain different types of errors, such as incorrect arithmetic operations, incorrect format, errors in the names of the line items, missing of information, missing of notes, incorrect numbering of notes, differences in the same amounts written in different places, incorrect indication of the industry, etc.

Errors were corrected as much as possible, mainly with help of information from notes. We excluded the companies whose data could not be corrected or were not unambiguous. Due to the fact that the data of the third category companies contained a particularly large number of errors, the fact that most of their statements contained incomplete or insufficient information (aggregated articles, lack of notes), the fact that the fourth category companies prepare financial statements according to different standards, and the fact that third and fourth category companies' statements are not audited, it was decided to use only the data of the first and second category companies for the research.

In the next step, we calculated all the significant coefficients that the available information allowed us to do. Then we calculated the means, medians, upper and lower quartiles for 2018 and 2019. Calculated ratios and used formulas are listed below (Bragg, 2007); (Bernstein & Wild, 1998):

Current ratio = Current assets / Current liabilities

Quick ratio = [Current assets – Inventories] /Current liabilities

Total assets turnover = Sales Revenue/ Total assets

Fixed assets turnover = Sales Revenue/ Net fixed assets
Inventory turnover = Cost of Sales / Inventories
Days sales outstanding (DSO) = Receivables / [Annual sales / 365]
Accounts payable to Cost of Sales = Accounts payable / Cost of Sales
Total debt to total assets = Total debt / Total assets
Total debt to common equity = Total debt / Common Equity
Times-interest-earned (TIE) = Earnings before interest and taxes (EBIT) / Interest expense
Gross margin = Gross income (sales revenue – cost of sales) / Sales Revenue
Operating margin = Operating income (EBIT) / Sales Revenue
EBITDA Margin = EBITDA / Sales Revenue
Profit margin = Net income / Sales Revenue
Return on total assets (ROA) = Net income / Total assets
Return on common equity (ROE) = Net income / Common equity
Return on invested capital (ROIC) = EBIT [1-profit tax rate] / Total invested capital (Total debt + total equity)
Basic earning power (BEP) = Operating income (EBIT) / Total assets

In the calculations, the year-end amounts are used in the balance sheet data and the annual amounts are used from the profit-and loss statement. DSO is shown in days. Other ratios are shown as a ratio or a percentage.

It is already possible to get information in the form of spreadsheets from SARAS. As a result, there will no longer be necessary to manually move data to spreadsheets, but pdf files are still needed to verify information, correct errors, extract additional information from notes, etc.

We used the calculated data in the following parts of the study.

2) In-depth interview of experts

In parallel with the first part of the research, an expert survey was prepared and conducted using in-depth interview techniques. Pre-designed discussion plan was used, although the experts had complete freedom to talk about topics that were important to them. We selected nine experts in the way to make sure that they perform one or several of following tasks: conduct financial analysis of companies, determine company value, prepare business plans, forecast companies development, trade stocks, offer stocks to market and investors, manage portfolios, provide loan financing, and some other activities where financial ratios are actively used.

In addition, interviews were conducted with experts in statistics and social research (three experts in total). In this case, we provided them with as much information as possible about the imitational model of the capital "market". Their advice and opinions were taken into account when developing the methodology and processing the research results.

Particular attention was paid to the opinions of experts regarding the limitations of the study.

3) Capital market data collection and analysis

The main question of the third part of the research was to find out which company will be considered as "strong" by market, which is "weak". In a completely underdeveloped market environment, it became necessary to determine which companies and individuals should or could be considered as a participants of a theoretical market and then to find a survey form that assures that the results could be processed and interpreted. We used a quantitative method, and as a data collection tool, we used a strictly structured questionnaire.

The questionnaire provided eighteen ratios[1] for two years (2018-2019) for 9 examined companies.

In order to achieve maximum objectivity of the answers, the questionnaire did not indicate the names of the companies or any other information (e.g. sales volume, net profit, etc.) that could affect the answers, make them biased or complicate the choice. Only the name of the industry - "Manufacturing" - was indicated. We sorted the companies (131) by sales volume and selected nine[2] of them (every 13th).

Respondents were asked to rate companies according to the ratios presented in the questionnaire using the following scale: Choice "Buy" - if the company ratios show the company is strong, "Sell" - if the ratios show the company looks weak and "Hold" if the state is neither good nor bad, and/or the information does not allow to make an unambiguous decision.

Given the essence of the market, it is implied that if a large number of market participants apply to buy shares, the company's shares will become more expensive and vice versa. Accordingly, we can make the assumption that respondents' answers determine stock price movements in the market. Such an imitation of the capital market allows us to envisage which companies would be favorable to the market, i.e. which companies' share price (and capitalization) would increase, and which would decrease.

[1] The ratios for the study are obtained by the author in the first part of the study.
[2] The minimum number that ensured heterogeneity.

The target group of the survey is all the financial companies that can potentially be considered as participants in the capital market. We found contact information of such companies (commercial and investment banks, investment, consulting, and brokerage companies) through the Internet and business directories (55 companies in total). At the next stage, the questionnaire was sent to them.

Each "Buy" choice corresponds to +1 point, "Sell" choice -1 point and "Hold" choice 0 points. The company with the highest score was considered a high performance company from market standpoint and the company with the lowest score was considered to have a weak performance.

Naturally, there is a likelihood that respondents used one or couple specific ratios rather than a full picture or analysis to make a decision when filling out the questionnaire. We used two methods to clear it out: the ex-post interview with a selective group and the regression analysis of the results.

4) Check the survey results via regression analysis

In order to determine whether any financial ratios, are a decisive factor in evaluating companies during the survey, we conducted a regression analysis of the ratios.

The null hypothesis is formulated in a following way: Ho - The value of any particular financial ratio does not determine the attitude towards the company (Ho: $b1 = 0$).

As an alternative hypothesis we can set as the following: Ha - The decision of the respondents is based on the value of a particular financial ratio(s) (Ha: $b1 \neq 0$).

If the null hypothesis is rejected, one or more coefficients will be identified that will have a statistically significant impact on the decision, therefore the correlation between the value of the ratios and the results of the companies will be high, the determination coefficient (R2) will be high and the results will be statistically significant. If we reject the null hypothesis, we get an alternative hypothesis (Gujarati, 2011).

Calculations were done using MS Excel Data Analysis module. The independent variable is the numerical value of the companies' valuations by the respondents, while the independent variable is the value of the financial ratio studied. Analysis of both 2019 and 2018 data was performed.

Since companies' ratings are based on ratio values, a positive correlation is expected. And since the decision according to the principles of analysis is made not by one or several specific ratios, the impact of the value of any ratio taken separately is not expected to be statistically significant (p-value less than 0.05).

Due to the large number of coefficients, it is impossible to conduct multivariate regression because of overfitting. Correlation between different coefficients prevents this possibility as well. However, since the purpose of the study was not to forecast but to calculate practical indicators, we did not consider this circumstance as a limiting factor in the use of the methodology.

Of course, there is always the possibility of making a type II error. That is, we may not reject the null hypothesis when it is false. In this case, the assumption that the company identified in the survey is "high-performing" is questionable. In order to study this issue in more depth, the financial analysis of the two strongest and three weakest companies in the opinion of the respondents was carried out using projections.

5) Review of the results of the survey using forecasted financial statements analysis

The survey identified "strong" companies based on financial ratios. In order to verify the results, a financial analysis of some companies was conducted, using forecasted financial statements. The main goal was to determine whether the selected "strong" companies are really such. We also checked the condition of "weak" companies.

For the analysis, two “strong” (Company 6 and Company 8) and two “weak” (Company 1 and Company 9) forecasts were made based on the Company's financial statements. Free cash flow from operations (FCF) was calculated, and the value of companies and their financial condition were assessed.

The current state of the companies and the existing proportions were used. Profit and loss statements and balance sheets (pro-forma statements) for the next five years were compiled. The economic growth rate published by the World Bank[3] as a measure of sales growth was used. Company's operating assets and liabilities were increased in proportion to sales growth. Need to increase or decrease funding requirements was identified using pro-forma balance sheet. If the company was in need of additional financing, debt was increased, and in case of excess financial resources, decreased. When the debt was reduced to zero, and further reductions in funding sources were needed, retained earnings was reduced through dividend payouts.

The operating free cash flow was calculated using the forecasted financial statements, using following formula: FCF = NOPAT – ΔTOC, where NOPAT (net operating profit after tax) is company’s operating profit (EBIT – earnings before interest and tax) after tax (EBIT(1-Tax rate)). ΔTOC is change in Total operating capital from year to year. Total operating capital is comprised of Operating working capital and Operating fixed assets

[3] World Bank Open Data portal: https://data.worldbank.org/indicator/NY.GDP.MKTP.KD.ZG?locations=GE

The method described in the CFA Institute literature to calculate operating capital was used- current operating assets are deducted from current operating liabilities (giving net working capital) and long-term operating assets are added (Pinto, Henry, Robinson, & Stowe, 2015).

To determine the operating value of the company, we used a modified Constant Growth Dividend Discount Model, which instead of dividends, uses free cash flow and therefore determines the value of company's operations or company as a whole (Brigham & Ehrhardt, 2014).

Calculations were made by following formula - Value of company operations = FCF_t x (1+g) / (WACC-g), where g is FCF constant growth rate, FCF_t is free cash flow at the moment of start of constant growth (t), WACC is Weighted Average Cost of Capital (Modigliani & Miller, 1958). Method is based on Gordon model, developed by Gordon and Shapiro (Gordon & Shapiro, 1956).

According to Fama and French (1997), use of industry capital cost yields large errors, but they acknowledge that its use is widespread, presumably because the error of other existing methods is not less (Fama & French, 1996).

It is impossible to determine the WACC of Georgian companies due to the lack of capital market data. Therefore, we used the relevant industry (Gregory & Michou, 2009) costs of United States, adding country risk premium (Damodaran, 2003). USA rates are based on US dollar denominated capital costs. Since Georgian lari (GEL) is used in companies' statements, currency risk premium was added as well. Premium was calculated based on USD-GEL loan interest rate[4] differences during last ten years, considering companies' relevant industries (Damodaran, 2019).

IV. RESULTS

1) Industry Average Financial Ratio study results

Financial statements of 131 companies of 2018-2019 years of Manufacturing Industry was processed. We calculated median, mean, and upper and lower quantiles of ratios. Results are shown in table 1.

Table 1 Industry Average Financial Ratios - Manufacturing 2018 and 2019

Ratio	Mean		Median		Upper Quantile		Lower Quantile	
	2019	2018	2019	2018	2019	2018	2019	2018
Current	6.64	3.04	1.59	1.36	3.44	3.36	0.95	0.83
Quick	3.19	1.65	0.90	0.77	1.59	1.64	0.42	0.41
Total assets turnover	1.29	1.31	1.10	1.02	1.68	1.56	0.64	0.67
Fixed assets turnover	6.71	7.56	2.98	2.88	5.53	5.42	1.57	1.48
Inventory turnover	7.72	42.95	4.07	3.58	6.85	7.35	1.85	1.90
(DSO) Days sales outstanding	63.04	86.99	47.01	43.69	87.46	81.26	23.61	26.71
Accounts payable to Cost of Sales	0.20	0.24	0.16	0.16	0.29	0.34	0.07	0.07
Total debt to total assets	34.1%	33.9%	23.2%	25.0%	50.4%	52.8%	5.3%	8.4%
Total debt to common equity	113.5%	289.8%	19.0%	27.6%	88.0%	81.5%	0.0%	0.0%
(TIE) Times-interest-earned	22.73	25.37	3.34	4.04	10.59	12.17	0.93	1.35
Gross margin	27.8%	28.8%	25.2%	23.0%	37.3%	36.8%	14.7%	14.6%
Operating margin	0.08	0.01	0.08	0.08	0.18	0.16	0.03	0.02
EBITDA margin	12.9%	6.2%	11.6%	11.9%	22.9%	20.6%	5.9%	4.9%
Profit margin	2.4%	-1.1%	5.2%	6.1%	13.2%	12.9%	-0.4%	-0.5%
(ROA) Return on total assets	6.0%	6.5%	5.9%	5.9%	14.9%	15.4%	-0.5%	-0.3%
(ROE) Return on total equity	2.7%	-57.8%	19.1%	16.0%	41.0%	35.3%	4.7%	1.8%
(ROIC) Return on invested capital	15.3%	12.3%	11.8%	10.5%	19.8%	22.0%	3.3%	2.3%
(BEP) Basic earning power	10.8%	10.4%	9.1%	9.2%	18.1%	18.8%	2.7%	3.2%

Measured Industry Average Financial Ratios can be used for analysis.

2) In-depth interview results

Nine professionals were questioned during the in-depth interview. The opinion of the experts on the issues discussed is uniform, despite, as a result of selection, they work in different types of companies and have different positions. Their experience and work interests are also different. What unites them is that they all use financial analysis in their work processes.

In general, according to experts, it is crucial to perform ratio analysis during financial analysis, and in this process, it is desirable (if not necessary) to compare ratios with different benchmarks. There are no industry averages - internationally recognized convenient benchmark for analysis available in Georgia. In their opinion, since we do not have capital market data in Georgia, the use of other approximate data, such as, for example, indicators of other countries similar to Georgia, with certain assumptions and restrictions, is acceptable and in some cases, desirable. Also, the imitational study of the "capital market" is interesting and the results will be

[4] Data regarding loans was obtained from National bank of Georgia, www.nbg.gov.ge

used in the work process. It is impossible to say which ratios are the most important. All depends on the context and the availability of information. Of particular interest are their views on the limitations of the study, information on which is provided in a separate chapter with the views of the authors.

3) Imitational Study of Capital Market

A survey of potential capital market participants in Georgia was conducted using a questionnaire. The questionnaire provided the financial ratios of 9 randomly selected companies from the Manufacturing industry. Respondents indicated which company's shares were, in their opinion, a promising acquisition based on financial ratios ("Buy"), which share price was expected to decrease ("Sell") and for which they had no opinion ("Hold").

The questionnaire was distributed to 55 organizations. We received 26 responses, 2 of which did not meet the required conditions and were not processed. We processed 24 questionnaires as follows - if the company was marked "Buy", we added 1 point, if - "Sell", then we deducted one point and if - "Hold", we left the points unchanged. The study revealed an obvious outsider with negative 18 points and a leader with 17 points. The company with 15 points took the second place. Results are in table 2 below.

Table 2 Capital Market Research Results

	Choice			
Company	**Buy**	**Sell**	**Hold**	**Points**
Company1	4	13	7	-9
Company2	7	5	12	2
Company3	2	20	2	-18
Company4	6	10	8	-4
Company5	11	2	11	9
Company6	19	2	3	17
Company7	7	4	13	3
Company8	16	1	7	15
Company9	4	14	6	-10

As a result, we can assume that the stock price and market capitalizations of the Company 6 will increase compared to the others. Slightly less will be the performance of the shares of the Company 8, but its data may also be interesting for those who do the analysis.

While our goal was to identify a "strong" company from a market point of view, "poorly" rated companies are also interesting for further research. The question arose – is only loss of the company the cause of negative attitudes? The Company 3 is really loss-making in 2019 and, naturally, the market does not consider its shares to be a good buy. The Company 9 is loss-making in 2018 and profitable in 2019. And the Company 4 is losing money in both years, but still has a better performance than, say, the Company 1, which is profitable in both years.

The financial ratios of the Company 6 can be considered as a benchmark of a "strong" company in the financial analysis, of course, with some approximation. The financial ratios of the company are given in the table below with the ratios of the Company 8, which can also be considered as a "strong" company.

Table 3 Ratios of the best companies according to the research

Ratio Name	**Company 6 Ratios**		**Company 8 Ratios**	
	2018	**2019**	**2018**	**2019**
Current	0.83	1.59	1.75	2.88
Quick	0.56	1.20	0.72	1.59
Total assets turnover	0.98	1.37	0.82	1.02
Fixed assets turnover	1.26	1.74	1.36	1.95
Inventory turnover	11.74	21.59	2.82	3.66
(DSO) Days sales outstanding	35.01	29.94	47.70	67.17
Accounts payable to Cost of Sales	0.20	0.04	0.07	0.05
Total debt to total assets	0.18	24.0%	0.25	15.9%
Total debt to common equity	0.32	38.0%	0.25	15.9%
(TIE) Times-interest-earned	15.75	23.22	3.05	3.46
Gross margin	18.5%	19.7%	18.7%	24.0%
Operating margin	7.4%	0.09	7.2%	11.4%
EBITDA margin	11.5%	12.7%	23.1%	23.1%
Profit margin	7.0%	8.8%	5.1%	8.2%
(ROA) Return on total assets	6.9%	12.0%	4.1%	8.4%
(ROE) Return on total equity	12.1%	19.0%	4.1%	8.4%
(ROIC) Return on invested capital	8.2%	12.2%	4.0%	8.5%
(BEP) Basic earning power	7.3%	12.5%	5.9%	11.6%

We compared the values of the ratios of the strongest and weakest companies with the industry figures, and did not find any regularity. For each value, there are higher and lower values. This fact does not prove

anything, but the contrary would make to presume to the "market" and its participants reacted ineffectively and made decisions based not on a whole picture, but only according to one or a few ratios – attitude, which is not considered effective in the analysis process, especially, while making financial decisions.

After the survey, we interviewed 5 respondents. In their opinion, filling out the questionnaire is not complicated and requires 20-40 minutes. None of them distinguished any particular ratios or groups of ratios by which the decision was made. Everyone expressed a willingness to participate if the survey is repeated.

4) Results of regression Analysis

The fact that potential capital market participants made decisions based on their assessment of the full picture of financial ratios, rather than one or a few specific ratios, was examined through regression analysis. The independent variable in the calculations was the financial ratio and the dependent variable was the numerical value of the company assessment by potential market participants. We analyzed both, 2018 and 2019 years.

Following measures were calculated: correlation coefficient (Multiple R), coefficient of determination (R square), standard error of regression, regression coefficients[5] and p-value.

We formulated Ho in such way that in case of fail to reject it, we will receive a key answer. That is, if we reject the notion that the value of any particular financial ratio is not a determinant of attitudes toward the company, we can assume that the values obtained in the survey are not the result of an all-inclusive analysis, but of evaluating specific ratio or two. In this case, set of "good" and "bad" companies' indicators are losing their meaning as benchmarks. Only one or a few ratio will matter. Results of the regression are given in the tables 4 below.

Table 4 Regression Analysis of Ratios

Ratio	Multiple R		R Square		Standard Error		b Coefficient		P-value	
	2019	2018	2019	2018	2019	2018	2019	2018	2019	2018
Current	0.38	0.35	0.15	0.12	11.72	11.90	4.28	-1.42	0.311	0.363
Quick	0.66	0.36	0.44	0.13	9.50	11.84	17.16	-4.84	0.052	0.343
Total assets turnover	0.25	0.03	0.06	0.00	12.29	12.68	-3.95	0.77	0.520	0.933
Fixed assets turnover	0.45	0.40	0.21	0.16	11.30	11.64	-1.50	-1.88	0.220	0.290
Inventory turnover	0.53	0.56	0.28	0.31	10.74	10.50	1.00	1.79	0.140	0.116
(DSO) Days sales outstanding	0.04	0.11	0.00	0.01	12.68	12.61	0.01	-0.03	0.925	0.785
Accounts payable to Cost of Sales	0.39	0.39	0.15	0.16	11.68	11.66	-25.22	-30.67	0.300	0.294
Total debt to total assets	0.36	0.28	0.13	0.08	11.82	12.18	-12.08	-8.44	0.338	0.468
Total debt to common equity	0.18	0.16	0.03	0.03	12.48	12.52	0.74	0.39	0.645	0.680
(TIE) Times-interest-earned	0.44	0.55	0.20	0.31	11.38	10.57	0.23	1.28	0.233	0.123
Gross margin	0.07	0.03	0.00	0.00	12.66	12.68	-5.02	-1.28	0.866	0.945
Operating margin	0.39	0.17	0.15	0.03	11.70	12.51	46.29	5.31	0.304	0.668
EBITDA margin	0.36	0.20	0.13	0.04	11.84	12.44	41.74	7.18	0.342	0.612
Profit margin	0.36	0.18	0.13	0.03	11.85	12.47	28.36	5.51	0.345	0.638
(ROA) Return on total assets	0.65	0.30	0.42	0.09	9.69	12.11	97.88	31.99	0.060	0.439
(ROE) Return on total equity	0.48	0.30	0.23	0.09	11.15	12.10	26.62	23.41	0.195	0.432
(ROIC) Return on invested capital	0.47	0.21	0.22	0.04	11.22	12.41	64.61	21.47	0.206	0.594
(BEP) Basic earning power	0.48	0.23	0.23	0.05	11.10	12.34	66.34	24.65	0.186	0.546

As the regression analysis showed, the null hypothesis could not be rejected. The p-value of all coefficients exceeds 0.05. In the case of Quick Ratio and ROA, the value is low, but not sufficiently. We must also take into account that the coefficient of determination for these coefficients is not high.

5) Results of analysis of companies' forecasted financial statements

In a survey of potential participants in the capital market, we identified the companies which's share price increase is expected. At the last stage of the research, we aimed to verify the results obtained - how strong or solid is the financial state of these companies. This time we used the forecasted financial statements of the companies and not just the financial ratios. An analysis of the two best performing companies was conducted. To see the full picture, we additionally analyzed three companies whose status was assessed as "weak".

We made five-year pro-forma statements and assessed the condition of the companies during this period. We used neither optimistic nor pessimistic approach for forecasting. The main assumption was that the companies would continue to operate as they did in 2019. Only in this case is it possible to understand how valid ratio based "market" estimates are. If we would use different operating indicators in the forecasts (e.g. improved or deteriorated efficiency, altered financial ratios), we would get a picture that would not be comparable to the survey results.

[5] By authors' opinion, the intersection ('a' coefficient) does not contain necessary or interesting information for this analysis and, therefore, we did not discuss it.

In the forecasts, we considered the possibility of growth of sales with the same rate as growth of the Georgian economy in 2019 (4.982%). We have considered this rate for the next 5 years.

With sales increase, the assets of the company should increases, which creates the need for additional funding. At the same time, the current liabilities related to the company's operations, such as, for example, accounts payable, also increases. This increase, to some extent, reduces the need for financing. In forecasting, we also took into account the operating income received by the company, which also finances the growth of assets to some extent. At the end of the forecast year, the sum of the Company's liabilities and operating income may be less than the increase of assets. The difference arising in this case must be financed from any external source - it can be either a debt or equity. Raising equity capital (especially it case of underdeveloped capital market) is much more difficult than getting debt financing. That is why we have used debt financing in our forecasts. For the purposes of the analysis, it does not matter if the debt is short-term or long-term.

When an increase in liabilities and operating income outweighs an increase in assets, a financial surplus will arise which will allow to decrease debt. If the debt is fully repaid, the forecasted excess should either be invested in short-term investments (if funds are needed in future, investments will be sold and reduced), in long-term investments (which contradicts our neutral approach), or issued as a dividend to investors. If company has a history of issuing dividends, some part of surplus was assumed to be paid as dividends and other part to reduce debt – i.e. we assumed that company will continue to pay dividends.

Increased or decreased debt volumes result in increased or decreased interest expenses in future periods, which are reflected in the profit and loss pro-forma statement, reducing income and creating the need for additional financing. This is why it is necessary to conduct several iterations when forecasting. We used the interest rates of the companies' loans for forecasts. Finally, we got balanced pro-forma statements. Through them, we assessed the condition of the companies, calculated the free cash flow and the value of the company's operations.

Companies 6 and 8, as the two "strongest", were studied. Negative operating income of the most "weak" company (3), confirms the weakness of the company and also does not allow us to determine the value. Therefore, we considered to analyze the next two companies rated "weak" – 9 and 1.

The results of the companies' analysis are described below.

a) Company 6

The company significantly increased its sales volume in 2019 (55%), which should be assumed to be related with a significant increase in fixed assets in 2018. The increase in sales was naturally followed by an increase in current assets resulting in negative (-2,738 thousand GEL) free cash flow (FCF) in 2019. Forecasts considers 4.98% sales growth. In this case the increased operating income and liabilities outweigh the increase in assets and the FCF is positive.

Table 5 Company 6 – FCF calculations

Actual amounts for 2019 and 5 year projections (thousands GEL)	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**
Net operating profit after taxes (NOPAT)	3,335	3,502	3,676	3,859	4,051	4,253
Total operating capital (TOC)	27,280	28,639	30,066	31,564	33,136	34,787
Change in TOC (ΔTOC)	6,073	1,359	1,427	1,498	1,573	1,651
FCF = NOPAT – ΔTOC	(2,738)	2,142	2,249	2,361	2,479	2,602

To assess the value of the company, we determined its weighted average cost of capital (WACC) and FCF increase. We used US data to calculate the WACC. The corresponding WACC of the company is 6.90% (Damodaran Online: Home Page for Aswath Damodaran, n.d.). In case of Georgian company we add country risk premium 4.41% (Damodaran, 2019) and local currency risk premium, calculated during the research, 2.94%. Result WACC is 14.25%.

By discounting FCF we determined that company operations value is 23.1 million GEL in 2019 and in the end of 2020 value is 24.2 mln GEL.

Analysis of forecasts shows that the company's operating and financial performance is satisfactory. The FCF is positive and growing. The value of the company is positive. Therefore, we can conclude that the company's "strong" rating by capital market participants through ratio analysis does not contradict the results of a broader analysis and its ratings are acceptable as a benchmark for a "strong" company.

b) Company 8

Next "high performance" company according to market survey is Company 8. It also has a high sales growth (22%). In this case, too, we have an increase in current assets, but unlike the previous company, fixed assets decrease. Because of this the 2020 FCF is lower than the relatively high 2019 FCF caused by this reduction. But all forecasts for the FCF are positive and growing steadily.

The company's corresponding WACC in the US is 5.24%. Similarly to the 6th company, by adding premiums (4.41% and 2.94%) we get 12.59%. Discounting the FCF, we get that the value of the company's operations at the end of 2019 is 55.7 mln GEL, and at the end of 2020 is 58.5 mln GEL.

Table 6 Company 8 – FCF calculations

Actual amounts for 2019 and 5 year projections (thousands GEL)	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**
Net operating profit after taxes (NOPAT)	7,089	7,420	7,789	8,178	8,585	9,013
Total operating capital (TOC)	63,781	66,959	70,294	73,797	77,473	81,333
Change in TOC (ΔTOC)	(1,203)	3,178	3,336	3,502	3,677	3,860
FCF = NOPAT – ΔTOC	8,292	4,242	4,454	4,675	4,908	5,153

Good financial state is observed In the case of the 8th company too. Consequently, for this company as well, we can conclude that the company's "high" rating does not contradict to the results of the deeper analysis and its ratios are also acceptable as a benchmark for the "good" company.

c) Weak companies (3, 9 and 1)

Company 3 is the weakest in terms of results. The deeper analysis confirms the same. According to the forecast, the company will increase operating losses from year to year, the need for external funding will increase intensively and the debt will increase significantly. FCF is negative and decreases from year to year.

Company 9 was rated as "weak" and took second place from the end. In 2019, the company has an increase (16%) in sales, at the same time reducing both current assets and fixed assets. As a result, the company will have a high FCF in 2019 (24.5 mln GEL), but in subsequent periods this figure will fall, although positive and growing.

The retained earnings of the company are negative. Operating income is growing, but is not enough to offset the negative retained earnings over three years. It becomes positive only in 2023. The company's income is not sufficient to finance increased assets and the use of external sources are required, resulting in an increase in the debt each year. As the result even in the 5th year, the company's debt is 5 times its total equity. In reality, the possibility to attract additional loans by such a company would be questioned. Without radical changes in operations, or without attracting additional equity capital, the financial condition of the company can be assessed as particularly risky. According to the projections, we have no reason to consider the 9th company as "strong".

Company 1 is third from the bottom. Sales growth from 2018 to 2019 is not high (4%), while the assets are growing significantly. Current assets increase by 28% and fixed assets by 26%. In addition to the increase in assets, the company's expenses increase (26%) and both operating and net profits decrease. We assumed that assets growth will be proportional to sales growth. According to forecasts, the company's operating income will not be sufficient to finance the growth of assets and the company needs to attract significant external capital. Consequently, debt increases from year to year. There is also an increase in interest expenses, which cannot be covered due to low operating income, and the company has a loss every forecasted year. Negative retained earnings are growing as well. The FCF is negative in 2019 and in all subsequent forecast years. Consequently, it is impossible to determine the value of the company. Therefore, we have no reason to consider the company as "strong".

As the results of the analysis of the projections showed, the companies that were considered "strong" by imitated capital market, have solid financial state, while those that were rated "weak" suffer from some operational and/or financial problems. Consequently, it is not possible to discard the results of the imitational research. This fact allows us to consider the financial ratios of the "high performance" companies identified in the study as a useful benchmark for financial analysis.

V.LIMITATIONS

The study uses published financial statements of companies in Georgia. Although the statements are prepared in accordance with the principles of financial accounting and applicable regulations, they both leave some degree of freedom for company and auditor, as well as the regulator. Interpretations and data aggregation is possible. Consequently, the availability of data varies from company to company. There are a large number of noticeable or detectable errors that have led to the failure to take into account data from 7 companies out of 138. Naturally, we must assume that there may be errors made unintentionally or intentionally that cannot be discovered.

There are two types of time-related constraints. One, the starting moment of the study, is determined by the regulations. Companies are required to publish their statements in October of the following year. Added to this is the duration of the research itself, which increases with the number of companies, impairment of quality of the reports, and the complications of information gathering. Consequently, obtaining the final results takes more than one year after the end of the reporting period (3-4 months after publication).

Due to the low quality of the third category companies' statements and the inability to obtain information in an acceptable form, the research was conducted using only the first and second category companies' data.

Interesting limitation is related to the fact that companies can update statements published in previous years to clarify or eliminate deficiencies. However, this fact also has a positive side - the quality of information improves over time.

Due to the lack of information it is generally impossible to calculate some of the ratios. For example, those related to the stock price of companies.

Market imitational research has methodological limitations. When completing a questionnaire, unlike during real market transactions, no real money is used. Consequently, it is likely that responses will differ from actual market decisions. The questionnaire contained information about nine companies, while the number of companies in the industry is much higher. We must assume that there is a company, or companies, that would have a higher performance than the best company identified in the survey. That is, the research revealed the financial ratios of the "good" and not the "best" company. Decisions were made based only on ratios. In reality, all circumstances are taken into account, like internal factors of the company, the working environment, or the world economy.

VI.CONCLUSIONS

The main conclusion from the results of the research is that the average financial ratios of Georgian industries can be calculated based on the availability and quality of present information. And, despite the scarcity of capital market data, using imitational model of the market, by surveying potential market participants, we can identify companies whose financial ratios are consistent with a successful company in terms of stock performance. Consequently, as a result of the research, we obtained two sets of benchmarks required for the analysis and methodology of their calculation.

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