An Internship Report on

"Efficient Frontier and Portfolio Optimization of Five Selected Stocks: A Quantitative Approach"

Submitted By

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ID: 21304016
BRAC Business School
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An internship report submitted to the BRAC Business School in partial fulfillment of the requirements for the degree of
Bachelor of Business Administration (BBA)

Declaration

It is hereby declared that

1. The internship report submitted is my/our own original work while completing degree at Brac University.
2. The report does not contain material previously published or written by a third party, except where this is appropriately cited through full and accurate reference.
3. The report does not contain material which has been accepted, or submitted, for any other degree or diploma at a university or other institution.
4. I/We have acknowledged all main sources of help.

Student's Full Name & Signature:

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21304016
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BRAC University

Supervisor's Full Name & Signature:

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Mohammad Mujibul Haque, *PhD*
Professor & Associate Dean (Acting Dean)
BRAC Business School
BRAC University

Letter of Transmittal

Mohammad Mujibul Haque, PhD
Professor & Associate Dean (Acting Dean),
BRAC Business School
BRAC University
Kha 224 Pragati Sarani, Merul Badda , Dhaka 1212

Subject: Submission of Internship report on **"Efficient Frontier and Portfolio Optimization of Five Selected Stocks: A Quantitative Approach"**

Dear Sir,

I am quite pleased to provide you with the assigned internship report, which fulfills the requirements for obtaining the Bachelor of Business Administration degree from BRAC Business School, BRAC University.

During the report-writing process, I deliberately tried to reflect on my internship and schoolwork. I am grateful that you are my supervisor since you helped me, gave me space, and provided me with the guidance and information I needed to complete the report. To completing the report in the most comprehensive, concise, and useful way possible, I have attempted to incorporate the pertinent information and suggestions. I am sure the report will meet all the requirements.

Sincerely yours,

____

Adiba Iqbal
21304016
BRAC Business School
BRAC University
Date: 05 January 2025

Non-Disclosure Agreement

This agreement is made between EBL Asset Management and the undersigned student Adiba Iqbal at Brac University that the report does not contain any confidential information from the organization.

Adiba Iqbal
ID: 21304016
BRAC Business School
BRAC University

Md. Asif Muntasir Shakkhor
Head of Investment
EBL Asset Management Limited

Acknowledgement

My sincere gratitude goes out to EBL Asset Management and the Research & Investment department. Md. Asif Muntasir Shakkhor, the Head of Investment and my on-the-job supervisor helped me with all my things I did throughout my internship and finished my report. They offered helpful perspectives to ensure that this report fulfilled all requirements.

Second, I would like to thank my academic co-supervisor, Dr. Abu Saad Md. Masnun Al Mahi, an assistant professor at BRAC Business School, and my academic supervisor, Mohammad Mujibul Haque, PhD, a professor and associate dean (acting dean). Periodically, they went over my reports, fixing my errors and giving me advice on how to present them more forcefully.

In conclusion, I would like to thank my mother, Shahin Sultana and friends namely, Tahmeed Hossain, Shaffat Ahmed, Mubeena Mozammel and Awsaf Hossain Chowdhury for helping me at every stage so that I could successfully finish my university education.

Executive Summary

The effective frontier and portfolio optimization of five chosen stocks—Grameenphone, Marico, Berger, Crown Cement, and Padma Oil—is highlighted in this research. Data from December 1, 2019, to November 30, 2024, was used for technical analysis to justify the stock pick. Diversifying the portfolio and identifying the best stock combination to provide investors with the maximum return at the lowest risk are the primary goals.

My internship at EBL Asset Management is discussed in the report's first section. Information regarding my duties and contributions to the company are included. The difficulties I encountered and my suggestions for the organization and students are also covered.

The business's functional departments—Finance, Accounting, Marketing, HRM, and Operations—have their methods and results examined in the report's organization section. Additionally, a SWOT analysis of the firm and an industry favourability study utilizing Five Porter's Forces have been conducted. These evaluations have led to the provision of recommendations. The approach has also been examined, as have the scope and restrictions.

In the project section, technical analysis was done of five chosen stocks- Grameenphone, Crown Cement, Marico, Berger Paints and Padma Oil. Using data from Dec 1, 2019, to Nov 30, 2024, I produced a price volume chart that illustrates the connection between an asset's trading volume and price change. A return chart was also created to display the stock's performance over time. To illustrate the frequency of returns for each stock and evaluate volatility, a return distribution chart was created over time. To further illustrate the market risk of each stock by expressing its beta, a scatter diagram was created using a regression line. Additionally, risk and yearly returns for each of the five equities were calculated. Then, to optimize the portfolio, we assessed the associations between various assets by creating a variance-covariance matrix. Following that, a simulation was used to create 10,000 possible combinations to create an effective frontier that assisted in determining the portfolio's maximum and lowest variance.

Lastly, diversity has significantly impacted revenues even if it has effectively reduced risk. By striking a balance between the two, an effective portfolio strategy would preserve a higher Sharpe ratio. Combinations with larger allocations to CROWN or other assets that provide a positive contribution should get the most attention and reducing the weights of assets that reduce returns, such as MARICO or PADMAOIL, and reviewing the inclusion of low-return assets.

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Chapter 1

Overview of Internship

1.1 Student Information

Name: Adiba Iqbal

ID: 21304016

Program: Bachelor of Business Administration (B.B.A)

Major: Finance

1.2 Internship Information

1.2.1 Period, Company Name, Department/Division, Address

Due to my keen interest in the capital market, I decided to pursue my internship in EBL Asset Management Ltd, a fully owned subsidiary of Eastern Bank Limited. My internship period was from 08 October 2024 to 08 January, 2025. I was given the role of research and investment analyst in the Research and Investment department. My workplace was located at Bangladesh Shipping Corporation (BSC) Tower 2-3, Rajuk Avenue (4th floor, Dhaka 1000).

1.2.2 Internship Company Supervisor's Information

My on-the-job supervisor for the whole period of my internship in EBL Asset Management was Md. Asif Muntasir Shakkhor. He is the Head of Investment in the Research & Investment department. He joined the organization in 2023. He graduated from North South University. Apart from working under him, I had to work with other team members of the department as well.

1.2.3 Job Responsibilities

As an investment research intern in EBLAML, my main duty was to analyze companies from different industries using in depth financial statement analysis and doing valuations. I had to prepare reports on the financial performance of various companies such as Berger, Marico, Padma Oil etc. Moreover, I assisted in preparing the daily news snippet of our company which was later published in social media. Other than that, I was assigned with small tasks such as creating some marketing contents for our social media pages.

My task was not limited to just finance or our country. I was asked to research on the marketing tools of Indian asset management companies and comparing that to our own. Using that information, I generated some ideas on how our asset management company can thrive in the future.

1.3 Internship Outcomes

1.3.1 My contribution to EBL Asset Management Limited

I produced financial performance reports for a few allocated organizations such as Marico, Berger, Padma Oil, Jamuna Oil and Meghna Petroleum. I think these reports will make it simpler for the business to assess a DSE listed firm. Furthermore, my assessment of the marketing tools used by Indian asset management companies helped the company to gather ideas on marketing strategies of some renowned asset management companies of India and take on a similar approach. Using these ideas, I generated some marketing contents to help EBL Asset Management Limited gain popularity in different social media and attract investors. I think the corporation may gain from using these marketing contents and reports to assess a company, industry, and ultimately stock value.

1.3.2 Benefits

For a student participating in an internship, there are numerous benefits. This also applies to my internship at EBL Asset Management Limited. I learnt a lot of things that, in my opinion, are already significantly influencing my personal growth. First, I learnt the fundamentals of our nation's business culture. There are certain fundamental aspects of culture that all organizations adhere to, even if they differ from one another. These include interpersonal skills, communication dos and don'ts, and eating and clothing etiquette. Additionally, I learnt how cultivating all these aspects of myself would make me a better person in general. I used to be very passionate and excited about money, especially the stock market and investing. I know how to determine if a company is doing well or not since I worked for a reputable brokerage house. I can also comprehend how to decide which stocks to purchase and if a company's stock is reasonably priced, overvalued, or undervalued. When I participate in the capital market or do a comparable function as a research intern for a company, this information will be helpful. Furthermore, I am aware of the stages at which a nation's capital market may advance or degrade as well as the contributing elements, including the fiscal and monetary issues of the economy. Lastly, I made some great connections in this company and got to know a lot of people through them. I strongly believe this will help me shine in further stages of my life.

1.3.3 Problems

Throughout my internship, I encountered several difficulties. I took two courses alongside my internship which was quite stressful balancing both work and studies. I often had very little time for studies or personal interests because of how stressful the back-and-forth commute was. Long periods of time spent in front of a computer screen led to headaches and eye strain, which made it difficult to concentrate. After a few weeks I started having shoulder and back pain. In addition, my laptop was very sluggish, which made things considerably more time-consuming and harder to complete. Additionally, I had to cope with my social anxiety where it was hard to engage with my coworkers and ask for help.

1.3.4 Recommendations

For finance geeks, I would recommend EBL Asset Management as a good learning environment. However, I have some suggestions for how the company and the future interns might enhance the internship experience and overall workplace.

First, having an experienced mentor or supervisor who can provide continuous advice and comments would be beneficial and improve the effectiveness of the learning process. Moreover, better access to modern equipment or technology, such as quicker laptops or more effective software, would also increase productivity and cut down on needless annoyances. Finally, establishing a more transparent and encouraging workplace where interns are at ease asking questions and exchanging ideas will promote a happier and more effective learning environment.

Chapter 2

Organization Part

2.1 Introduction

2.1.1 Objective

This section gives a broad summary of EBL with a focus on EBL Asset Management Limited. The present discourse focuses on the marketing and management strategies of EBL Asset Management Limited. Additionally, the accounting and information system procedures and operational management practices are also included here. Information on the financial performance over the previous several years is also included in this section. In this last phase of the project, industry and competitive analysis is completed.

2.1.2 Scope

This section of the report may be read more closely to get a deeper understanding of the organization's many facets and conduct a more thorough analysis of them. More data will be accessible for further study in the future. If this data is included in this pre-existing report, further analysis may provide more worthwhile outcomes. The company may get a better understanding of its financial performance, marketing initiatives, HRM practices, and standard accounting compliance. As a result, they may also focus on proposed changes or make their own observations and assessments. Consequently, this research might be pursued further by an individual or by the company.

2.1.3 Methodology

In this portion, the overview of the company is done by studying its vision and mission statements, core values, and the goods and services given by EBLAML. Then the management practices are briefly reviewed by assessing the management style, leadership style, remuneration system, assessment technique, and how they are considered for EBL Asset Management Limited.

The marketing practices are also examined by examining their brand promotion and advertising strategies along with researching the marketing channels employed by the firm. The accounting and financial procedures are studied by taking the 3 years data from 2021-2023 into consideration. The various ratios are assessed to determine how the company is performing from the viewpoint of financial commitments and standards. The operations management and information systems are also studied briefly.

The conclusions in this portion are based on accessible information on the company’s and other credible websites giving information about the business and the industry.

The information that could not be discovered on the firm’s websites or other public sources has been obtained by questioning the employees at EBLAML, largely known by the research team.

2.1.4 Limitations

There was not enough time for this study. As a result, numerous conclusions were drawn without doing a thorough analysis. This might have produced certain outcomes that were not in line with the norms. Confidentiality restrictions applied to the data that was extracted from the company. The study period does not represent the company's performance at peak and trough periods of the economy. Furthermore, it fails to consider the substantial modifications made to the company's rules and procedures to address adverse circumstances.

2.1.5 Significance of the study

This report is very important to the company and to me. By doing this study, I was able to get knowledge about the operations of an asset management firm, particularly EBL Asset Management Limited, and the tactics these companies use to stay competitive in the market. Additionally, I discovered regarding the restrictions that these businesses face while developing their plans, as well as the restrictions brought about by the authorities and outside variables affecting the organization's operational region. I learn more about these kinds of businesses and improve my understanding of how to evaluate a company's success in terms of its management, marketing, finance, accounting, and operations strategies.

My research may be reviewed by the company to learn about its opportunities, challenges, shortcomings, and strengths. To take the appropriate action, it may also determine if the internal and external environments are beneficial. I can help it learn more about its areas of improvement, and if required, it can take necessary actions. In addition to identifying the elements that are causing failures and taking the required corrective action, it may also determine which aspects are most important to its success and take steps to increase their contributions.

2.2 Overview of the Company

EBL started its journey in 1992. It became one of the nation's most valued financial organizations in under 30 years. With a growth mentality, EBL has shown dedication to supporting the nation's economic development in addition to concentrating on maintaining profitability. EBL's devotion to service quality, enthusiasm for innovation, and commitment to corporate governance are the forces that drive its outstanding success. In Bangladesh, EBL is currently seen as a modern and intelligent bank that represents stability.

The company has 3 sister concerns at present. They are EBL Investments Limited, EBL Securities Limited and EBL Asset Management Limited. EBL Asset Management Limited is a fully owned subsidiary of Eastern Bank Limited. EBL Asset Management Limited (EBLAML) was incorporated on 9 January 2011 to carry out asset management business. EBLAML obtained license from Bangladesh Securities & Exchange Commission (BSEC) on 25 May 2017 to run full-fledged business operations. As part of this commitment, EBLAML is supporting the EBL AML 1st Unit Fund, to increase the population's access to the economic benefits of the Bangladeshi capital market.

2.2.1 Vision Statement

Eastern Bank Limited (EBL) intends to be the most valuable brand in the nation as visible in its vision statement “To become the most valuable brand in the financial services in Bangladesh, creating long-lasting value for our stakeholders and above all for the community we operate in by transforming the way we do business and by delivering sustainable growth**.”**

EBL Asset Management Limited intends to become the best fund manager as seen in its vision statement “To become the best Fund Manager of Bangladesh by ensuring Professionalism, Integrity & Trust".

2.2.2 Mission Statement

The mission statement of EBL states “We will provide excellence to all customers, maximize the value of shareholders, and create a cohesive, team-based culture that drives continuous improvement and professional growth”.

The mission of EBL Asset Management Limited states, “To create investor’s confidence in the arena of asset management by following the highest standard of practices.”

2.2.3 Core Values

Core values of EBL include Service Excellence, Commitment, Openness, Integrity, Trust, Responsible Corporate Citizen.

Core values of EBL Asset Management include Integrity, Expertise, Innovation, Performance driven, Long Term Perspective, Collaboration and compliance, Risk Management.

2.3 Management Practices of EBL Asset Management Limited

EBL Asset Management Ltd always hires the best fit candidates based on their knowledge, skills, and ability to perform the work regardless of their race, ethnicity, sex or sexual orientation, gender, identity, age, disability, or marital status. The company continuously works on attracting a diversified pool of highly qualified candidates consistently with the company’s objective of hiring the best resources of the market**.**

Organogram of EBL

Source: EBL Annual report (2023**)**

2.3.1 Management Team of EBL Asset Management Limited

The board of directors of EBL include K. M. Tanjib-ul Alam, Mahreen Nasir, M. Khurshed Alam, Zara Namreen and Tauhidul Ashraf.

The managing director of EBL AML is Tauhidul Ashraf.

The employees of EBL AML include Mr. Rayhanul Arefin (Head of Finance), Monif Hasan Niloy (Investment Research Officer), Mohammad Rifat Hossain (Head of Investment) and Ms. Afsara Dia (Compliance Officer).

2.3.2 Leadership Style and Impact of Leadership Style on Achieving Goals and Objectives

EBL Asset Management Limited employs a democratic leadership style.

According to a small perspective that involves the managers of each department, every team at EBLAML is required to abide by a rule every day. There's a team meeting where the manager goes over the specifics of the previous day's work and the plans for the current day with their coworkers and staff. The supervisors at EBLAML pay attention to what their staff members have to say about any planning or problem. Team talks and suggestions from all angles present resolutions to the issues at hand. The company's MD as well looks up to the consultant regarding the specific issues or problems in the company.

Democratic leadership style practiced by EBL Asset Management Limited promotes a cooperative and a friendly working environment that aids in achieving the company's goals and objectives. Taking staff input aggressively, encouraging open communication and bragging team members in decision making processes can give managers different views and insights for a more thorough solution to problems. In addition to increasing employee engagement and morale, this strategy fosters creativity and problem-solving within the teams. Open atmosphere, regular meetings, helpful criticism helps output and inspire workers to be associated with the goals of the business. Additionally, participation of the Managing Director in the process of obtaining advice on the important issues along with the Management and Board, ensures that decisions are being made based on the knowledge and following the organizational strategic goals.

2.3.3 Recruitment Process

The sources of internal recruitment are:

- Internal job search for suitable positions as decided by the Management.
- Absorption of trainee staff depends on the availability of suitable vacancy.
- Retention of retired employees as contractual executive if their skills are necessary for the company.

The sources of external recruitment are:

- Recruiting fresh graduates in entry level positions.
- External recruitment through job search in EBLAML online recruitment tools and newspaper.
- Different universities and institutes.
- Lateral recruitment of experienced candidates sourced by the company.
- Ex EBLAML employees.
- Unsolicited CV database and employee referrals.

2.3.4 Compensation System

Employees of EBL Asset Management are provided with both monetary and fringe benefits. They are:

- Basic salary
- Promotional benefits

- Travelling allowances
- Bonus (Festival, performance)
- Transfer allowances
- Employee loans (Car loan, home loan, loan against monthly salary, loan against provident fund)
- Retirement benefits
- Overtime payments

2.3.5 Training and Development Programs

At EBL Asset Management Limited employees get job training at their workplace while they are doing their actual job. Off the job training is conducted in a location specifically designated for training. It may be near the workplace or away from work.

HR will confirm training requirement through a formal training need analysis by the end of November (every year) considering the competency-based training requirement, employees' individual training record and development plan.

2.3.6 Appraisal System

The appraisal system operates on a quarterly basis. Employees are required to complete an online assessment form every quarter, and their ratings are determined by their performance during that quarter. The final quarter and half-yearly rating decide how to assign the rating. The grading scale goes from 1 (excellent) to 5 (extremely bad). The annual increase is impacted by this rating. The assessment rating considers the training, everyday job actions, including interacting with customers and team members, and the grading from e-learning. All these procedures influence the evaluation grade and lead to an increase.

2.3.7 Comment on Management practices

EBL Asset Management Limited has good management skills, as shown by their careful approach to investing and their focus on risk management. Their team puts a lot of emphasis on making smart decisions based on market research. This makes sure that clients' portfolios are diversified and that their financial goals are met. Being open and talking to people daily is important to the company. This builds trust and leads to long-term relationships. Additionally, they make sure compliance and operating ethics by following the rules set by regulators.

2.4 Marketing Practices

The marketing practices of EBL Asset Management are carried out by members of other departments who are devoted to marketing strategies that adhere to the parent company's rules. There is no specific marketing team. According to the needs of the company, it uses many marketing techniques.

2.4.1 Products and Services of EBL Asset Management Limited

EBL AML offers a range of products and services which help people and organizations in controlling and enhancing their wealth. Here are its primary products:

i. EBL mutual funds: EBL has a suite of mutual fund options for people to make investments in professionally managed, diversified, and assured highest yield with minimum risk.
ii. Personalized Portfolio Management services for High-net-worth individuals: Portfolio management to allow high net worth individuals to achieve financial outcomes/outcome and maximize financial growth with tailored investment strategies.
iii. Wealth Management Solutions: services with all the options a customer needs in a financial way to address his/her need of estate planning, retirement plans, tax planning and asset allocation.
iv. Services provide advice and guidance to customers on investment opportunities, market trends, portfolio management approach to help them to take well informed decisions and make above average profits on investments.
v. Management of Institutional Funds - Expert services for overseeing large institutional assets, guaranteeing maximum returns while abiding by legal mandates and customer objectives.
vi. Analysis of Research and Markets - Comprehensive market research and analysis that gives customers important information about investment opportunities, market trends, and economic aspects to help them make investment choices.

2.4.2 Target Customers, Targeting and Positioning Strategy

2.4.2.1 Segmentation of EBL Asset Management Limited

EBL Asset Management segments its customers in various ways. Firstly, based on psychographics. Lifestyle, values, risk tolerance, investment goals, etc. are investigated when considering potential clients. Secondly, based on behavioral segmentation investment experience, trading frequency, preferred communication channels, etc. are crucial. When it comes to financial segmentation, net worth, investable assets, income sources, etc. are key factors when deciding how to onboard clients. Demographical segmentation is the last part where age, income, occupation, location, etc. are considered.

2.4.2.2 Target Group of EBL Asset Management Limited

Following market segmentation, EBL Asset Management chooses certain target groups that complement their resources, investing know-how, and competitive advantages. Targeting considers the following factors:

- Segment size and development potential: The business concentrates on market sectors with substantial size and room for expansion.

- Segment profitability: The business evaluates each segment's potential profitability by considering variables such as average account size and revenue per customer.
- Competitive intensity: The business assesses the degree of competition in each market and finds ways to set itself apart.
- Company resources and capabilities: The business makes sure it has the tools and know-how required to successfully service the selected target markets.

2.4.2.3 Positioning Strategy of EBL Asset Management Limited

EBL Asset Management’s positioning strategies include:

- Investment philosophy and strategy: The business's distinct approach to investment, including income-oriented, growth-oriented, or value-oriented methods.
- Performance history: The business's past investment performance, indicating its capacity to provide customers with substantial returns.
- The level of expertise and customer service: The commitment of the business to offer superior client care with private advice, continued interaction and contact to experienced financial geeks.
- Brand culture and values: The company's culture and values that appeal to the target market and foster loyalty and trust.

2.4.3 Marketing Channels

EBL Asset Management employs lots of methods of marketing which includes direct marketing channels such as seminars and workshops, conventional media like print and television, and digital media such as social media and online advertising. EBL advertises its investment products via the network of branches of its parent business through bank branches and also through financial advisers.

2.4.4 Product Development and Competitive Practices

EBL Asset Management may offer mutual funds established to achieve growth, income or a particular industry (such as EBL Growth Fund, EBL Income Fund and EBL Real Estate Fund). Also, they could offer specialized investment portfolios, and pension fund management services to affluent people. Most likely, EBL focuses on competitive pricing, has a solid performance history and highly emphasized risk management, in order to compete. Through its partnership with Eastern Bank Limited, EBL may provide integrated financial solutions that provide customers easy access to investing and banking services.

2.4.5 Advertising, Promotion and Branding Strategies

EBL Asset Management posts new content on Facebook and LinkedIn sites. Both share a "daily news snippet" that informs users about different financial events or news gleaned from newspaper financial sections. In addition, EBLAML publishes about other economic news or developments pertaining to Bangladesh's economy outside of the capital market and uses email marketing. Through its postings, EBLAML shares its vision and ideals highlighting its logo. They interact with people both rationally and emotionally. For instance, pages have consistently included Eid greetings to improve business ties with current and prospective clients. Digital marketing also makes advantage of EBLAML's dynamic website. To preserve or convey the brand value to their clients, they consistently center their postings around the colors, values, and visions of the company.

A content made to attract SIP investors (Source: EBL asset management Facebook page, https://www.facebook.com/EBLAML)

A happy new year's greeting (Source: EBL asset management LinkedIn page, https://www.linkedin.com/company/eblaml/posts/?feedView=all)

Victory Day Post on Facebook (Source: EBL asset management Facebook page, https://www.facebook.com/EBLAML)

2.4.6 Comment on Marketing practices

EBL Asset Management Limited's marketing seems to be falling behind the times, and the company isn't very visible in the market. They could make their marketing more effective and up to date by using digital platforms and social media to reach more people. Increasing brand recognition through focused marketing and educating investors could help bring in a wide range of customers. They could also get and keep more customers by improving their value offering and showing off their success stories.

2.5 Financial Performance and Accounting Practices

2.5.1 Financial Performance

I have analyzed the financial performance of EBL Asset Management Limited by taking the financial statements of the last five years (2019-2023).

Financial Highlights (2019-2023)

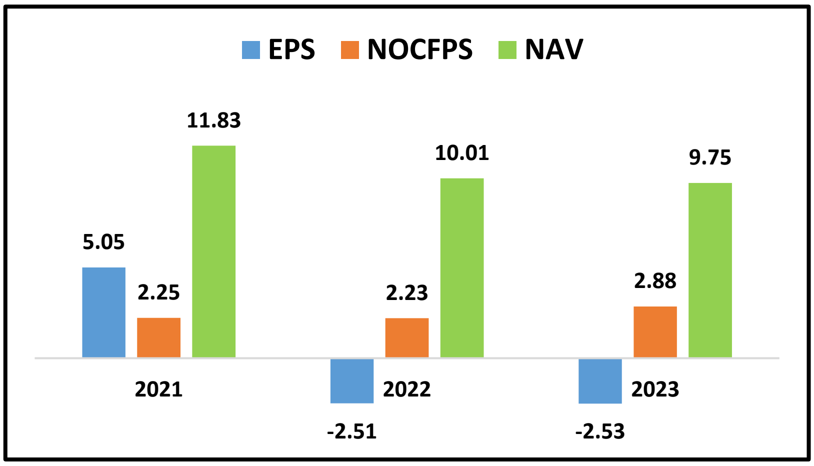
	2019	2020	2021	2022	2023
Interest income	20684637	14397124	9229932	9663174	1907771
Growth (%)		**-30.4%**	**-35.9%**	**4.7%**	**-80.3%**
Investment income	6139991	2279666	9758181	7158524	13344596
Growth (%)		**-62.9%**	**328.1%**	**-26.6%**	**86.4%**
Operating income	26,824,628	15,560,701	27,407,270	7,168,341	9,769,566
Growth (%)		**-42.0%**	**76.1%**	**-73.8%**	**36.3%**
Operating expense	9,402,796	10,644,070	12,486,780	14,050,894	15,291,504
Growth (%)		**13.2%**	**17.3%**	**12.5%**	**8.8%**
Operating profit	17,421,832	4,916,631	14,920,490	-6,882,553	-5,521,938
Growth (%)		**-71.8%**	**203.5%**	**-146.1%**	**-19.8%**
Profit before income tax	5,275,752	19,745,410	14,920,490	-6,882,553	-5,521,938
Growth (%)		**274.3%**	**-24.4%**	**-146.1%**	**-19.8%**
Net profit for the year	563,647	17,680,495	12,626,891	-6,286,688	-811,488
Growth (%)		**3036.8%**	**-28.6%**	**-149.8%**	**-87.1%**
Non current assets	4,976,869	58,613,544	57,078,681	64,234,573	80,194,996
Growth (%)		**1077.7%**	**-2.6%**	**12.5%**	**24.8%**
Current assets	290,161,661	234,481,559	242,108,848	196,975,089	173,383,647
Growth (%)		**-19.2%**	**3.3%**	**-18.6%**	**-12.0%**
Total assets	295,138,530	293,095,103	299,187,529	261,209,662	253,578,642
Growth (%)		**-0.7%**	**2.1%**	**-12.7%**	**-2.9%**
Total equity	265,286,174	283,103,611	295,730,501	250,140,361	243,806,935
Growth (%)		**6.7%**	**4.5%**	**-15.4%**	**-2.5%**
Non current liabilities	2,301,373	573,521	0	7,615,046	5,531,511
Growth (%)		**-75.1%**	**-100.0%**	**100.0%**	**-27.4%**
Current liabilites	27,550,983	9,417,969	3,457,027	3,454,254	4,240,196
Growth (%)		**-65.8%**	**-63.3%**	**-0.1%**	**22.8%**

EBL AML 1st Unit Fund Performance (2021-2023)

Dividend declaration			
Dividend declared to Unit Holders of EBL AML 1st Unit Fund	12.00%	5.00%	6.25%
Customers outreach			
Fund raised by EBL AML 1st Unit Fund (YoY) in mn	160	179.18	255.67

2.5.1.1 Financial Ratios highlights (2021-2023)

	2021	2022	2023
Market value ratios			
EPS	5.05	-2.51	-2.53
NOCFPS	2.25	2.23	2.88
NAV	11.83	10.01	9.75
Liquidity			
Current Ratio	70.03	57.02	40.89
Cash ratio	10.68	22.12	2.72
Profitability			
Net Profit Margin	46.07%	-87.70%	-8.31%
Operating Profit Margin	54.44%	-96.01%	-56.52%
Return on Assets	4.22%	-2.41%	-0.32%
Return on Equity	4.27%	-2.51%	-0.33%
Leverage			
Debt to Equity	1.17%	4.43%	4.01%
Debt to Assets	1.16%	4.24%	3.85%



2.5.1.2 Analysis of financial performance

According to the data above, EBL Asset Management's financial performance exhibits notable fluctuations.

Analysis of Revenue and Income

1. Interest income:
   Declining trend from 2019 to 2023, with a notable 80.3% decline in 2023, indicating a decline in primary revenue sources.
2. Income from Investments:
   Extremely erratic, with a notable reduction in 2020 (-62.9%) and notable increases and decreases, suggesting a high level of market dependence.
3. Revenue from Operations:
   Significant decline in 2020 (-42%), suggesting decreased ability to generate income or operational inefficiencies.

Expenses and Profitability

1. Operating Cost:
   Rising until 2023 on average, which puts pressure on profit margins.
2. Profit from Operations:
   Large losses in 2022 and 2023, together with high volatility that peaked in 2021, suggest inefficiency or poor market circumstances.
3. Net Profit:
   Indicating decreased profitability, there was a notable rise in 2020, followed by a decline and even losses in 2023 (-811,488).

Liability and Asset Analysis

1. Non-Current Resources:
   A robust 25.16% rise in 2023, which would indicate expenditures for future expansion.
2. Current Resources:
   A slow rebound in 2023 after years of decline.
3. Debts:
   There are variations in both current and non-current obligations, with non-current liabilities rising sharply in 2023.

Analysis of Ratios and Metrics

1. Liquidity Ratios:
   The cash ratio is decreasing as well as the current ratio (2021: 70.03, 10.68 vs. 2023: 40.89, 2.72). The drop suggests that liquidity is becoming worse.
2. Profitability:
   A difficult profitability environment is indicated by metrics such as Return on Equity (-0.33%), Operating Profit Margin (-56.52%), and Net Profit Margin (-8.31% in 2023).
3. Ratios of Leverage:
   A greater dependence on debt was shown by the increases in debt to equity (4.01% in 2023) and debt to assets (3.85%) as compared to 2021.

2.5.2 Accounting Practices

EBL applies the **consistency principle** in accounting to provide financial reports that comply with the IFRS framework with IAS 1 and IAS 8. The sums are applied retrospectively and accounted for in accordance with IAS 8's guidelines for choosing and implementing new accounting procedures, adjusting current accounting procedures, and fixing mistakes.

In addition to being consistent, Eastern Bank Limited adheres to the accounting rules of **going concern.** The business has sufficient cash on hand to sustain itself for the foreseeable future. The directors still construct the financial statements on a going-concern basis as a result. The company has the resources necessary to meet its continuous financial obligations to its running activities and enterprises, including sufficient credit facilities. The management has promised that there are no threats and that the business will continue to run.

Time frame for reporting: The company's financial statements, which cover the period from January 1 to December 31, 2021, are continually monitored.

Depreciation Method: Their value is determined by subtracting the cost from the total amount of depreciation. Expenses that are directly related to the acquisition of the land, plant, and equipment make up the cost. IAS-16 states that when assets are used, property, plant, and equipment (PPE) depreciation is assigned to additions using the straight-line approach.
Auditor: The financial statements of EBL Asset Management Limited for the year ended 31 December 2022, were audited by Aziz Halim Khair Choudhury, Chartered Accountants who expressed an unmodified opinion on those financial statements on 22 February 2023.

2.5.3 Comment on Financial and Accounting performance

EBL Asset Management Limited uses good accounting methods by following the uniformity principle under IFRS and the rules for financial reporting in IAS 1 and IAS 8. The fact that they follow the "going concern" idea further ensures stability by showing that they have enough cash flow and resources to meet their ongoing commitments. Following IAS 16's instructions for using the straight-line depreciation method is clear and consistent. The audit opinion from Aziz Halim Khair Choudhury, which has not been changed, also adds to the credibility and accuracy of their financial accounts. In general, EBL's financial methods show that the company values openness, uniformity, and following the rules set by regulators.

However, the business is having serious problems with cash and profitability. Operating expenses are high, revenue sources are declining, and investment returns are negative. Growing assets and liabilities suggest that the business may not be effectively managing short-term operations while trying to invest in long-term prospects.

2.6 Operations Management and Information System Practices

Data management at EBLAML is crucial to facilitating efficient and successful communication between staff members and customers. As a result, information system procedures and operations management are quite strict.

2.6.1 Quality Assurance, Scheduling and Allocation of Resources

Customer and continual improvement are the main goals of the quality management strategies. Every choice is logical and backed up by facts. The client experience is constantly taken into consideration while supervising all operations. Also, worker involvement and employee involvement are always guaranteed to generate successful results and maintain employee happiness. Every procedure has its benefit over cost evaluated, and if costs are higher than benefits, remedial action is performed. The activities or operations have a realistic goal to accomplish and a reasonable but flexible timeline. Justifiable resource allocation is based on the anticipated outcomes of an activity. To get the desired outcomes, it's critical to make sure every department is operating well. As a result, resources are allocated fairly until a department needs more resources to complete an action.

2.6.2 Information System

The cloud server of EBLAML is accessible to all employees for viewing and editing. Each worker has their own folder to which they may post information or data. When necessary, other staff members, including those from other departments, may view the files. This leads to efficient communication both in and across the departments. Additionally, each department has its own group chats or platforms for internal communication.

2.6.3 Comment on Operations Management and IT practices

EBL Asset Management Limited combines operations management and information systems in a way that works well to make sure that communication is clear, and operations run smoothly. Their quality assurance plans, which are based on keeping customers happy and always getting better, show that they value making smart decisions and getting employees involved. Resource sharing is done wisely, which makes sure that all areas work at their best. A cloud-based information system makes it easier for people to work together and retrieve data, which makes contact easier within and between departments. This organized way of managing activities and information makes the workplace more united and responsive.

2.7 Industry and Competitive Analysis

EBL Asset Management Limited is one of the leading asset management companies in Bangladesh. It falls under the industry of financial institutions.

2.7.1 Porter's Five Forces Analysis

- **Threat of New Entrants (Moderate):** There are modest entry barriers in Bangladesh's asset management sector. Although regulatory bodies like the Securities and Exchange Commission of Bangladesh (SEC) provide specific guidelines, new businesses do not face unreasonably high entry costs. But building connections with customers, trust, and a great brand takes time. For newcomers to successfully compete in the market, they would need a significant amount of money and experience. Furthermore, EBLAML's well-established reputation and relationships with investors and customers contribute to a competitive edge that hinders new competitors' ability to quickly capture market share.
- **Bargaining Power of Suppliers (Low):** When it comes to asset management, the "suppliers" are usually the platforms, data sources, and financial instruments that the business utilizes to make investment decisions. These vendors have little negotiating influence over EBLAML since there are many other third-party suppliers on the market that supply competitive rates and services. Furthermore, by diversifying its information and investment sources, EBLAML may lessen its reliance on any one source. A diverse portfolio and the company's proficiency in financial management help mitigate the effects of supplier influence.
- **Bargaining Power of Buyers (High):** Investors and purchasers have significant negotiating power in the asset management sector. Clients have a number of choices including mutual funds, different types of investments, and local, foreign asset management companies among others. Investors also have the benefit of internet tools and platforms as well as becoming more sophisticated, allowing them to look at the fees and services associated with different asset managers at will. Therefore, EBLAML must offer services to new and old customers by providing individualized services, competitiveness in pricing and returns on investments achieved. In this market, customer happiness and loyalty are essential to have a competition advantage.
- **Threat of Substitute Products (Moderate):** The danger of substitution in the asset management sector is weak. As such, there are alternative investment possibilities investors can opt for, peer-to peer lending platforms, real estate investments and direct stock trading are some of the alternatives that can give investors similar returns. The internet is providing more and more alternatives to traditional asset managers – there are internet investing platforms and robo – advisors that are much cheaper and as a result, offer aggressive pricing for their services. This may not remove the risk, but EBLAML gains on this risk by educating, individualizing a service and a set of investment options that would be attractive to customers who do not want to do this themselves.
- **Rivalry Among Existing Firms (High):** The asset management sector in Bangladesh is quite competitive. The market is full of well-known competitors that share the same clientele, including, independent asset management companies, regional banks and financial institutions. If EBLAML wishes to retain a lead in the market, it has to hone its innovation and client connection capabilities as well as produce better investment returns than its competitors.

2.7.2 SWOT Analysis

Strengths:

- Gaining Reputation and Credibility: EBLAML builds up reputation and credibility in the asset management area due to the fact that it has a parent firm – Eastern Bank Limited (EBL) with a credible brand.
- EBLAML has a diverse investment portfolio for its customers, such as mutual funds, pension funds, and other investment consultancies.
- Due to the existence of such business relationships, EBLAML has firmly connected with both individual and institutional investors and hence preserves their product loyalty and retention.
- The company adopts the mission and attains its credibility in the market by adhering to the standards of Bangladesh Securities and Exchange Commission (BSEC) which ensures well regulated investment environment.

Weaknesses:

- Dependence on Parent Brand: Although positive, EBLAML's capacity to establish its own identity and brand in the asset management industry may be constrained by its affiliation with EBL.
- Limited Technological and Digital Innovation: In the asset management sector, digital tools and platforms are being used more and more. EBLAML could have trouble maintaining up with its more recent, technologically advanced rivals that provide automated investing solutions and robo-advisors.

Opportunities:

- With the growth of the middle class in the country, there is an increasingly interest in wealth management, savings, investments, etc.
- By giving them diversification of investment products which include alternative investment products such as green bonds, real estate funds, and ESG (Environmental, Social, and Governance) investment alternatives, EBLAML may expand its portfolio.
- EBLAML might develop with the help of strategic partnerships and alliances with banks, other financial institutions and foreign companies in order to expand the client base and improve the products and therefore consolidate its positions in the market.

Challenges:

- Regulatory Changes could impact EBLAML’s operations or investment plans due to changes in government rules or tax laws related to financial or investment industry.
- Investment product performance, and therefore EBLAML and its customers' potential gain or loss on account holdings, may be adversely impacted by uncertainty in the economy, inflation or stock market swings.

- An important danger is technological disruption and fintech firms, robo-advisors, or other investing technology platforms create greater ease and lower costs for the investor.

2.8 Summary and Conclusion

Using efficient management, marketing and accounting techniques, EBL Asset Management has successfully negotiated the intricacies in the asset management industry. Due to its strategic focus on customer centric marketing, ethical investing practises, and good financial management the firm has achieved moderate financial performance and good position in the competitive industry. The firm needs to keep innovating and adapt to the market condition, and will have to strongly emphasize on risk management and technology development to sustain long term growth and its position as a key player in asset management market of Bangladesh.

2.9 Recommendations

EBL Asset Management should be ranked above its sector in terms of asset allocation and risk management, and in that regard, it should use technological innovation in terms of using AI powered tools to improve asset allocation and robo advisory services to manage risk effectively. Green bonds and ESG investments are attractive to investors that care about social issues when there is wider interest in sustainable finance. If risk management frameworks in Bangladesh's dynamic economic environment were strengthened, it would be easier to handle market volatility.

EBL's marketing strategy should concentrate on teaching the public about asset management, especially among younger, tech-savvy clientele, via seminars and online advertising. Building trust will come from adjusting marketing tactics to appeal to Bangladeshi cultural values, such as generational prosperity and family stability. EBL will expand its audience by digitizing services via social media marketing and smartphone applications.

For financial performance, customer retention and profitability will increase with operational simplification, loyalty programs, and adaptable product development that adapts to changing market conditions.

Chapter 3

Project Part

3.1 Introduction

This report highlights the efficient frontier and portfolio optimization of five selected stocks-Grameenphone, Marico, Berger, Crown Cement and Padma Oil. Technical analysis had been done by taking the data from 1 Dec 2019 to 30 Nov 2024 to support the selection of stocks. The main aim is to diversify the portfolio and determine the optimal combination of stocks which gives the highest return to investors while exposing them to the least amount of risk.

3.1.1 Background

One of the major financial markets in Bangladesh is the Dhaka Stock Exchange, where investors encounter difficulties because of the high level of market volatility and information scarcity. Two key ideas in contemporary portfolio theory are portfolio optimization and building an efficient frontier. Studying the performance of specific stocks along with risk return trade-offs gives the investors the opportunity to manage their resources efficiently in order to meet their financial objectives. This research limits itself to five well known DSE stocks that covers different sectors of industry for ensuring diversity and gain insight for the performance of the portfolio in various conditions of the economy.

3.1.2 Objectives

The main purpose is to assist buyers to comprehend how to incorporate the Dhaka Stock Exchange well and structure the best stock portfolio possible by realizing the trade off between risk – return and diversity.

1. To study five selected stocks of the Dhaka Stock Exchange (DSE) using technical and fundamental analysis to build a portfolio minimizing the risks and maximizing the reward.
2. To obtain the best risk return combinations of portfolios, an efficient frontier is created.
3. To derive the Capital Allocation Line (CAL) and explain how it can help in portfolio optimization.
4. To develop and compare three different portfolio combinations: optimal portfolio, minimum variance portfolio and equally weighted portfolio.
5. To analyze portfolio risk and return to see how diversification affects it.

3.1.3 Significance

This research will end up giving guidance of how diversified portfolios can be made to optimize risk adjusted returns helping investors choose wisely. It will provide knowledge about the performance and stability of the Bangladeshi stock market through financial literacy so that they can develop advanced techniques of portfolio management. This knowledge will thereby help investors to take a proper decision in selecting securities in their financial portfolio for maximizing wealth. Furthermore, by lowering uncertainty and increasing the investment outcomes, the project seeks to encourage more people into stock market as contribution to the economic development. Therefore, the useful value of the study will enable fund managers and individual investors to craft investment strategies suitable for their risk appetite as well as financial objectives.

3.2 Literature Review

Financial markets within Bangladesh have established increasing relevance in using technical and basic analysis in selection of stock and optimization of portfolio. These two approaches, especially in a market such as Bangladesh that is much less developed than industrialized markets, enable the investors to select investments based on educated decisions that can result in higher returns and lower risks.

Technical analysis has been extensively used for prediction of transient price fluctuations, by use of historical price data and trade volumes (Murphy, 1999). Studies conducted in Bangladesh have shown that technical analysis especially chart patterns and indicators like Moving Averages and Relative Strength Index (RSI) can provide useful signs for stock price movements (Hossain & Mollah, 2015). Critics counter that speculative activity often shapes technical analysis in the Bangladesh market and that it is not necessarily trustworthy for long-term investment plans (Hossain, 2018).

Conversely, fundamental analysis looks at a company's inherent worth using macroeconomic elements, managerial quality, industry position, and financial statements. Traditionally, Bangladesh has focused on measures such earnings per share (EPS), price-to-earning (P/E) ratio, and dividend yield to evaluate company financial situation (Siddique & Islam, 2016). According to research, basic analysis may provide Dhaka Stock Exchange (DSE) (Rahman et al., 2017) investors more consistent long-term insights. But sometimes the volatility of the Bangladeshi stock market renders basic research less useful in forecasting temporary price swings (Ahsan, 2019).

Particularly those addressing the Efficient Frontier, portfolio optimization strategies have attracted interest as investors try to mix risk and reward by spreading their assets. Derived from Modern Portfolio Theory (MPT), the Efficient Frontier guides in determining the ideal asset mix to maximize return for a given degree of risk (Markowitz, 1952). MPT has been used in various research to maximize Bangladeshi stock portfolios. For example, it proved that people can risk and gain reasonable price mix by choosing equitable such as Grameenphone, Square pharmaceutical and BRAC Bank (Saha & Islam, 2019). Moreover, the historical data of stock returns of the Dhaka Stock Exchange (DSE) has enabled academics to set up the efficient border for guidance of the investor in selecting the ideal portfolio for it (Rahman & Chowdhury, 2018).

The studies that have been done recently include improvements of how they combine technical and basic analysis for portfolio optimization. This was done by using both techniques in selecting stocks to build a portfolio which reflects market trends and business performance and keeping a balance between risk and return. (Khan & Islam, 2020). According to research, when all these above-mentioned strategies are used together, we can significantly increase the portfolio performance in the said Bangladeshi stock market for a group of five equity chosen randomly (Ahmed et al., 2021).

Basically, Bangladesh's test developing market ought to be directed by both specialized and easy investigation. Particularly via the Efficient Frontier, by including these strategies into portfolio optimization models investors may build portfolios that maximize returns while controlling risk. Future studies should investigate the connection in Bangladesh's particular financial environment between market volatility and the effectiveness of these models.

3.3 Methodology

The reason for choosing these five stocks is because they are all DSE listed companies and finding information regarding these stocks will be easier. Also, my workplace assigned me to do rigorous analysis on these 5 stocks which made me want to work with these to generate a portfolio.

This report aims to do security analysis and selection of five stocks to diversify the portfolio by representing various sectors. Examination of the past information (such as returns and prices) from **November 2019 to November 2024 (last 5 years**) is done. The daily historical price data is collected from investing.com. Markowitz's portfolio optimization model is used to determine three different portfolios strategies. Also, the Monte Carlo simulation method is used to generate 10,000 different portfolio combinations.

To examine price patterns, trade volumes, return distributions, and volatility**, technical analysis** is used. A scatter diagram is also drawn with a regression line to show the market risk of each stock indicating its beta. Last five years daily data was used to do this analysis.

Fundamental analysis using different equity valuation methods such as dividend discount model, free cash flow to equity model and market multiplier method were used to determine the intrinsic value of the stocks and by comparing it to the market price (20 Jan 2025), the buy/sell decisions were made. 2024 was the base year of forecast and the projections were made till 2028, and the present value was calculated by discounting the projected values with the required rate of return calculated for each stock. The growth rate is assumed to be 6% for the next 5 years according to multiple reliable sources.

This analysis comprises **3 different portfolio strategies**: an equally weighted portfolio, an optimum portfolio to maximize the Sharpe ratio, and a minimum variance portfolio to provide minimal risk. These different portfolios provide an understanding of the effects different capital allocations have on return, the standard deviation, and the Sharpe ratio of the portfolio. For portfolio formation, the returns, variances, and standard deviations for every stock on a daily and annual basis are determined. Then by constructing a variance covariance matrix, the relationships between multiple assets are assessed helping in portfolio optimization. By utilizing Modern Portfolio Theory to determine the weights of a portfolio that minimize risk for a specific return level. Then visualization by creating a plot of the portfolio's efficient frontier and risk-return matrix by using 10,000 different combinations using simulation is conducted which will help to identify the minimum variance and maximum portfolio.

The data and information used came from other sources, like business websites, DSE websites, newspapers, journals, articles, reports that have already been written, and so on. There is no use of primary info.

Keep in mind that beliefs and predictions play a big role in figuring out how much a stock is worth. Making predictions and assumptions might lead to errors which are not considered at all while the numbers are being done.

Some important formulas used in valuation are:

The cashflow for the next five years (2024-2029) was projected using the formula:

$$\frac{FCFE * (1+g)}{(1+r)^n}$$

After that, terminal value was calculated using:

$$\frac{\text{FCFE/Dividend per share of the latest year (2029)}}{\text{r-g}}$$

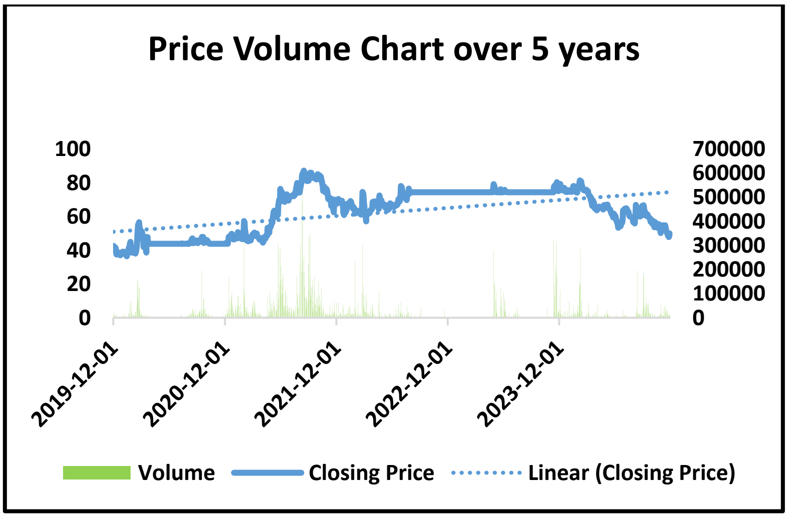
PV of Cashflow:

$$\frac{\text{Cashflow (current year)}}{(1+r)^{\wedge} n}$$

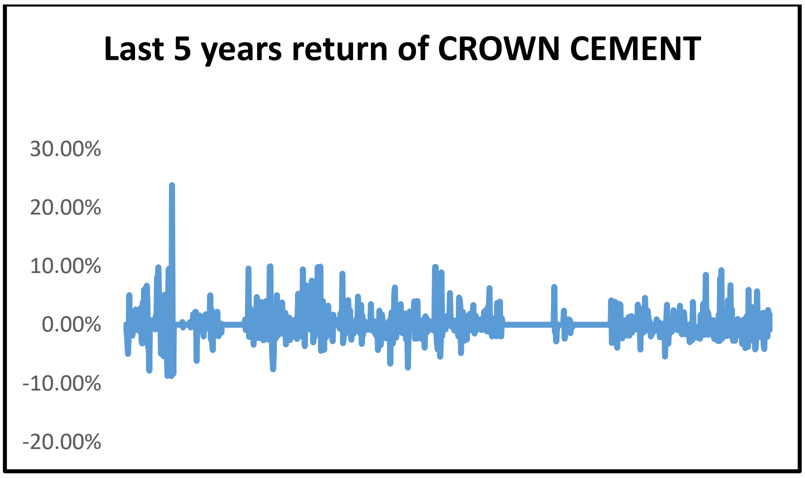
3.4 Findings and Analysis

3.4.1 Security Analysis and selection

3.4.1.1 Technical Analysis of CROWN CEMENT PLC



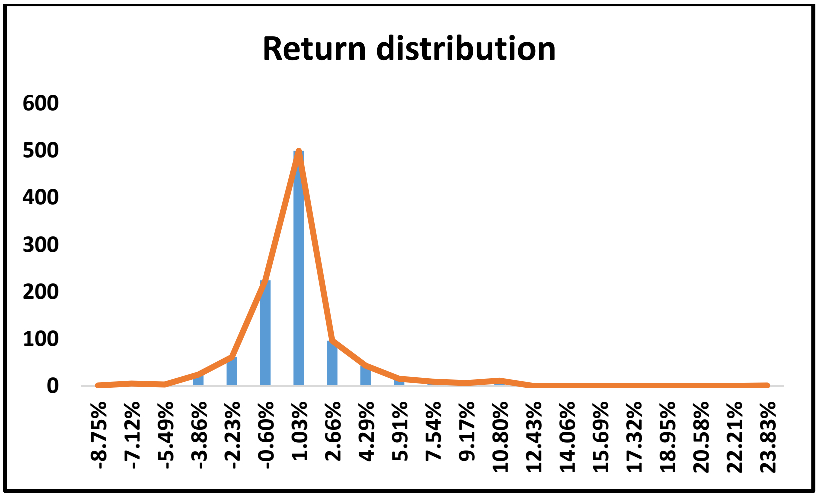
The data used in this article was gathered from December 1, 2019, to November 30, 2024. The volume and closing price of Crown Cement's stocks on those days were used to create the chart that is shown above. It is evident that the price declines towards the end of 2019 because of the COVID-19 pandemic, but it soars to over 90 BDT on the chart in 2021. After then, it was adjusted to the market and began to provide a consistent rate until the end of 2023, at which point there may have been a brief upturn. The trendline is increasing favorably because the stock, which was most volatile from late 2019 to mid-2021, subsequently stabilized and continued to provide high returns.



This chart shows the return of CROWN CEMENT over the last 5 years (1 Dec 2019-30 Nov 2024). The daily returns vary from about -9% to 24%.

Daily average return	0.04%
No.of trading days	999
Annualized return	42%
Daily Standard Deviation	2.38%
Annualized Standard Deviation	75.12%

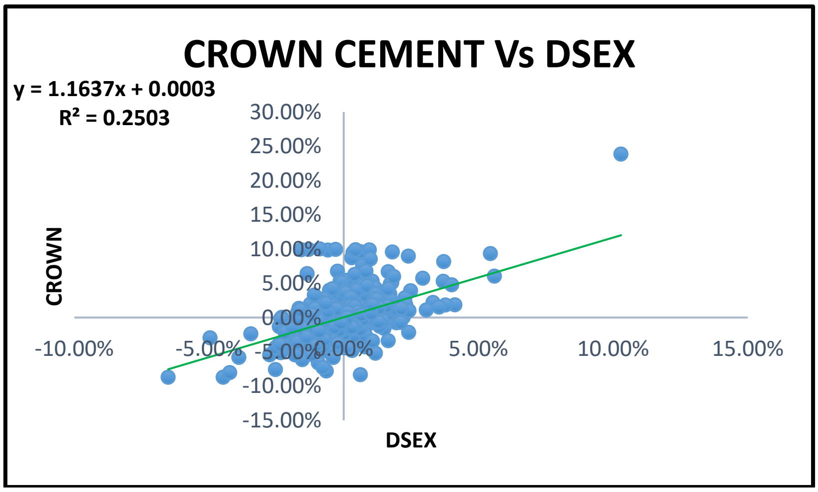
By producing an average annualized return of 42% over the previous five years, the company really performed very well when considering the daily return swings and the daily average return of 0.04%. However, as the above statistics show, Crown Cement has a significant risk even though it offers a big return where 47.20% is the annualized standard deviation. Therefore, the only way for a risk-tolerant investor to increase their prospective return on investment in this company is to diversify their holdings to lower their risk tolerance.



Max	23.83%
Min	-8.75%
Range	32.58%
Bins	20
Distance	1.63%
Skewness	1.89
Kurtosis	13.73

The company's return distribution has a lengthy right tail and a peak that leans left. Kurtosis, according to Kenton (2024), is a measure of the amount of dispersed data on the tails. The data's deviation from the mean is shown by the tails. Peaked ness indicates the number of data points that are centered around the mean. A dataset with a higher kurtosis is more likely to include anomalies and extreme values (StudySmarter, n.d.). Given that Crown Cement's kurtosis is rather high at 13.73, it can be confirmed that there are outliers (anomalies) in the data distribution and that the likelihood of receiving extremely positive returns is greater than that of receiving extremely negative returns.

Conversely, the direction in which the data distribution deviates from the normal distribution is known as skewness (Taylor, 2023). Therefore, a positively skewed distribution is shown when the tail is longer or fatter toward the right. The fact that there are more values to the left of the mean is also referenced in that. The data from Crown Cements shows that they are favorably skewed, but they are significantly skewed since their skewness is more than 1 (1.747). According to the results of Hair et al. (2022), skewness between -2 and 2 is acceptable. Based on the claim, Crown should provide positive returns.



From the above figure, the equation y = 1.1637x + 0.0003 shows a linear regression model, with y standing for Crown Cement's stock return and x for the market return. The beta of the Crown Cement stock is 1.1637, the coefficient of x. The beta coefficient quantifies how responsive the stock's return is to changes in the market return. Crown Cement's stock return is predicted to fluctuate by 1.1637% for every 1% change in the market return, according to a beta value of 1.1637. The fact that the beta is higher than one indicates that the stock of Crown Cement is more volatile than the market.

The percentage of Crown Cement's stock return variation that can be accounted for by changes in the market return is shown by the R-squared value, which is 0.2503. Changes in the market return in this instance account for 25.03% of the variations in Crown Cement's stock return. The fact that 74.97% of the variance in the stock's return cannot be explained by the market return suggests that the stock's performance is also impacted by variables other than market fluctuations.

3.4.1.2 Fundamental Analysis of CROWN CEMENT PLC

<u>Stock valuation – Free Cash Flow to Equity</u>

Year	Operating Profit	Capital Expenditure	Net Borrowing	FCFE	Growth	
2018	1,001,289,846	1,796,522,484	1,720,355,699	925,123,061		
2019	1,177,413,394	1,865,538,038	-740,898,464	-1,429,023,108	-254%	-154%
2020	799,581,796	1,188,753,883	229,400,841	-159,771,246	-89%	11%
2021	1,563,494,294	74,095,934	-3,395,551,239	-1,906,152,879	1093%	1193%
2022	867,364,694	6,131,458,717	96,896,934	-5,167,197,089	171%	271%
2023	3,005,658,403	3,736,147,006	3,599,358,156	2,868,869,553	-156%	-56%
					Growth rate of FCFE	**53.49%**

The free cash flow to equity, or FCFE, methodology has been used to effectively and sufficiently assess Crown Cement's stock. According to Muszynski (2024), FCFE is the sum that remains after all operational costs, taxes, debt repayment, and capital expenditures have been covered by the business. Therefore, the funds that are left over after the business has satisfied its obligations. Throughout 2019–2023, Crown Cement has a positive cash flow and has made significant capital investments in its business plan.

The free cash flow has been calculated using both the operating profit and the net cash flow from operating activities in order to get a more accurate result. The results show that, up to 2022, Crown Cement's net cash flow from operations increased gradually; however, in 2023, there was a little decline. The image it presents is more realistic in terms of operational profit. As may be seen, Crown Cement's earnings varied yet always remained sufficient. It is necessary to draw attention to the year 2021 as it is evident that there is the lowest capital expenditure and the biggest debt repayment during that year. It is comparable to the company's decision to reduce spending in response to COVID-19 and utilize the savings to settle its debt.

The FCFE identified via operational profit has been used to more accurately calculate the company's FCFE growth. The growth rate of the institution's future cash flow was estimated here based on appropriate and positive growths using Geomean function of Excel which, given the erratic nature of Crown Cements' performances before to COVID-19, throughout COVID-19, and during the post-pandemic recovery phase, came at a rather high rate of 53%. In addition to providing accurate metrics that allow investors to safely assume that the firm is not falsifying its data, it is a solid indication that the business can generate operational profit at a progressive pace. Nonetheless, cautious investors who prefer a consistent rise over sporadic gains and declines may be concerned about the growth variation. Furthermore, investors will be able to see the slow change since these growth rates often slow down with time.

Source: Bangladesh Bank Annual Report and Dhaka Stock Exchange				**Using Index**		**Using Market Cap**	
Whole Period	Using Market Cap	Using Index		Last 5 Years	Last 10 Years	Last 5 Years	Last 10 Years
R_m Market Return	20.44%	6.42%		3.01%	3.89%	14.89%	14.57%
Expected Market Return	**17.50%**	This will be used for calculating the Required Return					

The expected market return is 17.5% which is calculated using the average of the market return for whole period from (2004-2023) and last 10 years market return.

Current Price (20 Jan 2025)	**44.20**
Required Return	18.24%
Beta	1.14
Risk Free Rate	12.10%
Long-Term Growth Rate	6%
Number Of Shares	**148,500,000**

The required rate of return was calculated using the CAPM method which is 18.24%.
Required Rate of Return, K = Rf − (Rm x β).

The beta was calculated using the slope function of Excel taking the daily returns of Crown against DSEX.
The long-term GDP growth rate according to multiple reliable sources was found to be 6% for the next five years.

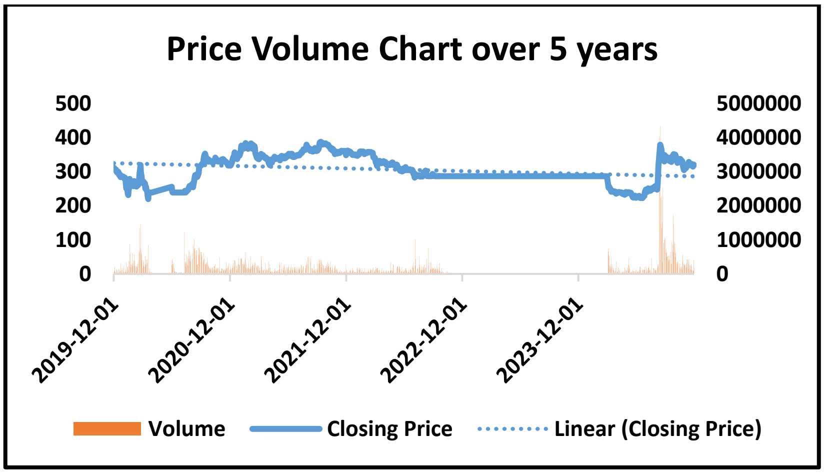
The risk-free rate was taken as the cutoff yield for the 5-year T-bill issued on 15 January 2025.

Terminal Value using Gordon Growth		9,091,370,546

Cashflow Projections					
2024	**2025**	**2026**	**2027**	**2028**	**2029**
3,724,163,878	4,088,771,327	3,796,670,591	2,981,666,536	1,980,438,137	1,112,524,407
Total CF Gordon	3,724,163,878	4,088,771,327	3,796,670,591	2,981,666,536	11,071,808,683
Present Value Gordon	3,149,740,976	2,924,724,319	2,296,894,718	1,525,609,200	4,791,250,278
Year	1	2	3	4	5
Intrinsic Value/Share	**99**	**Using Gordon Model**			

The intrinsic value was calculated by adding all the present value of future cashflows and the amount is 99 BDT. The market price, however, stands at 44.20 BDT, which suggests that the intrinsic value is much higher than the market price. Hence, the stock is **undervalued,** and investors should **buy** the stock.

3.4.1.3 Technical Analysis of Grameenphone



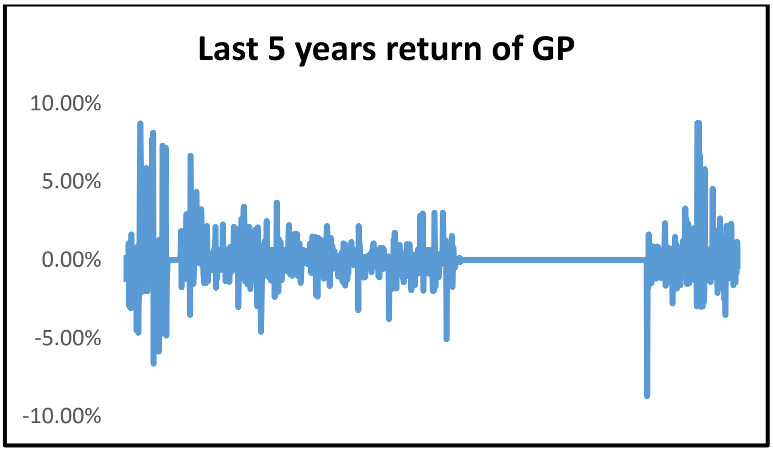
It is clear from the price volume data that throughout the course of the last five years, Grameenphone Ltd.'s price has fluctuated significantly. The pricing has a general decreasing tendency from 2019 until the end of 2020, with notable rises and dips over that time. Although the price fluctuated from the start, it grew increasingly erratic over the 2019 period and began to decline even further towards the start of 2020, mostly as a result of the COVID-19 pandemic, which had a detrimental effect on the market as a whole.

Additionally, Grameenphone made little money at this time, and there was a lack of clarity about dividend payments to shareholders, which caused the share price to decline even more (Babu & Tuhin, 2020). A price floor was put in place later in COVID-19 to stop the price from falling even lower.

Additionally, the market's trading operations were suspended throughout that time. It would be more accurate to state that throughout the next two years, from the end of 2020 to November 2022, the price was somewhat less volatile. However, there were significant price fluctuations in the early months of 2021.

In addition, the price began to decline precipitously once again in the early and middle months of 2022, mostly because of the commencement of the conflict between Russia and Ukraine. Since Grameenphone Ltd.'s sim sales were prohibited in 2022, it continued to decline (TBS report, 2022). A price floor was put in place to stem the price decline as it continued. The price per share has fluctuated between 220 and 420 takas during the last five years.

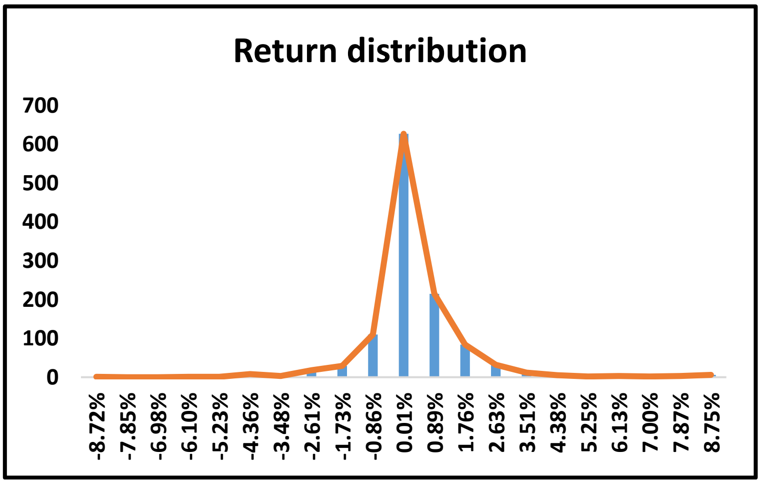
With about the same amount of volatility, the volume chart underneath the price line shows a similar tendency. Volume decreased in tandem with price increases, and vice versa. But the volume almost vanished as soon as the price floor was put in place.



This chart shows the return of GP over the last 5 years (1 Dec 2019-30 Nov 2024). The daily returns vary from about -9% to 9%.

Daily average return	0.01%
No.of trading days	1163
Annualized return	14%
Daily Standard Deviation	1.38%
Annualized Standard Deviation	47.22%

Grameenphone Limited's daily average return of 0.01% indicates that the stock typically rises by 0.01% per day. With an annualized return of 14%, the stock price is predicted to rise by 14% over the course of a full year assuming the same pattern holds true. The volatility of the stock is seen by its annualized standard deviation of 47.22%. More substantial price swings for the stock are indicated by a greater standard deviation. As a result, even though Grameenphone can provide a small annual return of 14%, investors may experience large daily and yearly price fluctuations, suggesting that the stock is not very safe.

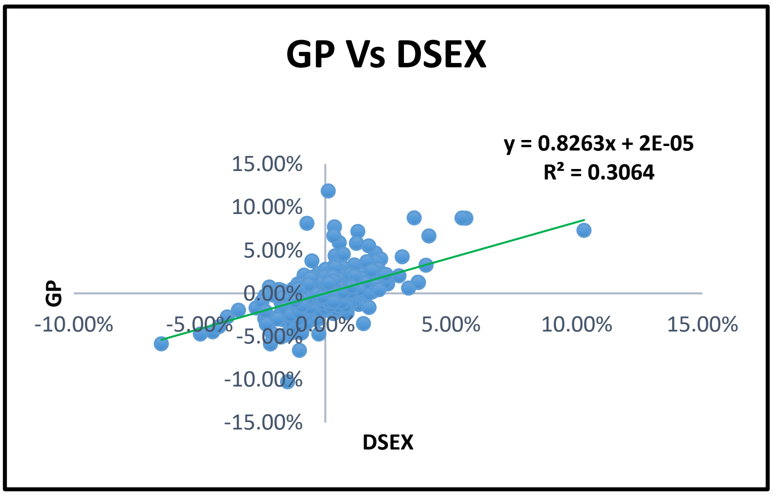


Max	8.75%
Min	-8.72%
Range	17.47%
Bins	20
Distance	0.87%
Skewness	1.43
Kurtosis	13.31

Grameenphone's return distribution chart indicates that most returns cluster around the mean, with some dispersion, as it displays a symmetrical form centered around 0%. The returns range from a low of -8.72% to a high of 8.75%, with a range of 17.47%. This suggests that there has been some fluctuation in the returns throughout the examined time frame.

With a positive skew and a skewness score of 1.43, there are more severe positive returns than negative returns. But the skew is not extremely large, indicating that the data is only somewhat asymmetrical. An indication of a leptokurtic distribution is the kurtosis value of 13.31, which is much more than the kurtosis of 3 for the normal distribution. This suggests that extreme returns (both profits and losses) occur more often than in a normal distribution because the return distribution has fatter tails and a sharper peak.

Because of the possibility of sharp swings in returns, investors in Grameenphone face a greater risk even if the returns are often concentrated around zero. The high kurtosis indicates sporadic notable deviations.



According to the beta (0.8263), the stock often moves less sharply but in the same direction as the market. A 1% change in market return results in a 0.8263% change in stock return. The stock moves less aggressively in reaction to market fluctuations since its beta is less than 1, which indicates that it is less volatile than the market. The stock is expected to rise when the market rises, but not as much, since a positive beta means that the stock tends to move in the same direction as the market.

With an R-squared value of 0.3064, the market return may explain 30.64% of the movement in the stock return, indicating that other variables are responsible for the remaining 69.36% of the stock's behavior.

3.4.1.4 Fundamental Analysis of Grameenphone

Stock valuation – Dividend Discount Model

BDT in million	Historical Data						Average Growth
	2018	2019	2020	2021	2022	2023	
Revenue	132,832	143,656	139,606	143,066	150,403	158,716	
Growth		*8.15%*	*-2.82%*	*2.48%*	*5.13%*	*5.53%*	6.84%
Operating Profit	56,777	66,652	63,440	63,336	63,598	64,429	
Growth		*17.39%*	*-4.82%*	*-0.16%*	*0.41%*	*1.31%*	
% of Revenue	***42.74%***	***46.40%***	***45.44%***	***44.27%***	***42.29%***	***40.59%***	43.62%
Net Profit	33,363	34,517	37,187	34,129	30,092	33,075	
Growth		*3.46%*	*7.74%*	*-8.22%*	*-11.83%*	*9.91%*	
% of Revenue	***25.12%***	***24.03%***	***26.64%***	***23.86%***	***20.01%***	***20.84%***	23.41%
EPS (BDT)	24.71	25.56	27.54	25.28	22.29	24.49	
Growth		*3.44%*	*7.75%*	*-8.21%*	*-11.83%*	*9.87%*	0.205%
Dividend Paid	**37800**	**17550**	**37125**	**33750**	**29700**	**16875**	
Growth		*-53.57%*	*111.54%*	*-9.09%*	*-12.00%*	*-43.18%*	
% of Revenue	*28.46%*	*12.22%*	*26.59%*	*23.59%*	*19.75%*	*10.63%*	
Dividend Payout Ratio	113.3%	50.8%	99.8%	98.9%	98.7%	51.0%	99.1%
No of Share (in mn)	1350	1350	1350	1350	1350	1351	**Dividend per share**

In Bangladesh, Grameenphone is among the most lucrative and dividend-paying businesses. A greater percentage of its net earnings has been paid out as a cash dividend to shareholders, with a lower part being retained. For the last six years, from 2018 to 2023, they have only had a dividend payment ratio around 50% in 2023, and for the last four years, it was almost 100%, reaching 113% in 2018. Given Grameenphone Ltd.'s track record of paying out large cash dividends, it is anticipated that the business will keep up its high dividend payments in the years to come. The Dividend Discounting Model (DDM) is thus being utilized to determine the intrinsic value of the company's stocks.

Taking the historical data for the period 2018-2023, the YoY revenue growth, operating profit growth, net profit growth, EPS growth, Dividend growth was found. After that, the average growth was calculated for all. The sales data from only 2019 and 2023 to calculate the average, which is 6.84%, as the other years were impacted by COVID and ban on Grameen sim-card sales. We can see that the dividend payout ratio is quite stable for Grameenphone. Hence, 2020, 2021 and 2022 data were taken to compute a more stable average dividend payout ratio which stood at 99.1%.

Projections						
	2024	**2025**	**2026**	**2027**	**2028**	**2029**
Revenue	169568.83	181163.77	193551.56	206786.41	220926.25	236032.95
Operating Profit	73969.32	79027.26	84431.07	90204.37	96372.45	102962.30
Net Profit	39702.69	42417.52	45317.98	48416.78	51727.47	55264.54
EPS (BDT)	29.40	31.41	33.56	35.85	38.30	
Dividend Paid	39361.26	42052.74	44928.27	48000.41	51282.63	54789.28
Dividend per share	29.14	31.14	33.27	35.54	37.97	40.57

The net profit for the future (2024-2029) has been forecasted using the average net profit growth rate for the last 6 years and multiplying it by the forecasted revenue.

EPS has been forecasted by dividing forecasted net profit by the latest number of shares in 2023.

Dividend has been forecasted by multiplying the forecasted net profit amount with the average dividend payout ratio growth. Using that, dividend per share is forecasted by dividing forecasted dividend by the latest number of shares in 2023.

Grameenphone's 2024–2029 forecasts show steady development in all important financial indicators. It is anticipated that revenue would increase gradually from BDT 169,568M in 2024 to BDT 236,032M in 2029 due to robust market penetration and rising telecom service demand. By 2029, operating profit will have increased to BDT 102,962M, demonstrating the company's cost control and operational effectiveness. Additionally, net profit increases dramatically, increasing shareholder payouts from BDT 39,702M in 2024 to BDT 55,264M in 2029. As dividend distributions and dividends per share grow in tandem, the EPS is expected to rise from 29.40 to 40.57, demonstrating Grameenphone's dedication to rewarding investors. These forecasts highlight Grameenphone's steady development trajectory, which is bolstered by its dominant market position and prospective forays into digital services and 5G networks.

Current Price (20 Jan 2025)	**333.1**
Required Return	16.16%
Beta	0.75
Risk Free Rate	12.10%
Long-Term Growth Rate	6.00%

The required rate of return was calculated using the CAPM method which is 16.16%.
Required Rate of Return, K = Rf − (Rm x β).

The beta was calculated using the slope function of Excel taking the daily returns of GP against DSEX.

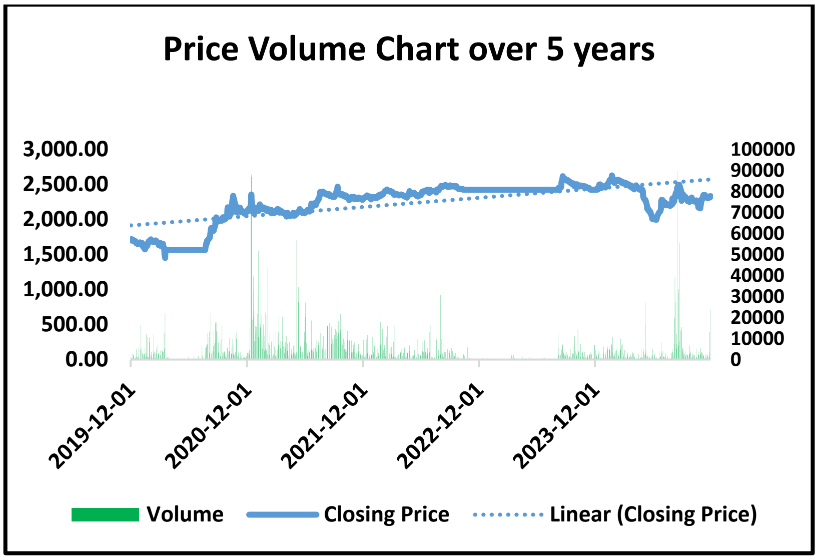
The long-term GDP growth rate according to multiple reliable sources was found to be 6% for the next five years.

The risk-free rate was taken as the cutoff yield for the 5-year T-bill issued on 15 January 2025.

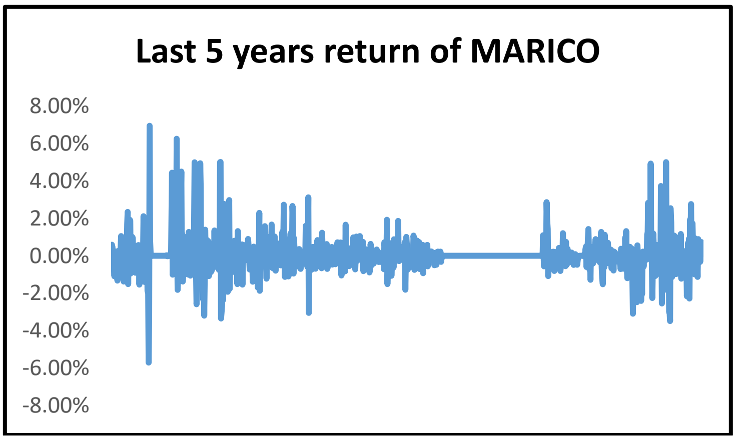
Terminal Value using Gordon Model					399.20	
Total CF Gordon	29.14	31.14	33.27	35.54	437.18	
Present Value Gordon	25.09	23.08	21.22	19.52	206.70	
Year	1	2	3	4	5	
Intrinsic Value per Share	**295.60**	**Using Gordon Model**				

The intrinsic value of GP is lower at 295.60 BDT compared to the market price of 333.1 BDT. This suggests that the stock is **overvalued** and hence investors should decide to **sell** the stock.

3.4.1.5 Technical Analysis of Marico



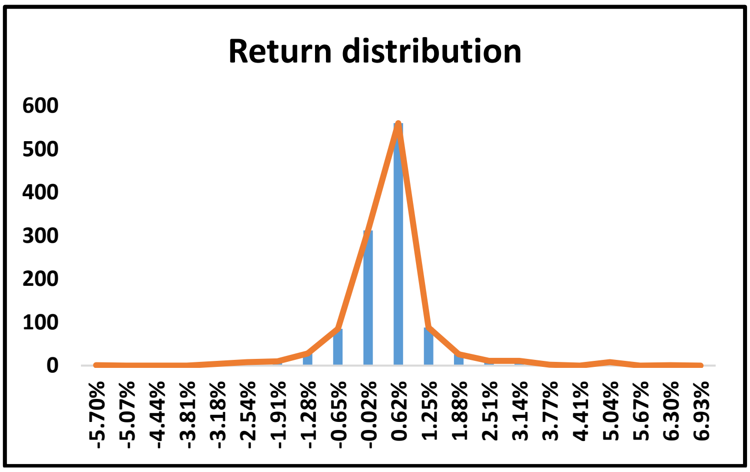
Marico Bangladesh's price-volume chart over the last five years indicates a consistent rising trend in the closing price, with sporadic swings influenced by market activity. The dashed linear trend line validates this long-term expansion, while the blue line shows that the closing price increased steadily, averaging between 2,000 and 3,000 BDT. For example, in 2023, there was a significant increase in trading volume (green bars) that exceeded 90,000 shares. This was probably caused by a significant event, such a company announcement or general market shifts, which also happened to coincide with a brief price rise. Comparably, a notable spike in volume in 2021 might be a measure of how investors are responding to changes in policy or quarterly performance. The price of the stock exhibits resilience despite these rises, since it bounces back swiftly from little drops, preserving investor confidence. Further indicating that these trading spikes are mostly event-driven and emphasizing both growth potential and short-term trading opportunities is the periodic synchronization of volume surges with price adjustments.



This chart shows the return of MARICO over the last 5 years (1 Dec 2019-30 Nov 2024). The daily returns vary from about -5.70% to 7%.

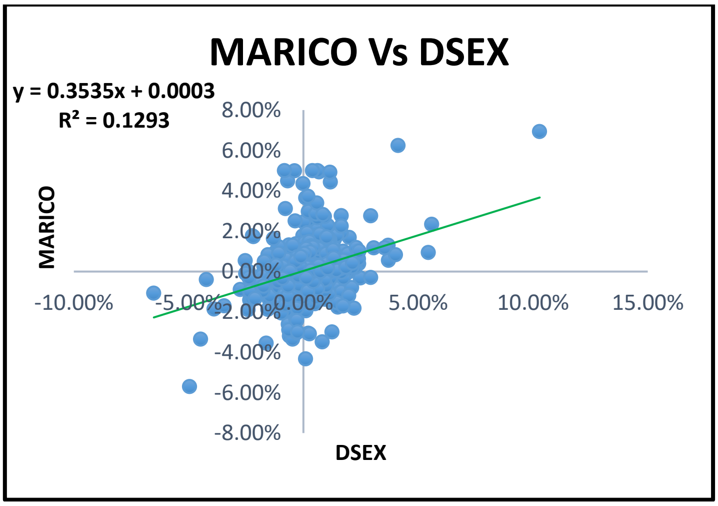
Daily average return	0.03%
No.of trading days	1157
Annualized return	36%
Daily Standard Deviation	0.92%
Annualized Standard Deviation	31.21%

Given the fluctuation in the daily returns of MARICO and the daily average return of 0.03%, the stock generates a very high yield of 36%. A high standard deviation of 31.21% on the other hand brings out risk which could be higher or lower depending on the market conditions.



Max	6.93%
Min	-5.70%
Range	12.64%
Bins	20
Distance	0.63%
Skewness	1.35
Kurtosis	12.14

Marico's return distribution is positively skewed, with a larger tail on the right side of the distribution, according to the skewness of 1.35. This implies that there is a chance for some comparatively greater positive returns even while the majority of returns cluster around the mean. A leptokurtic distribution with fat tails and a high peak is indicated by the kurtosis value of 12.14. This suggests that there are a lot of extreme values in the data, which raises the possibility of outlier results. Variability in returns throughout the period studied time is shown by the range of 12.64%, with a low return of -5.70% and a high return of 6.93%. The strong skewness and high kurtosis indicate the possibility of dramatic but less frequent positive returns in addition to the substantial risks of abrupt negative returns, even if the average spread seems mild.



Marico's stock return moves 35.35% as much as the market return, according to the beta (0.3535) in the equation y = 0.3535x + 0.0003, suggesting that it is less volatile than the market.

The market return can only account for around 12.93% of Marico's stock return, according to the R-squared (0.1293), which indicates that other variables account for most of the stock's movement.

3.4.1.6 Fundamental Analysis of Marico

<u>Stock Valuation – Free Cash flow to Equity</u>

Year	Net Cash Flow From Operating Activities	Capital Expenditure	Net Borrowing	FCFE	Growth	
2018	1,541,076,781	83,293,327	300,000,000	1,757,783,454		
2019	2,729,173,826	88,842,501	-100,000,000	2,540,331,325	45%	145%
2020	3,012,957,714	320,280,709	-200,000,000	2,492,677,005	-2%	98%
2021	3,304,608,823	241,574,664	250,000,000	3,313,034,159	33%	133%
2022	3,605,353,998	313,759,008	-250,000,000	3,041,594,990	-8%	92%
2023	5,393,901,438	517,290,654		4,876,610,784	60%	160%
					Growth rate of FCFE	23%

Year	Operating Profit	Capital Expenditure	Net Borrowing	FCFE	Growth	
2018	2,136,042,141	83,293,327	300,000,000	2,352,748,814		
2019	2,591,547,066	88,842,501	-100,000,000	2,402,704,565	2%	102%
2020	3,378,838,315	320,280,709	-200,000,000	2,858,557,606	19%	119%
2021	4,284,691,947	241,574,664	250,000,000	4,293,117,283	50%	150%
2022	4,644,343,824	313,759,008	-250,000,000	4,080,584,816	-5%	95%
2023	5,137,879,525	517,290,654		4,620,588,871	13%	113%
					Growth rate of FCFE	**14.45%**

Over time, the FCFE has grown significantly, increasing at an annual growth rate of 23% from about 1.76 billion in 2018 to 4.88 billion in 2023. FCFE was found using operating net cash flow from operating activities since it provides a higher growth rate. The capacity of the business to provide returns for shareholders after deducting net borrowings and capital expenditures is shown by this consistent improvement.

Marico rebounded swiftly, achieving 60% growth in 2023, despite certain years exhibiting growth rate swings, such as a decline from 33% in 2021 to -8% in 2022. Such resilience might arise from the diversification or strong brand portfolios. To illustrate, Saffola goods or Parachute oil are robust FMCG brands which probably kept consumers loyal during recession. Over time, it is observed that Marico's capital expenditures increased, with an investment of 5.1 billion dollars in 2023 implying that the company would like to either innovate its products

or grow its capacity. Meanwhile, net borrowing in some years implies reliance on outside finance, including, for instance support to expansion projects or advertising campaigns intended for competitive positioning such as rivals.
Marico would still grow its FCFE which gives a similar option to reward its investors like major FMCG companies through dividends and share buybacks. At the same time, being as any other global FMCG firm, they might invest in eco-friendly product lines or a digital transformation of their business in order to become more operationally efficient or satisfy changing customer demands.

Current Price (20 Jan 2025)	**2322.6**
Required Return	14.14%
Beta	0.38
Risk Free Rate	12.10%
Long-Term Growth Rate	6.00%
Number Of Shares	31500000

The required rate of return was calculated using the CAPM method which is 14.14%.
Required Rate of Return, K = Rf − (Rm x β).

The beta was calculated using the slope function of Excel taking the daily returns of Marico against DSEX.

The long-term GDP growth rate according to multiple reliable sources was found to be 6% for the next five years.

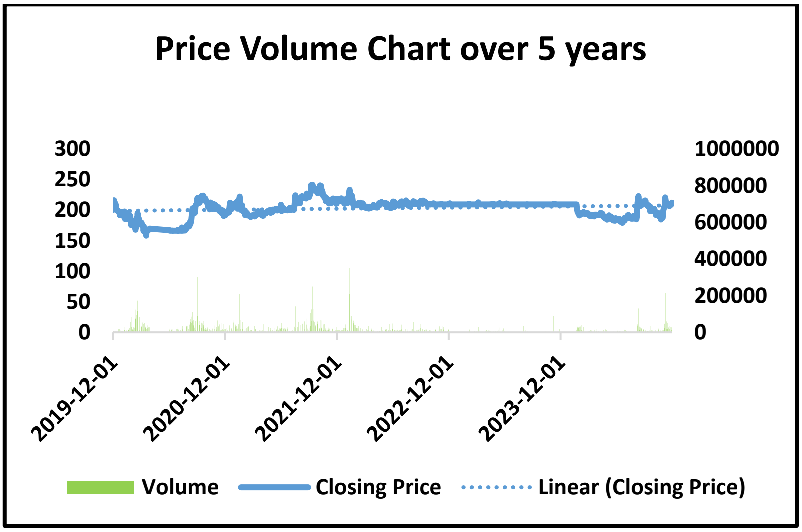
The risk-free rate was taken as the cutoff yield for the 5-year T-bill issued on 15 January 2025.

Terminal Value using Gordon Growth		44,438,709,753

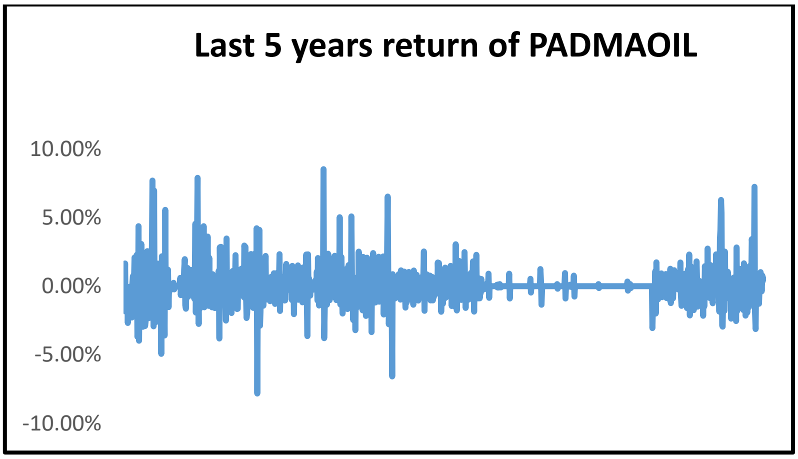
Cashflow Projections					
2024	**2025**	**2026**	**2027**	**2028**	**2029**
5,239,580,287	4,931,996,557	4,067,212,749	2,938,453,862	1,859,896,265	1,031,350,845
Total CF Gordon	5,239,580,287	4,931,996,557	4,067,212,749	2,938,453,862	46,298,606,017
Present Value Gordon	4,590,334,774	3,785,458,465	2,734,893,828	1,731,052,810	23,895,010,015
Year	1	2	3	4	5
Intrinsic Value/Share	**1,166.25**	**Using Gordon Model**			

The intrinsic value was calculated by adding all the present value of future cashflows and the amount is 1166.25 BDT. The market price, however, stands at 2322.60 BDT, which suggests that the intrinsic value is much lower than the market price. Hence, the stock is **overvalued,** and investors should **sell** the stock.

3.4.1.7 Technical Analysis of Padma Oil Co. Ltd



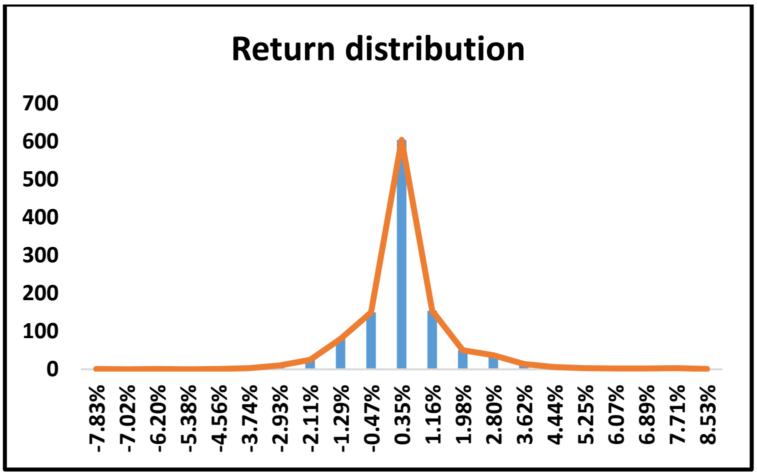
The stock performance and trading activities of Padma Oil Co. Ltd. over the last five years are shown in the price-volume chart. The closing price (blue line), which averaged between 150 and 250 BDT, varied a lot. There was a noticeable price jump in late 2021, most likely brought on by a particular announcement or market event. Nonetheless, the dashed straight line, which represents the general price trend, shows no discernible upward or downward movement and seems to be quite steady with minor oscillations. Although trading activity (green bars) has been modest overall, there have been sporadic, notable spikes, such as in early 2021 when volumes surpassed 800,000 shares. These surges most likely indicate periods of increased investor interest, which may be connected to financial outcomes, governmental choices, or general economic circumstances. Even while there is sporadic volatility in trading activity, the chart shows that Padma Oil's stock price is stable over the long run, giving it a potential candidate for investors who are risk averse.



This chart shows the return of PADMAOIL over the last 5 years (1 Dec 2019-30 Nov 2024). The daily returns varied from about -7.83% to 8.53%.

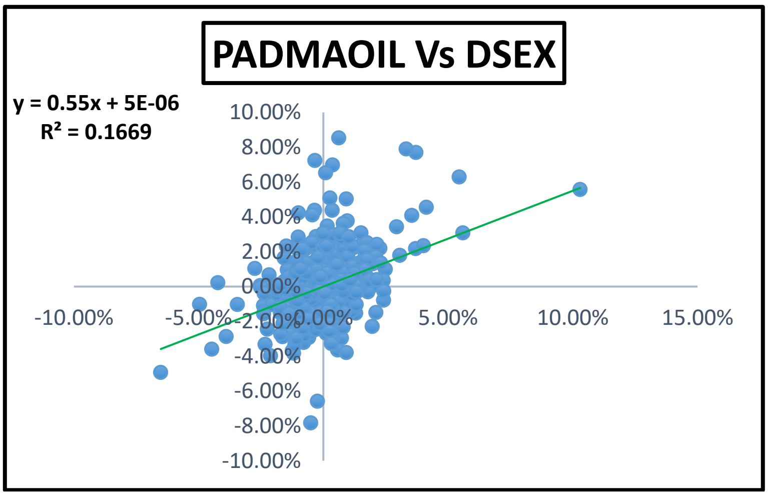
Daily average return	**0.01%**
No.of trading days	**1149**
Annualized return	**8%**
Daily Standard Deviation	**1.29%**
Annualized Standard Deviation	**43.80%**

An annualized return of 8% is obtained from the daily average return of 0.01%, suggesting consistent compounding growth throughout the year. Significant price swings are highlighted by the annualized standard deviation of 43.80%, which indicates a high degree of risk or uncertainty in its performance. Conservative investors who value stability may not find such a profile ideal, but it could fit risk-tolerant investors seeking growth prospects.



Max	**8.53%**
Min	**-7.83%**
Range	**16.36%**
Bins	**20**
Distance	**0.82%**
Skewness	**1.10**
Kurtosis	**9.24**

According to the skewness value of 1.10, Padma Oil Company's return distribution is somewhat favorably skewed, which means that the data is biased in favor of greater returns with smaller negative returns occurring more often and bigger positive returns occurring seldom. In contrast to a normal distribution, a leptokurtic distribution has heavier tails and a sharper peak, as shown by the kurtosis value of 9.24, which is much greater than 3. This implies a greater level of risk as the returns seem to encounter extreme values more often than would be predicted from a normal distribution. The 16.36% gap between the lowest return of -7.83% and the highest return of 8.53% shows a significant performance spread and highlights the fluctuations in the company's returns over the time under observation. These numbers taken together point to an asymmetric, erratic, and severe outcome-prone return pattern that might offer investors both possibilities and hazards.



The Padma Oil stock return is predicted to fluctuate by 0.55% for every 1% change in the market return in this instance, according to a beta of 0.55. When Padma Oil's beta value is less than 1, it indicates that it is less volatile than the market, which means that its stock returns are less susceptible to changes in the market.

The percentage that the market return can account for in explaining the volatility in Padma Oil's stock return is shown by the R square of 0.1669. In other words, market fluctuations account for just 16.69% of the variability in the stock's return, leaving 83.31% of it unexplained. When the R square is low, it means that external variables or company-specific risks are probably more important in affecting Padma Oil's stock returns than market returns.

3.4.1.8 Fundamental Analysis of Padma Oil Co. Ltd

	EPS (TTM)	Current price
Padma	37.42	187.7

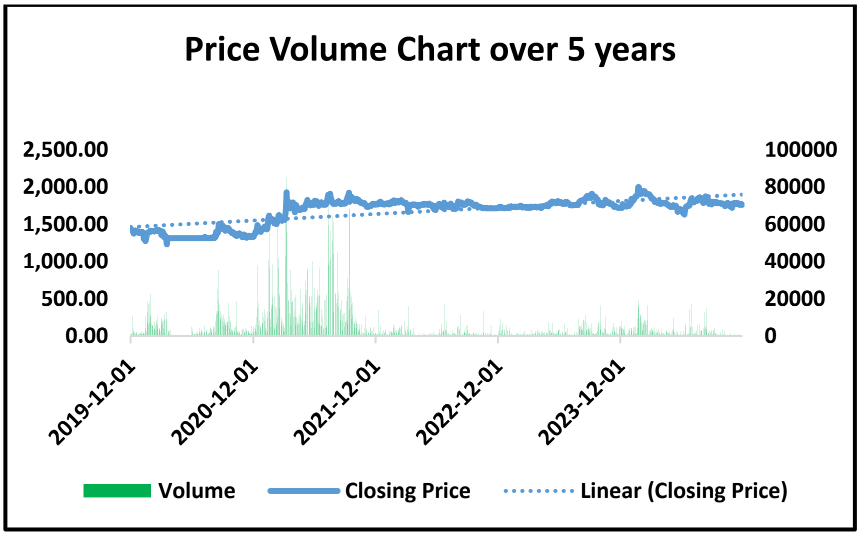
EPS using Trailing Twelve Months of Padma Oil was calculated by adding the EPS values of the last 4 quarters from their published quarterly reports.

	P/E
Padma	5.02

Industry P/E	9.71
Company EPS	37.42
Intrinsic Value	**363.35**
Market price (20 Jan 2025)	**187.7**

Using the EPS (TTM) and the current share price of Padma Oil, Price to Earnings ratio was calculated by dividing the share price with EPS. The industry P/E is 9.71 BDT which is published in the P/E sector (fuel & power) of amarstock.com. After that, intrinsic value was found by multiplying EPS with the industry P/E which stands at 363.35 BDT. The intrinsic value is higher than the market price, which suggests that the stock is **undervalued**, and investors should **buy** the stock.

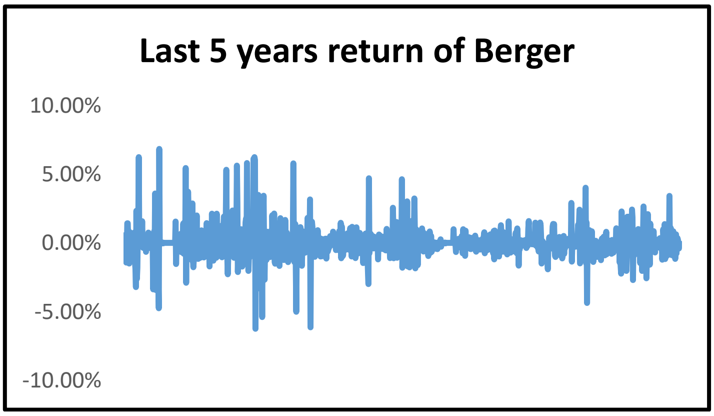
3.4.1.9 Technical Analysis of Berger



Berger Paints Bangladesh's price-volume chart illustrates the company's trading activity and stock performance over the last five years. Beginning below 1,500 BDT in 2019 and continuously ranging between 1,800 and 2,000 BDT in 2023, the blue line that represents the closing price exhibits an increasing tendency. This general increase in the stock price is supported by the dashed linear trend line, which shows consistent performance and high investor trust. Nonetheless, there were brief drops in price that were followed by increases, indicating the stock's durability.

Significant activity surges can be seen in the green bars, which represent trading volume, especially in 2020 and the first few months of 2021, when the traded volume exceeded 80,000 shares. These peaks most frequently correspond to significant occurrences, such the announcement of favorable financial results, strategic plans, or changes in market attitude. Trading activity has been modest after these jumps, indicating that some triggers are linked to high-volume days.

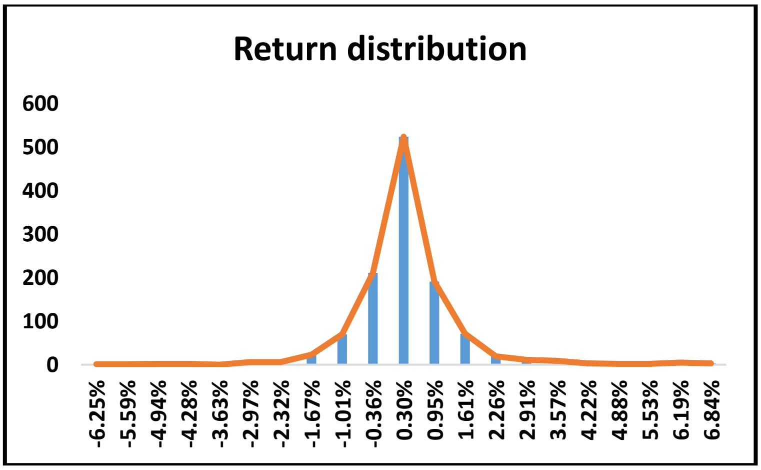
Overall, the graph shows that Berger Paints' stock price has grown steadily and consistently, supported by sporadic spikes in activity. Volume spikes signal periods of busy trading and possible short-term opportunities, while this performance makes it an appealing option for long-term investors looking for consistent profits.



This chart shows the return of BERGER over the last 5 years (1 Dec 2019-30 Nov 2024). The daily returns vary from about -6.25% to 6.84%.

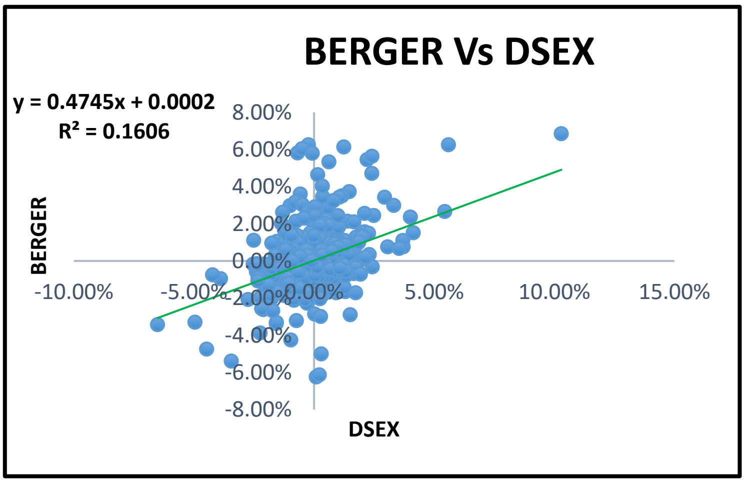
Daily average return	**0.02%**
No.of trading days	**1163**
Annualized return	**29%**
Daily Standard Deviation	**1.12%**
Annualized Standard Deviation	**38.08%**

According to the statistics, the stock of Berger Paints Bangladesh Limited has an average daily return of 0.02%, which indicates that it increases somewhat every trading day. If this daily performance persists over a year, the annualized return rises to 29%, suggesting a robust growth tendency. The stock's volatility is shown in its annualized standard deviation of 38.08%, which indicates that its price might fluctuate greatly over time. This high volatility suggests that even while the potential return is alluring, there is a significant risk associated with the investment since price swings might result in significant short-term profits or losses. Therefore, before making an investment, investors need to balance the high degree of uncertainty with the possible large rewards.



Max	**6.84%**
Min	**-6.25%**
Range	**13.09%**
Bins	**20**
Distance	**0.65%**
Skewness	**0.98**
Kurtosis	**9.93**

The return distribution for Berger seems to have a larger tail on the right side, as shown by the somewhat positive skewness score of 0.98. This indicates that the number of higher-than-average positive returns is greater than the number of negative returns. The existence of extreme outliers and a leptokurtic distribution is indicated by the kurtosis value of 9.93, which is much greater than the kurtosis of 3 for the normal distribution. This suggests that a small number of extreme values have a significant impact on the return data. With a minimum return of -6.25% and a maximum return of 6.84%, the range of returns is 13.09%. Berger's performance throughout the period studied time was variable, as seen by the somewhat broad range of returns. All things considered, the data indicates that while Berger has the potential to provide significant positive returns, it is also prone to significant volatility and sharp fluctuations.



Berger Paints' stock is less volatile than the market, according to its beta of 0.4745. A 1% change in the market return results in a 0.4745% change in the stock return.

With an R-squared value of 0.1606, the market returns only accounts for 16.06% of the stock return, indicating that other variables have a substantial impact on the company's performance.

3.4.1.10 Fundamental Analysis of Berger

Stock Valuation – Dividend Discount Model

BDT in million	Historical Data							Average Growth
	2018	2019	2020	2021	2022	2023		
Revenue	16,533	17800.412	16328.653	16877.369	22,195	25,899		
Growth		*7.67%*	*-8.27%*	*3.36%*	*31.51%*	*16.69%*		12.18%
Operating Profit	2450.459	2839.477	3208.433	3680.786	4,093	4,110		
Growth		*15.88%*	*12.99%*	*14.72%*	*11.21%*	*0.41%*		
% of Revenue	*14.82%*	***15.95%***	***19.65%***	***21.81%***	***18.44%***	***15.87%***		17.76%
Net Profit	1787.894	2046.588	2422.077	2691.528	2,907	3,010		
Growth		*14.47%*	*18.35%*	*11.12%*	*8.00%*	*3.56%*		
% of Revenue	*10.81%*	***11.50%***	***14.83%***	***15.95%***	***13.10%***	***11.62%***		12.97%
EPS (BDT)	77.1	**44.13**	**52.22**	**58.03**	**62.68**	**64.91**		
Growth		*-42.76%*	*18.33%*	*11.13%*	*8.01%*	*3.56%*		-0.347%
Dividend Paid	**985.194**	66.99	1555.05	1365.95	**3136.47**	**465.14**		
Growth		*-93.20%*	*2221.28%*	*-12.16%*	*129.62%*	*-85.17%*		
% of Revenue	*5.96%*	*0.38%*	*9.52%*	*8.09%*	*14.13%*	*1.80%*		
Dividend Payout Ratio	55.10%	3.3%	64.2%	50.8%	107.9%	15.5%		43.3%
No of Share (in mn)	23.189	46.376	46.382	46.382	46.378	46.379		**Dividend per share**

The sales data from only 2019 and 2023 was taken to calculate the average, which is 12.18%, as the other years were impacted by COVID and the paint industry suffering from a fall in demand. We can see that the dividend payout ratio is quite stable for Berger. Hence, 2018, 2020 and 2021 data were taken to compute a more stable average dividend payout ratio which stood at 99.1%.

Berger's historical financial data is shown which highlights the company's revenue, operating profit, net profit, earnings per share (EPS), and dividend payments from 2018 to 2023. With an average revenue increase of 12.18% and an operating profit growth of 17.76%, Berger demonstrated effective cost management and operational methods. On the other hand, net profit margins showed pressure on profitability as they decreased marginally, averaging 12.97%.

Despite its volatility, the dividend payout ratio peaked in 2021 at 107.9%, indicating shareholder-centric policies that may have come at the cost of retained profits for expansion. The EPS's negative growth (-0.347%) from 2018 to 2023 can draw attention to difficulties with per-share profitability in the context of dividend priority.

	Projections					
	2024	**2025**	**2026**	**2027**	**2028**	**2029**
Revenue	29052.72	32590.84	36559.84	41012.20	46006.78	51609.62
Operating Profit	5159.06	5787.35	6492.15	7282.78	8169.70	9164.62
Net Profit	3767.85	4226.71	4741.45	5318.87	5966.62	6693.25
EPS (BDT)	81.24	91.13	102.23	114.68	128.65	
Dividend Paid	1632.71	1831.54	2054.59	2304.80	2585.49	2900.36
Dividend per share	35.20	39.49	44.30	49.70	55.75	62.54

The net profit for the future (2024-2029) has been forecasted using the average net profit growth rate for the last 6 years and multiplying it by the forecasted revenue.

EPS has been forecasted by dividing forecasted net profit by the latest number of shares in 2023.

Dividend has been forecasted by multiplying the forecasted net profit amount with the average dividend payout ratio growth. Using that, dividend per share is forecasted by dividing forecasted dividend by the latest number of shares in 2023.

Berger's projections for 2024–2029 indicate a significant rise in revenue from BDT 29,052M in 2024 to BDT 51,610M in 2029, along with gains in operating profit and net profit. According to projections, EPS will rise steadily from BDT 81.24 in 2024 to BDT 128.65 by 2029. In keeping with Berger's commitment to rewarding shareholders while maintaining strong company performance, dividend payments are also expected to increase gradually. To meet the growing demand from consumers for high-end paints and environmentally friendly goods, the company is concentrating on growing its market share while preserving operational effectiveness.

Current Price (20 Jan 2025)	**1823.10**
Required Return	14.90%
Beta	0.52
Risk Free Rate	12.10%
Long-Term Growth Rate	6.00%

The required rate of return was calculated using the CAPM method which is 14.90%.
Required Rate of Return, K = Rf − (Rm x β).

The beta was calculated using the slope function of Excel taking the daily returns of Berger against DSEX.

The long-term GDP growth rate according to multiple reliable sources was found to be 6% for the next five years.

The risk-free rate was taken as the cutoff yield for the 5-year T-bill issued on 15 January 2025

Terminal Value using Gordon Model					702.53
Total CF Gordon	35.20	39.49	44.30	49.70	758.28
Present Value Gordon	30.64	29.91	29.20	28.51	378.62
Year	1	2	3	4	5
Intrinsic Value per Share	**496.88**	Using Gordon Model			

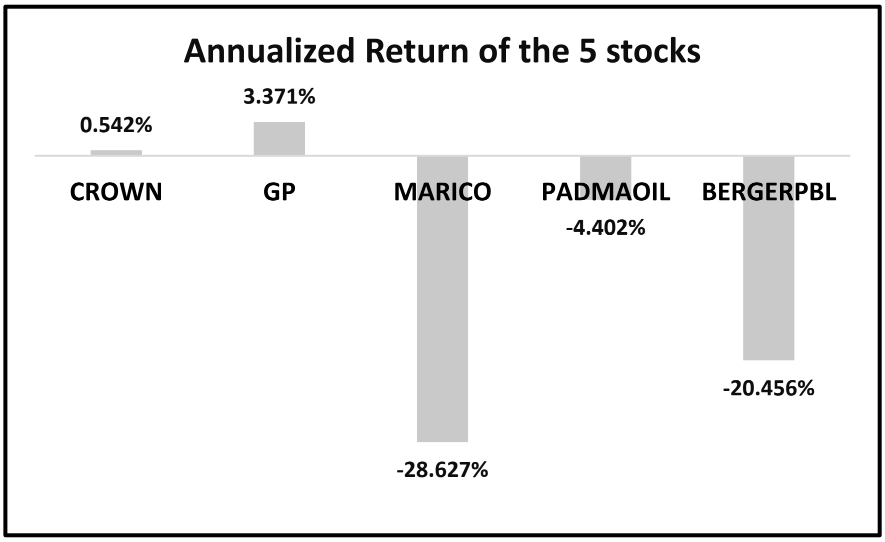
The intrinsic value of Berger is lower at 496.88 BDT compared to the market price of 1823.10 BDT. This suggests that the stock is **overvalued** and hence investors should decide to **sell** the stock.

3.4.2 Portfolio Formation

I have selected five stocks—CROWN, GP, PADMAOIL, MARICO and BERGER—to diversify the portfolio. The goal is to identify the best mix of these equities that expose investors to the least amount of risk while providing the most return. By examining the historical data, I will look at each stock's performance, volatility, and correlation to create a suitably diversified portfolio that fits the investor's objectives and risk tolerance.

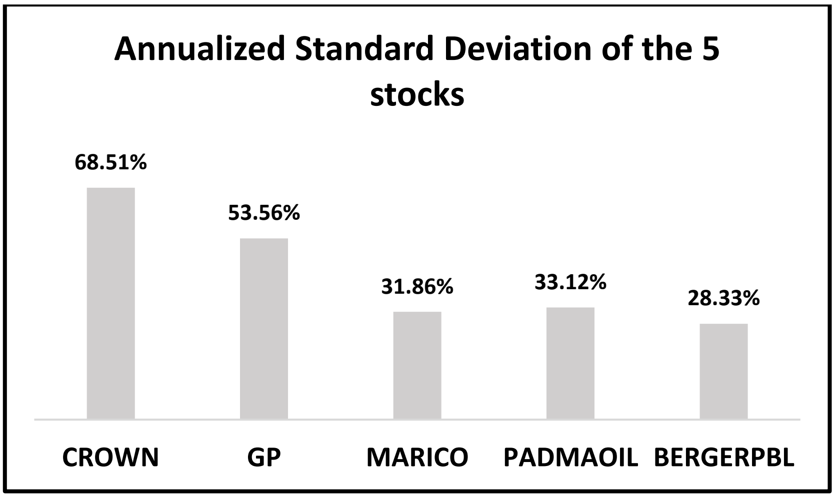
3.4.2.1 Annual expected return of the stocks

I have collected the monthly price data of the five stocks for the last 5 years. To calculate the monthly return of the stocks, I have subtracted the previous month's price with the current month's price and divided it by the current month's price. After that the monthly average return of all five stocks was calculated by taking an average of all the returns. By multiplying it with the number of trading days, which is 60, the annual return of the five stocks was generated.



3.4.2.2 Annual variance and standard deviation of the stocks

Monthly variance of all the five stocks were calculated using the variance formula in excel. After that, I annualized the variance by multiplying the monthly variance with the number of trading days. On the other hand, annual standard deviation of all the five stocks were generated using the square root function of excel (square root of annual variance).



3.4.2.3 Variance-Covariance Matrix

	CROWN	GP	MARICO	PADMAOIL	BERGERPBL
CROWN	0.0005643	0.0000235	0.0000287	0.0000437	0.0000475
GP	0.0000235	0.0001546	0.0000135	0.0000152	0.0000133
MARICO	0.0000287	0.0000135	0.0000723	0.0000058	0.0000138
PADMAOIL	0.0000437	0.0000152	0.0000058	0.0001554	0.0000159
BERGERPBL	0.0000475	0.0000133	0.0000138	0.0000159	0.0001316

The links between the returns of the five companies—CROWN, GP, MARICO, PADMAOIL, and BERGERPBL—are shown using the variance-covariance matrix.

CROWN CEMENT is the most volatile stock, as seen by its largest variance (0.0005643). With a smaller variance (0.0001546) than the others, GP seems to be less volatile. With the lowest variance (0.0001316), BERGERPBL exhibits the least amount of fluctuation in its returns.
A modest correlation between the returns of CROWN and GP is shown by their covariance of 0.0000235. The covariance between CROWN and MARICO is somewhat larger (0.0000287), suggesting a stronger positive correlation. The near-zero correlation (0.0000058) between MARICO and PADMAOIL indicates that their returns are essentially independent. GP and PADMAOIL have the greatest covariance (0.0000152), suggesting a somewhat favorable association.

Since their returns do not fluctuate in tandem, stocks with low or negative covariances are better for diversification. Because of their low correlation, equities like MARICO and PADMAOIL may lower total portfolio risk when included in the same portfolio.
In summary, this matrix demonstrates that diversification may be accomplished by combining equities with low covariances (e.g., MARICO and PADMAOIL), even when individual stocks like CROWN are riskier. Additionally, since BERGERPBL has the least volatility, investors may concentrate on it for consistency.

3.4.2.4 Efficient Portfolio Combinations

	CROWN	GP	MARICO	PADMAOIL	BERGERPBL	E(R)	Risk	Sharpe Ratio
Combination	Weight							
1	100%	0%	0%	0%	0%	0.54%	18.40%	-64.88%
2	90%	10%	0%	0%	0%	0.83%	16.66%	-69.94%
3	80%	10%	10%	0%	0%	-2.09%	14.94%	-97.53%
4	85%	5%	5%	5%	0%	-1.02%	15.82%	-85.36%
5	80%	10%	5%	5%	0%	-0.88%	14.96%	-89.29%
6	75%	10%	10%	5%	0%	-2.34%	14.11%	-105.05%
7	70%	10%	10%	10%	0%	-2.59%	13.29%	-113.35%
8	65%	15%	10%	10%	0%	-2.44%	12.47%	-119.69%
9	60%	15%	15%	10%	0%	-3.90%	11.64%	-140.79%
10	55%	15%	15%	15%	0%	-4.15%	10.86%	-153.09%
11	50%	15%	15%	15%	5%	-5.20%	10.07%	-175.60%
12	45%	15%	15%	15%	10%	-6.25%	9.30%	-201.33%
13	40%	15%	15%	15%	15%	-7.30%	8.57%	-230.68%
14	35%	15%	15%	15%	20%	-8.35%	7.89%	-263.89%
15	30%	15%	15%	15%	25%	-9.40%	7.27%	-300.86%
16	25%	15%	15%	15%	30%	-10.45%	6.73%	-340.78%
17	20%	15%	15%	15%	35%	-11.50%	6.28%	-381.73%
18	15%	15%	15%	15%	40%	-12.55%	5.95%	-420.38%
19	10%	15%	15%	15%	45%	-13.60%	5.77%	-452.33%
20	5%	15%	15%	15%	50%	-14.65%	5.73%	-473.44%

The table shows 20 possible portfolio combinations and shows how the performance of the portfolio is affected by the weights assigned to the five assets in terms of risk, Sharpe ratio, and anticipated return.

<u>Expected return trend</u>

Combination 1 (100% CROWN) gives the portfolio a positive return in the beginning (0.54%).

However, the returns gradually decrease when the weight is shifted to other assets, becoming negative by Combination 20. This implies that the return on the portfolio is decreased by the addition of certain assets.

<u>Risk trend</u>

Weight diversification away from CROWN reduces risk (standard deviation), particularly for Combinations 1 through 12. Combination 12 results in a modest decrease in risk, although it is still lower than it was before. Diversification seems to lower risk, but the profits are much lower.

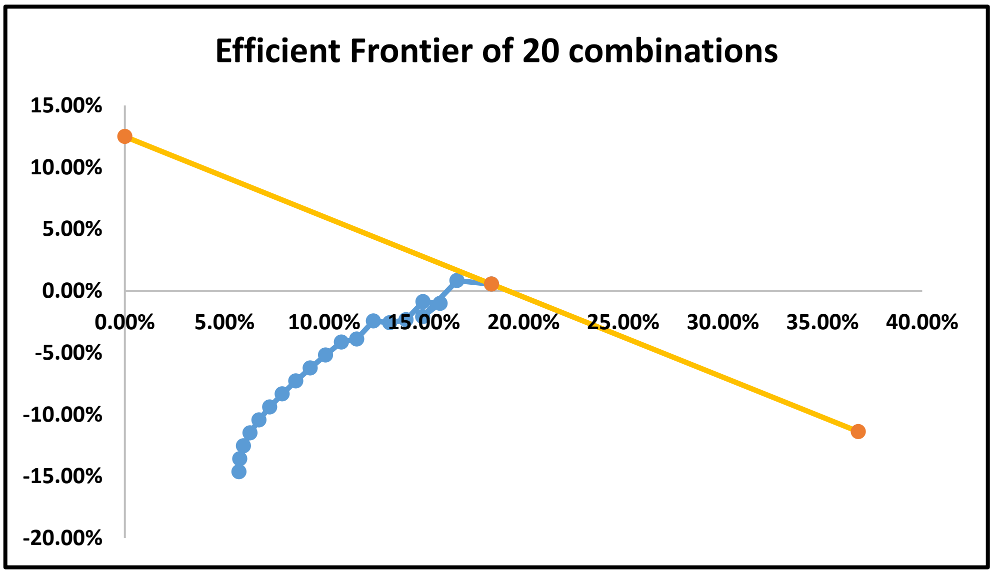
<u>The Dynamics of Sharpe Ratio:</u>

Combination 1 has the greatest Sharpe ratio (64.88), which calculates return per unit of risk. As more assets are added, the ratio gradually decreases. Combination 20 has a sharply negative Sharpe ratio (-473.44), which is indicative of very inefficient portfolios.

<u>Effect of Diversification:</u>

The addition of assets such as GP, MARICO, and PADMAOIL lowers returns and raises risk, indicating that they may not be in line with the portfolio's return goals. Diversification has not increased overall performance, but it has decreased the danger of focus.

3.4.2.5 Assessment of Efficient Frontier



Here, the optimal CAL for this portfolio has been determined by plotting the efficient frontier from the 20 alternative weight combinations. Combination 1, the highest point on this table of 20 weight combinations, is the portfolio that performs the best after the CAL goes over it. Combination 1 has 100% weight on Crown Cement with an expected return of 0.54% and a risk of 18.4%. Every combination is suboptimal below the efficient frontier. A solid basis for logical portfolio selection that emphasizes variety as a means of balancing risk and return is provided by such analysis.

3.4.2.6 Performance evaluation and various portfolio combinations

Here, an examination of strategic portfolio combinations will provide light on how to strike a balance between risk and return in different stock pairings. Three distinct portfolio strategies are included in this analysis: An equally weighted portfolio, a minimum variance portfolio to provide the least amount of risk, and an optimal portfolio to maximize the Sharpe ratio. Understanding the impact of various capital allocations on the portfolio's return, standard deviation, and Sharpe ratio is made possible by these various portfolios.

Portfolio 1: Equally Weighted portfolio

Portfolio 1	CROWN	GP	MARICO	PADMAOIL	BERGERPBL
Equally Weighted	20%	20%	20%	20%	20%
Portfolio return	-9.91%				
Portfolio Risk	6.04%				
Sharpe ratio	-370.77%				

Analysis: Here we have an equally weighted portfolio of 20% capital allocation in each stock. As we can see, the portfolio generates a negative return of -9.91% with around 6% standard deviation. The Sharpe ratio has a very high negative value of -370.77%. This suggests that even after taking risks, the portfolio lost value and provided a bad return than the risk-free rate would have provided.

Portfolio 2: Minimum Variance Portfolio

Minimum Variance	CROWN	GP	MARICO	PADMAOIL	BERGERPBL	
Weights	1%	17%	44%	19%	20%	100%
Portfolio return	-16.81%					
Portfolio Risk	4.76%					
Sharpe Ratio	-603.57%					

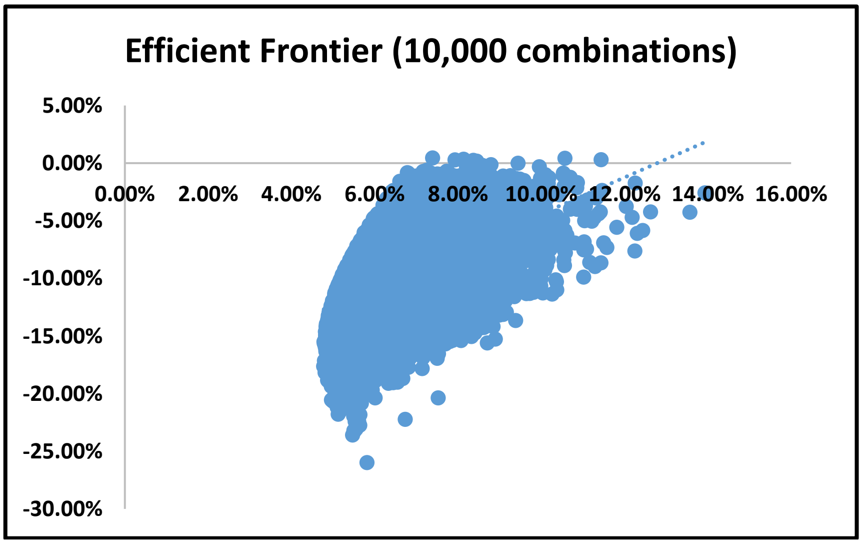
Analysis: According to the results, the least variance portfolio has a 4.76% risk. GP and CROWN have the greatest systematic risk (53.56% and 68.51% respectively), whereas Berger has the lowest systematic risk (28.33%) according to the weight distribution in this portfolio. Despite reducing risk, the weight allocation has a sharply negative Sharpe ratio (-603.57%) and produces negative portfolio returns (-16.81%).

Portfolio 3: Optimum Portfolio

Optimum Portfolio	CROWN	GP	MARICO	PADMAOIL	BERGERPBL	
Weights	100%	0%	0%	0%	0%	100%
Portfolio return	0.54%					
Portfolio Risk	18.40%					
Sharpe ratio	-62.00%					

Analysis: A portfolio with 100% invested in Crown and 0% in Marico, GP, Berger, and Padma Oil was the ideal weight allocation. The maximum possible Sharpe Ratio of -62.00% (which is still negative) and a return of 0.54% are offered by this portfolio. This distribution of weights is equivalent to the fact that all stocks' annualized returns showed negative values, except for Crown and GP. However, although while GP and Crown generate positive returns, they are far lower than the risk-free rate of 12.48%, which indicates that a higher return may be obtained with almost no risk.

3.4.2.7 Evaluation of Efficient Frontier



This graph shows the portfolio with 10,000 randomly generated weight combinations, all equal to 100%. Numerous random simulations produce a smooth curve, where the outside edge represents our efficient frontier. This chart shows the best risk-free CAL based on the risk-free rate of 12.48%.

3.5 Summary and Conclusions

The purpose of this research was to analyze individual stocks and their attributes as well as to compile a portfolio of all the securities from various sectors. This was accomplished by evaluating the individual choices made about the selection of Crown Cement, Grameenphone, Marico, Berger Paints and Padma Oil and working with those businesses to construct a portfolio that would provide the highest results with the right weight distribution. While the result did lean somewhat toward a single stock or firm, this does not imply that the portfolio is not well-diversified or optimized. Additionally, it affirms the idea that adjustments depending on market results, company conditions, and a portfolio's overall composition are essential to all portfolios performing superbly. This kind of portfolio may reach new heights with skill and precise projections.

3.6 Recommendations

<u>Portfolio Strategy Selection</u>

- **Avoid an Equally Weighted Portfolio:** The equally weighted portfolio showed a negative return of -9.91% with a high standard deviation, leading to a poor Sharpe ratio (-370.77%). This suggests that spreading capital equally among all stocks does not optimize returns.

- **Minimum Variance Portfolio Is Risk-Averse but Inefficient:** While this portfolio achieved the lowest risk (4.76%), it had a highly negative Sharpe ratio (-603.57%) and negative returns (-16.81%), making it an unattractive option.

- **Optimal Portfolio Recommendation:** The highest Sharpe ratio (-62.00%) was achieved when 100% of the investment was allocated to Crown Cement. However, despite being the best of the three strategies, the return (0.54%) was still lower than the risk-free rate (12.48%), making the portfolio inefficient.

<u>Stock-Specific Investment Insights</u>

- **Crown Cement (CROWN):** The stock has the highest annualized return (42%) but also carries significant risk (47.2% standard deviation). Suitable for high-risk investors, but diversification is necessary.

- **Berger Paints (BERGER):** The stock has shown strong long-term growth potential, but its intrinsic value (496.88 BDT) is far lower than its market price (1823.10 BDT), suggesting it is overvalued. Investors should consider selling.

- **Grameenphone (GP):** Less volatile (variance: 0.0001546) but contributes to portfolio inefficiencies when added, meaning its inclusion must be carefully evaluated.

- **Padma Oil (PADMAOIL):** Exhibits low correlation with other stocks, which helps in diversification, but has shown weaker return performance.

- **Marico (MARICO):** A defensive stock but does not significantly enhance portfolio returns. Weights should be reduced in optimized portfolios.

Diversification and Risk Management

- **Reduce MARICO and PADMAOIL Allocations:** These stocks negatively impact portfolio returns. Re-evaluating their inclusion is necessary.

- **Prioritize Low-Covariance Stocks:** The variance-covariance matrix shows that MARICO and PADMAOIL have low correlations, meaning they contribute to risk reduction. However, their return trade-off should be reconsidered.

- **Efficient Frontier Analysis:** The best-performing portfolio weights were heavily allocated to Crown Cement, but diversifying into lower-volatility stocks like BERGER can help manage risks while maintaining returns.

Final Recommendations for Investors

- **Risk-Tolerant Investors:** Prioritize Crown Cement while carefully managing exposure to high-volatility stocks like GP.

- **Risk-Averse Investors:** Consider a balanced mix of Crown Cement and Berger but be mindful of Berger’s current overvaluation.

- **Long-Term Investors:** Avoid overvalued stocks like Berger at current prices and focus on stocks with strong fundamentals and lower risk.

- **Diversification Strategy:** Ensure a mix of low-correlation assets to mitigate overall portfolio volatility while maintaining an acceptable return.

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Appendix A.

Appendix 1: (Closing price and monthly returns data of Crown, GP, Marico, Padma oil and Berger from December 1, 2019, to November 30, 2024.)

	Trading Code					Monthly Returns (%)				
Date	CROWN	GP	MARICO	PADMAOIL	BERGERPBL	CROWN	GP	MARICO	PADMAOIL	BERGERPBL
11/01/2024	49.5	319.7	2,332.50	212	1,757.70					
10/01/2024	53.8	314.2	2,287.80	199.4	1,766.90	8.69%	-1.72%	-1.92%	-5.94%	0.52%
09/01/2024	57.4	350.2	2,311.90	200.5	1,778.40	6.69%	11.46%	1.05%	0.55%	0.65%
08/01/2024	66.3	344	2,263.70	213.8	1,761.60	15.51%	-1.77%	-2.08%	6.63%	-0.94%
07/01/2024	56.5	252.5	2,292.00	187.8	1,810.00	-14.78%	-26.60%	1.25%	-12.16%	2.75%
06/01/2024	63	247.7	2,274.50	187.4	1,844.70	11.50%	-1.90%	-0.76%	-0.21%	1.92%
05/01/2024	60.5	223.5	2,007.30	184.6	1,669.90	-3.97%	-9.77%	-11.75%	-1.49%	-9.48%
04/01/2024	65.8	235.8	2,328.50	184.3	1,728.40	8.76%	5.50%	16.00%	-0.16%	3.50%
03/01/2024	65.1	237.8	2,444.90	191.8	1,787.60	-1.06%	0.85%	5.00%	4.07%	3.43%
02/01/2024	75.6	286.6	2,515.90	193.1	1,860.30	16.13%	20.52%	2.90%	0.68%	4.07%
01/01/2024	78	286.6	2,520.40	191	1,901.40	3.17%	0.00%	0.18%	-1.09%	2.21%
12/01/2023	75.7	286.6	2,460.70	209.2	1,774.00	-2.95%	0.00%	-2.37%	9.53%	-6.70%
11/01/2023	77.9	286.6	2,421.50	209.2	1,720.10	2.91%	0.00%	-1.59%	0.00%	-3.04%
10/01/2023	74.4	286.6	2,469.10	209.2	1,768.30	-4.49%	0.00%	1.97%	0.00%	2.80%
09/01/2023	74.4	286.6	2,471.90	209.2	1,765.60	0.00%	0.00%	0.11%	0.00%	-0.15%
08/01/2023	74.4	286.6	2,560.20	209.2	1,858.70	0.00%	0.00%	3.57%	0.00%	5.27%
07/01/2023	74.4	286.6	2,421.50	209.2	1,799.60	0.00%	0.00%	-5.42%	0.00%	-3.18%
06/01/2023	74.4	286.6	2,421.50	209.2	1,793.90	0.00%	0.00%	0.00%	0.00%	-0.32%
05/01/2023	74.4	286.6	2,421.50	209.2	1,800.00	0.00%	0.00%	0.00%	0.00%	0.34%
04/01/2023	79.2	286.6	2,421.50	209.2	1,736.60	6.45%	0.00%	0.00%	0.00%	-3.52%
03/01/2023	74.4	286.6	2,421.50	209.2	1,733.40	-6.06%	0.00%	0.00%	0.00%	-0.18%
02/01/2023	74.4	286.6	2,421.50	209.2	1,718.30	0.00%	0.00%	0.00%	0.00%	-0.87%
01/01/2023	74.4	286.6	2,421.50	209.2	1,737.10	0.00%	0.00%	0.00%	0.00%	1.09%
12/01/2022	74.4	286.6	2,421.50	209.2	1,722.60	0.00%	0.00%	0.00%	0.00%	-0.83%
11/01/2022	74.4	286.6	2,421.50	209.2	1,711.60	0.00%	0.00%	0.00%	0.00%	-0.64%
10/01/2022	74.4	286.6	2,421.50	209.2	1,711.60	0.00%	0.00%	0.00%	0.00%	0.00%
09/01/2022	74.4	286.6	2,430.70	209.2	1,740.10	0.00%	0.00%	0.38%	0.00%	1.67%
08/01/2022	74.4	287.8	2,472.60	215	1,790.40	0.00%	0.42%	1.72%	2.77%	2.89%
07/01/2022	74.4	294.3	2,449.70	209.9	1,714.60	0.00%	2.26%	-0.93%	-2.37%	-4.23%
06/01/2022	78.1	294.1	2,421.00	214.1	1,734.90	4.97%	-0.07%	-1.17%	2.00%	1.18%
05/01/2022	65.9	307.1	2,344.80	211	1,727.20	-15.62%	4.42%	-3.15%	-1.45%	-0.44%
04/01/2022	67.7	319.9	2,353.10	211.1	1,768.40	2.73%	4.17%	0.35%	0.05%	2.39%
03/01/2022	68.5	328.9	2,355.20	206.1	1,753.60	1.18%	2.81%	0.09%	-2.37%	-0.84%
02/01/2022	71.2	340	2,399.40	207.1	1,788.10	3.94%	3.37%	1.88%	0.49%	1.97%
01/01/2022	61.8	355.9	2,356.10	208.2	1,810.20	-13.20%	4.68%	-1.80%	0.53%	1.24%
12/01/2021	62.2	349.5	2,301.00	212.5	1,765.90	0.65%	-1.80%	-2.34%	2.07%	-2.45%
11/01/2021	67.4	348.3	2,280.50	211.2	1,759.90	8.36%	-0.34%	-0.89%	-0.61%	-0.34%
10/01/2021	75.5	358.5	2,295.10	217.6	1,760.80	12.02%	2.93%	0.64%	3.03%	0.05%
09/01/2021	85.1	380.2	2,333.70	230.5	1,808.40	12.72%	6.05%	1.68%	5.93%	2.70%
08/01/2021	81.9	362.6	2,322.80	222.9	1,779.80	-3.76%	-4.63%	-0.47%	-3.30%	-1.58%
07/01/2021	74.3	379.3	2,380.00	210.9	1,778.30	-9.28%	4.61%	2.46%	-5.38%	-0.08%
06/01/2021	71.7	349.4	2,229.20	203.8	1,759.50	-3.50%	-7.88%	-6.34%	-3.37%	-1.06%
05/01/2021	76.4	346.3	2,090.60	203.9	1,765.00	6.56%	-0.89%	-6.22%	0.05%	0.31%
04/01/2021	53.7	339	2,055.00	195.5	1,697.80	-29.71%	-2.11%	-1.70%	-4.12%	-3.81%
03/01/2021	46.4	328.5	2,077.00	191.2	1,754.70	-13.59%	-3.10%	1.07%	-2.20%	3.35%
02/01/2021	49	338.3	2,105.10	190.5	1,554.70	5.60%	2.98%	1.35%	-0.37%	-11.40%
01/01/2021	52.1	371.9	2,153.20	198.3	1,534.90	6.33%	9.93%	2.28%	4.09%	-1.27%
12/01/2020	46.4	347.1	2,138.80	205.1	1,429.50	-10.94%	-6.67%	-0.67%	3.43%	-6.87%
11/01/2020	43.8	319.1	2,110.90	191.9	1,327.50	-5.60%	-8.07%	-1.30%	-6.44%	-7.14%
10/01/2020	43.8	329.7	2,099.40	208.7	1,322.70	0.00%	3.32%	-0.54%	8.75%	-0.36%
09/01/2020	45.1	330	2,146.30	213.4	1,384.00	2.97%	0.09%	2.23%	2.25%	4.63%
08/01/2020	45.7	318.4	1,983.40	210.5	1,452.50	1.33%	-3.52%	-7.59%	-1.36%	4.95%
07/01/2020	44	258.5	1,700.80	175.5	1,308.60	-3.72%	-18.81%	-14.25%	-16.63%	-9.91%
06/01/2020	43.8	238.8	1,562.50	166.2	1,308.60	-0.45%	-7.62%	-8.13%	-5.30%	0.00%
05/01/2020	43.8	255.9	1,562.50	167	1,308.60	0.00%	7.16%	0.00%	0.48%	0.00%
04/01/2020	43.8	238.8	1,562.50	169.6	1,308.60	0.00%	-6.68%	0.00%	1.56%	0.00%
03/01/2020	43.8	238.8	1,562.50	167.6	1,308.60	0.00%	0.00%	0.00%	-1.18%	0.00%
02/01/2020	52.1	274.4	1,630.80	176.5	1,406.50	18.95%	14.91%	4.37%	5.31%	7.48%
01/01/2020	38.6	257.8	1,699.90	176.1	1,407.80	-25.91%	-6.05%	4.24%	-0.23%	0.09%
12/01/2019	39	285.8	1,673.30	192.2	1,380.50	1.04%	10.86%	-1.56%	9.14%	-1.94%

Appendix 2: (Calculation of Expected Market return)

Using Market Cap (Taka in million)			
Year	Market Cap	Return	
2004	224922		
2005	233542	3.83%	103.83%
2006	323368	38.46%	138.46%
2007	753955	133.16%	233.16%
2008	1059530	40.53%	140.53%
2009	1887177	78.11%	178.11%
2010	3471109	83.93%	183.93%
2011	2327000	-32.96%	67.04%
2012	1933500	-16.91%	83.09%
2013	1977400	2.27%	102.27%
2014	2694448	36.26%	136.26%
2015	2607793	-3.22%	96.78%
2016	3185700	22.16%	122.16%
2017	3801000	19.31%	119.31%
2018	3847300	1.22%	101.22%
2019	3998200	3.92%	103.92%
2020	3119700	-21.97%	78.03%
2021	5142800	64.85%	164.85%
2022	5177800	0.68%	100.68%
2023	7702322	48.76%	148.76%

Using DSEX/DGEN			
Year	Market Cap	Return	
2004	1916.73		
2005	1630.91	-14.91%	85.09%
2006	1564.94	-4.04%	95.96%
2007	2933.67	87.46%	187.46%
2008	2717.94	-7.35%	92.65%
2009	4409.94	62.25%	162.25%
2010	8060.85	82.79%	182.79%
2011	5112.03	-36.58%	63.42%
2012	4102.48	-19.75%	80.25%
2013	4266.55	4.00%	104.00%
2014	4864.96	14.03%	114.03%
2015	4629.64	-4.84%	95.16%
2016	5036.05	8.78%	108.78%
2017	6244.52	24.00%	124.00%
2018	5385.64	-13.75%	86.25%
2019	4452.93	-17.32%	82.68%
2020	5402.07	21.31%	121.31%
2021	6756.66	25.08%	125.08%
2022	6206.81	-8.14%	91.86%
2023	6246.50	0.64%	100.64%

Source: Bangladesh Bank Annual Report and Dhaka Stock Exchange				Using Index		Using Market Cap	
Whole Period	Using Market Cap	Using Index		Last 5 Years	Last 10 Years	Last 5 Years	Last 10 Years
R_m Market Return	20.44%	6.42%		3.01%	3.89%	14.89%	14.57%
Expected Market Return	**17.50%**	This will be used for calculating the Required Return					

Appendix 3: Proposal of the report

“Efficient Frontier and Portfolio Optimization of Five Selected Stocks: A Quantitative Approach”

Objectives:

1. Building the Best Portfolio: Examine five selected stocks from the Dhaka Stock Exchange (DSE) to build a portfolio that minimizes risks and optimizes rewards.
2. Creating the Efficient Frontier: Plot the risk-return combinations using quantitative techniques to get the efficient frontier.
3. Risk assessment: Determine each stock's contribution to the portfolio by analyzing its risk and volatility.
4. Impact of Diversification: Analyze how diversification affects the portfolio's overall risk and return profile.
5. Practical Application: Give investors useful information about the Bangladeshi stock market.

Background Information:

One of the major financial markets in Bangladesh is the Dhaka Stock Exchange, where investors encounter difficulties because of the high level of market volatility and information scarcity. Two key ideas in contemporary portfolio theory are portfolio optimization and building the efficient frontier. Investors can efficiently manage resources to reach their financial objectives by examining the performance of specific stocks and comprehending the risk-return trade-offs. To ensure diversity and gain insight into portfolio performance under various economic situations, this research focuses on five well-known stocks from the DSE that represent several industries.

Preliminary Methodology:

This report aims to do security analysis and selection of five stocks in order to diversify the portfolio by representing various sectors. Examination of the past information (such as returns and prices) from November 2019 to November 2024 (last 5 years) will be done.

The historical price data will be collected from **investing.com**. Markowitz’s portfolio optimization model will be used to determine three different portfolios strategies. Also, Monte Carlo simulation method will be used to generate 10,000 different portfolio combinations.

To examine price patterns, trade volumes, return distributions, and volatility, **technical analysis** will be used. A scatter diagram will also be drawn with a regression line to show the market risk of each stock indicating its beta.

This analysis comprises **3 different portfolio strategies**: an equally weighted portfolio, an optimum portfolio to maximize the Sharpe ratio, and a minimum variance portfolio to provide minimal risk. These different portfolios provide an understanding of the effects different capital allocations have on the return, the standard deviation, and the Sharpe ratio of the portfolio.

For **portfolio formation**, the returns, variances, and standard deviations for every stock on a daily and annual basis will be determined. Then by constructing a variance covariance matrix, the relationships between multiple assets will be assessed helping in portfolio optimization. By utilizing Modern Portfolio Theory to determine the weights of a portfolio that minimize risk for a specific return level. Then visualization by creating a plot of the portfolio's efficient frontier and risk-return matrix by using 10,000 different combinations using simulation will be conducted which will help to identify the minimum variance and maximum portfolio.

Significance of the issue:

1. The findings will help investors make decisions by providing guidance on how to build diverse portfolios that maximize risk-adjusted returns.
2. Provide information about the stability and performance of the Bangladeshi stock market.
3. Educate stakeholders on sophisticated portfolio management strategies to encourage well-informed investing behaviors through financial literacy.
4. Economic Growth: By increasing investment results and lowering uncertainty, promote greater stock market involvement.
5. Practical Utility: The study will assist fund managers and individual investors in creating plans that complement their financial objectives and risk tolerance.

Timeline of the work:

The first chapter will be completed by the last week of December before the assigned submission date of December 29, 2024 since my internship ends on January 08, 2025 and this chapter requires me to write about my internship experience.

The second chapter will be done by the end of November, 2024.

The third chapter is lengthy and requires utmost effort. Data collection will be done by December 10, 2024. Technical analysis will be done by December 20, 2024. The next 5 days will be utilized for portfolio formation. The whole report will be compiled and completed following the guidelines by December 28, 2024.