



# North South University

## Group Report (Part-1) on “Portfolio Optimization on DSE Stock”

**Course Title** : Investment Theory

**Course Code** : FIN435

**Section** : 03

### Submitted To:

**Hasan Mohammed Sami**

**Lecturer**

**Department of Accounting & Finance**

**North South University**

### Submitted By:

No	Name	ID
1	Sohrab Ahmed	2013612030
2	Dibbo Kundu	2022022630
3	Humayra Binte Harun	1921141030
4	Tasmin Ferdous Rumaya	1922286030
5	Sadia Tasnim	1931050630

---

**Date of Submission: 27<sup>th</sup> November, 2023**

## ACKNOWLEDGEMENT

We would like to express our deepest gratitude to our esteemed instructor, Hasan Mohammed Sami, for his unwavering support and guidance throughout the FIN435 (Investment Theory) course, and also this project. His extensive knowledge and expertise in the field of investment theory have been invaluable to us, and his infectious enthusiasm has inspired us to delve deeper into the intricacies of portfolio optimization.

We are also incredibly grateful to our fellow classmates and group members for their collaborative spirit and willingness to share their insights. The exchange of ideas and the camaraderie we experienced have been instrumental in shaping our understanding of the project's objectives and in overcoming any challenges we encountered along the way.

Finally, we would like to extend our heartfelt appreciation to our parents and loved ones for their unwavering belief in our abilities and for providing us with the unwavering support we needed to complete this project. Their encouragement and understanding have been a constant source of motivation, and we are truly blessed to have them in our lives.

We are incredibly proud of the work we have accomplished on this project, and we are confident that the knowledge and skills we have acquired will serve us well in our future endeavors. Thank you to everyone who has contributed to making this project a success.

## Executive Summary

The first project develops into the Dhaka Stock Exchange (DSE), focusing on SK Trims & Industries Ltd. (SKTRIMS) and Karnaphuli Insurance Company Ltd. (KARNAPHULI). These stocks were chosen for their robust financial performance in the Bangladesh stock market. The analysis involved Ratio Analysis, Portfolio Optimization, Dividend Discount Model (DDM) Valuation, Gordon Growth Model (GGM) analysis, Sensitivity Analysis, and Cash Flow Calculation.

SKTRIMS, a leader in garment accessories manufacturing, and KARNAPHULI, a stalwart in the insurance sector, displayed favorable financial metrics such as P/E ratio, EPS, Beta, and Current Ratio. Despite their positive indicators, the project revealed unsatisfactory yearly returns and negative portfolio Sharpe Ratio for the selected DSE stocks. Consequently, the recommendation shifted towards the US market, particularly NASDAQ, citing higher growth potential, greater liquidity, and exposure to global innovation.

The second project focused on portfolio optimization in the US market, specifically targeting three auto manufacturing industry stocks: Federal Signal Corporation (FSS), Ford Motor Company (F), and General Motors Company (GM). Employing LSTM models for price prediction and a portfolio optimization algorithm, the project aimed to maximize returns within a 70-day investment period.

The outcome of the portfolio optimization project was impressive. Despite predicted prices being lower than actual prices, the optimized portfolio exhibited a significant gain, with GM being excluded in favor of FSS and F. The investment strategy suggested buying 11 FSS and 56 F stocks, yielding an approximate gain of \$310.47 from a \$1000 investment. The portfolio demonstrated a remarkable 278.5% expected annual return, a Sharpe ratio of 13.52, and an annual volatility of 20.5%. This efficient portfolio significantly outperformed the USA auto manufacturing industry average return on investment.

In summary, the portfolio optimization projects highlight the importance of adapting investment strategies based on market conditions. The shift from DSE to NASDAQ showcased the potential for higher returns and global exposure. The success of the US market portfolio optimization underscores the effectiveness of data-driven approaches and meticulous financial analysis in maximizing profits within a specified timeframe.

## Table of Contents

ACKNOWLEDGEMENT .....	1
Executive Summary .....	2
INTRODUCTION .....	1
METHODOLOGY .....	2
INDUSTRY BACKGROUND .....	3
REASON for SELECTING THOSE STOCKS .....	4
RATIO ANALYSIS .....	5
PORTFOLIO OPTIMIZATION .....	6
Index Parameters of the Stocks .....	6
DDM Valuation .....	8
Calculation of Project Cash Flow .....	10
Gordon Growth Model (GGM) .....	12
Sensitivity Gordon Model .....	13
Portfolio Analysis .....	15
INVEST IN DSE MARKET IS PROFITABLE OR NOT .....	17
REASON for SWITCHING to INVEST in NASDAQ in US MARKET .....	18
CONCLUSION .....	20

## INTRODUCTION

In the dynamic landscape of financial markets, investors seek to maximize returns while minimizing risks through strategic portfolio optimization. This project delves into the realm of the Dhaka Stock Exchange (DSE), specifically focusing on two prominent stocks: SK Trims & Industries Ltd. (SKTRIMS) and Karnaphuli Insurance Company Ltd. (KARNAPHULI). The selection of these stocks is rooted in their robust financial performance and promising indicators within the Bangladesh stock market.

SK Trims & Industries Ltd., an industry leader in garment accessories manufacturing, and Karnaphuli Insurance Company Ltd., a stalwart in the insurance sector, stand out with commendable financial metrics such as Price-to-Earnings (P/E) ratio, Earnings Per Share (EPS), Beta, and Current Ratio. The rationale behind choosing these stocks lies in their favorable position relative to industry benchmarks, evident in their P/E ratios of 31 and 19.25, respectively, both surpassing industry averages.

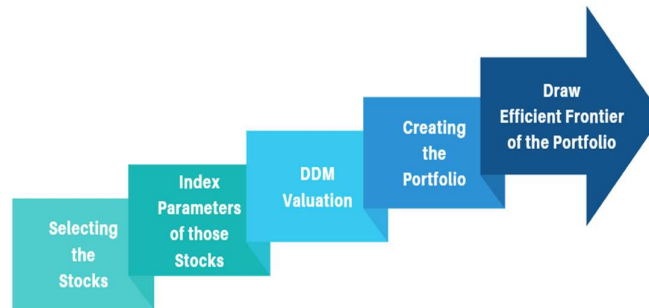
This project employs a multifaceted methodology encompassing Ratio Analysis, Portfolio Optimization, Dividend Discount Model (DDM) Valuation, Gordon Growth Model (GGM) analysis, Sensitivity Analysis, and Cash Flow Calculation. Through these analytical lenses, the study aims to construct an optimized portfolio, judiciously allocating funds between SKTRIMS and KARNAPHULI based on anticipated performance.

The Dhaka Stock Exchange, provides a challenging yet potentially rewarding environment for investors. Volatility in the DSE market is explored through in-depth analyses of beta values, market returns, and growth potential. Despite the potential benefits, the decision to shift focus to the US market, particularly the NASDAQ, is rooted in the quest for higher growth, greater liquidity, and a diverse array of investment opportunities.

This project sets the stage for a comprehensive exploration of portfolio optimization, offering insights into the financial intricacies of DSE stocks, the underlying market volatility, and the strategic decision to transition towards the US stock market for enhanced returns and global exposure.

## METHODOLOGY

We have chosen two stocks from same stock exchange (DSE) for portfolio optimization which aims to identifying and invest in these two stocks. This project shows strong financial equations like: P/E ratio, EPS, Beta and Current ratio, Portfolio optimization. To construct a



portfolio optimizing the allocation of funds among the stocks based on their anticipated performance. Financial indicators such as return on investment (ROI) and risk-adjusted are used assess portfolio performance. Calculating the DDM valuation, forecasting price in six years (2023-2028) of those stocks, and the Gordon Model analysis identifying how those stocks valuation in farther time frame, and also showing that how those stocks are performing.

For doing this project we have gather primary data from: [lankabd.com](http://lankabd.com), [investing.co](http://investing.co). and as our secondary source we gathered information from different websites, pages and articles which are cited in the references. We have calculated financial indicators which measures that collect information about these industries so that investors can analyze the effectiveness of the actions done by the departments of these industries. They have the role of providing data to aid in decision making. Also, we have done portfolio optimization which is used to determine the best allocation of funds among stocks. Finally, the portfolio's performance is assessed using financial benchmarks.

## INDUSTRY BACKGROUND

### **SK Trims & Industries Ltd. (SKTRIMS):**

SK trims & Industries Ltd. was established in 1998, with standard machineries covering an area of about 40,000 square feet. They have the leading garments accessories manufacturing equipment in the industry. Their company is one of the leading industries. They integrate design research, manufacture, sale and service to ensure the highest level of quality and customer satisfaction. Being a professional manufacturer with more than 20 years of experience their products are widely recognized and trusted by industrial customers all over the world.

They have bag manufacturing units who design and manufacture all kind of bag by professional team and workers. Also, they have trims and accessories units who produce top quality trims and accessories with best materials.

As per 30 June 2023, 3% cash (All Shareholder), Cash 2,54,10,000 Taka will be paid to Shareholders as cash dividend. Their present total numbers of share 8,74,00,000. They have net asset value of Tk. 1,318,762,849.

### **Karnaphuli Insurance Company Ltd. (KARNAPHULI):**

Karnaphuli Insurance Company Limited was incorporated on 23<sup>rd</sup> November, 1986 as a public limited Company under the companies Act 1931, obtained the certificated of registration for General Insurance Business from Controller of Capital issues on 23<sup>rd</sup> November, 1986. The company started its business on 25<sup>th</sup> November, 1986 being sponsored by group of renowned business personalities, reputed industries and journalist of the country.

The company started its non-life Insurance Business with a paid-up capital of 3.00 crore and authorized 30.00 crore on 23<sup>rd</sup> November 1986. The company enhance its paid-up capital through floated initial public offering of Tk. 3.00 crore in 1995, issuing right share and declared stock dividend different year. At the end of 2022 the paid-up capital was raised at 44.87 crore and authorized capital Tk. 60.00 crore. The face value of per share was also changed from Tk.100 to Tk.10.00 and market lot size from 20 to 200 share on 3<sup>rd</sup> October 2010. The shares of the company listed with Dhaka Stock Exchange Ltd. Under a category issue.

## Reason for selecting these stocks

### **SK Trims & Industries Ltd. (SKTRIMS):**

Their net asset value in 30 June, 2022 was 1,291,010,229 it increases and become Tk. 1,318,762,849. Their NAV in 2022 was Tk.15.24 increases in 2023 which is Tk.15.57, their earning per share in 2022 was Tk.0.90 now in 2023 it is Tk.0.94. their current beta is 0.99 which not very less the 1. Their current ratio is 3.641 and their P/E ratio is 31 Tk according to 27 November, 2023.

### **Karnaphuli Insurance Company Ltd. (KARNAPHULI):**

Karnaphuli Insurance Company Ltd. Has a P/E ratio of 19.25 according to 27 November, 2023. Their recent beta is 0.776. Their EPS as 2022 is 1.86. they have total shares 44876114. EPS was Tk. 0.37 for July-September 2023 as against Tk. 0.45 for July-September 2022; EPS was Tk. 1.43 for January-September 2023 as against Tk. 1.61 for January-September 2022. NOCFPS was Tk. 1.93 for January-September 2023 as against Tk. 1.75 for January-September 2022. NAV per share was Tk. 21.15 as on September 30, 2023 and Tk. 20.59 as on September 30, 2022.

We can see these two companies are in quite good financial position in Dhaka Stock Exchange. Because of these reasons we have choose these stocks for our financial analysis.



## RATIO ANALYSIS

Ratio analysis compares line-item data from a company's financial records to elicit information about profitability, liquidity, operational efficiency and solvency. Ratio analysis can show how a company has changed over time and compare one company to another in the same industry or sector. Ratio analysis is critical in evaluating a company's financial health and performance, providing significant insights for selecting companies with the potential for growth and profitability. Here are the key financial ratios of these two companies (P/E Ratio, EPS, Beta, Current Ratio):

Industry Name	P/E Ratio	EPS	Beta	Current Ratio
Karnaphuli Insurance Company Ltd. (KARNAPHULI)	19.25	1.86	0.776	2.47
SK Trims & Industries Ltd. (SKTRIMS)	31	0.94	0.99	3.64

**Note:** Karnaphuli Insurance Company Ltd. (KARNAPHULI) is under Bangladesh insurance industry. This industry's P/E ratio is 16.7. SK Trims & Industries Ltd. (SKTRIMS) is under Bangladesh readymade garments industry. The P/E ratio of this industry is 18.34. Those two stocks we are selecting, performing better in the industry average.

# PORTFOLIO OPTIMIZATION

## Index Parameters of the Stocks

### SK Trims & Industries Ltd. (SKTRIMS):

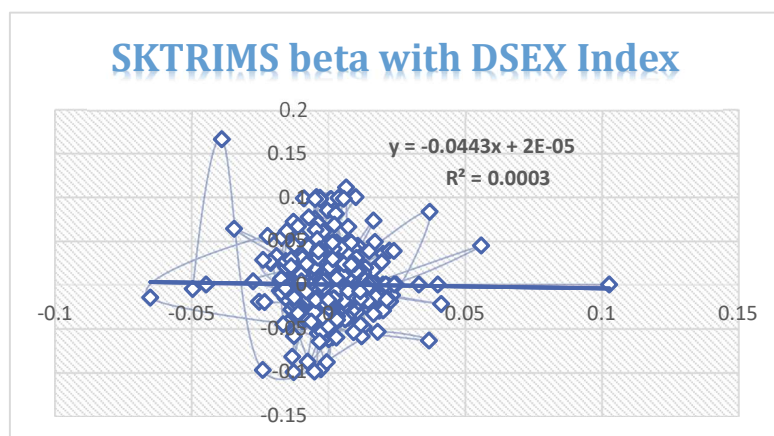
The field name and attribute name that you designate as the index's foundation are contained in the index parameter. Indexing is a crucial component of every research journal's visibility strategy, allowing the greatest number of academics to discover and pursue novel concepts and global possibilities.

Beta (SKTRIMS)	Source Info	
-0.044313863	0.229	Investing.com
Index DSEX Return	(SKTRIMS) Return	
0.000302715	1.000302715	9.53894E-06
0.030271534	Market Index Return (Daily)	
Yearly Index Return	Market Return	
0.071541264	-0.007973054	
(SKTRIMS) Return	Overall Growth Potential Vs Index Growth	
-0.015955647	-0.223027189	

Beta measures the volatility, or systematic risk, of security as compared to the broader market. A company's beta measures how the company's equity market value changes with changes in the overall market. SK Thread & Industries Limited (SKTRIMS) actual Beta is negative (.0443), and the investing.com source has .229. On the other hand, the Index DSEX return is .0003027, the SK Thread & Industries Limited return is 9.5389, and the Market Index Return (Daily) is .030271. If we look at the yearly Index return, it is .07154, and its market return is negative .00797. And finally, the overall growth potential vs. Index growth is negative at .2230.

### Analysis

Here, in the case of SK Trims & Industries Limited, the Beta is -0.0443. This means, if the market return moves by 100%, the stock return would move -4.43%.



Therefore, it is not a risky stock to invest. Here, the value of R2 is 0.0003. This refers to the value is extremely low, indicating a very low correlation between the stock return and the market return. Hence, the model is not reliable (as per the value of R 2).

### Karnaphuli Insurance Company Ltd. (KARNAPHULI):

Beta is a measure of a security's volatility, or systematic risk, as compared to the broader market. A company's beta measures how the company's equity market value changes with changes in the overall market. Karnaphuli Insurance

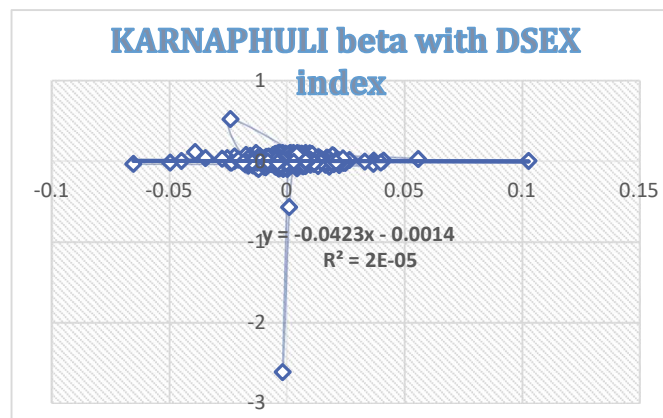
Beta (KARNAPHULI)	Source Info	
-0.041304363	0.758	investing.com
Index DSEX Return		KARNAPHULI Return
4.1457E-05		-0.001376275
0.004145696		Market Index return (daily)
		Market Return
Yearly Index Return		0.10210738
0.025154519		
KARNAPHULI Return	Overall Growth Potential Vs Index Growth Potential	
0.205591036	8.173125464	

Company Ltd Beta is negative .041, and the investing.com source has .758. On the other hand, the Index DSEX return is 4.145, the Karnaphuli Insurance Company Ltd return is negative .0013, and the Market Index Return (Daily) is .00414. If we look at the yearly Index return, then it's .0251, and its market return is .1021. And finally, the overall growth potential vs. Index growth is negative 8.173.

### Analysis:

An individual stock's risk relative to the overall stock market risk is measured by beta calculation. Beta represents the movement of stock return relative to the market return. Here, Karnaphuli Insurance Company Ltd Beta is -0.042 which implies that if the market return

moves by 100% the stock return moves by almost -4.2%. So, the stock is not stable. It is not risky stock to invest. The value of R2 is 0.00002% which is too much low and shows a weak correlation between the stock return and the market return.



## DDM Valuation

Regardless of the state of the market, the DDM's goal is to determine a stock's fair value. An investor can use the dividend discount model to get a reasonable price for a stock by estimating how much cash the company will repay in dividends over the long run. One method for calculating a stock's intrinsic value is DDM.

### SK Thread & Industries Limited (SKTRIMS)

	2018	2019	2020	2021	2022
Revenue	691,391,358.00	1,146,706,965.00	1,079,371,618.00	864,394,154.00	755,366,331.00
Growth		0.658549751	-0.058720623	-0.199169091	-0.126132069
Operating Income	120,757,142.00	228,750,809.00	184,396,792.00	1,330,188,138.00	106,907,628.00
Growth		0.894304595	-0.193896656	6.213727113	-0.919629694
Percentage of Revenue	0.174658159	0.199484974	0.170837169	1.538867578	0.141530836
Net Profit after Tax	93,515,821.00	194,493,192.00	154,058,196.00	96,409,814.00	76,325,712.00
Growth		1.079789173	-0.207899287	-0.374198735	-0.208320099
Percentage of Revenue	0.135257434	0.169610195	0.142729523	0.111534551	0.101044631
EPS	2.08	2.53	1.82	1.14	0.9
Growth		0.216346154	-0.280632411	-0.373626374	-0.210526316
Dividends Paid		9443979	53441126	88059737	29203812
Growth		#DIV/0!	4.658751041	0.6477897	-0.668363625
Percentage of Revenue	0	0.008235739	0.049511332	0.101874517	0.038661787
Dividend Payout Ratio	0	0.048556862	0.346889211	0.913389761	0.382620892
Number of Shares	44,959,529.33	76,874,779.45	84,647,360.44	84,570,012.28	84,806,346.67
Shares Change in each year		0.709866197	0.101107035	-0.000913769	0.002794541

#### Analysis:

SK Thread & Industries Limited revenue has been fluctuating for various reasons. Overall, the economic environment can significantly impact consumer spending and business investment. During economic downturns, consumers and businesses may cut back on spending, leading to a decline in revenue. Revenue growth is how sales are increasing or decreasing over time. From 2018 to 2022, their average revenue growth is -12 % because of an economy's GDP decrease during any quarter. On the other hand, their average operating income is -21% because they are experiencing a decline in sales or have lower-than-expected revenue; they may struggle to cover their operational expenses, resulting in negative operating income. If we look at the Percentage of revenue growth, it is 17% from 20218 to 2022, and the dividend payout ratio growth is .4228.

### FOR Karnaphuli Insurance Company Ltd. (KARNAPHULI)

	2018	2019	2020	2021	2022
Revenue	93,761,792.00	79,216,331.00	102,952,585.00	147,525,829.00	113,944,986.00
Growth		-0.155132071	0.299638391	0.432949246	-0.227626872
Operating Income	29,353,531.00	24,956,983.00	48,308,676.00	14,407,000.00	
Growth		-0.149779187	0.935677722	-0.701771996	-1
Percentage of Revenue	0.313064953	0.315048459	0.469232278	0.097657475	0
Net Profit after Tax	55,888,260.00	49,299,241.00	71,853,592.00	106,361,717.00	83,417,980.00
Growth		-0.117896299	0.45749895	0.480256088	-0.21571424
Percentage of Revenue	0.596066466	0.622336839	0.697928974	0.720970136	0.732089958
EPS	1.25	1.1	1.6	2.37	1.86
Growth		-0.12	0.454545455	0.48125	-0.215189873
Dividends Paid	24,422,375.00	25,643,494.00	44,876,113.00	44,876,113.00	53,851,336.00
Growth		0.05000001	0.749999942	0	0.200000009
Percentage of Revenue	0.260472571	0.32371474	0.435891075	0.304191566	0.472608211
Dividend Payout Ratio	0.436985782	0.520160016	0.624549334	0.421919787	0.645560298
Number of Shares	44,710,608.00	44,817,491.82	44,908,495.00	44,878,361.60	44,848,376.34
Shares Change in each year		0.00239057	0.002030528	-0.000670995	-0.000668145

**Analysis:** FOR Karnaphuli Insurance Company Ltd., revenue has been increasing over a while, and at the same time, their products are in high demand. Revenue growth is how sales are increasing or decreasing over time. From 2018 to 2022, their average revenue growth is 8.745%. On the other hand, their average operating income is -22% because of their high level of financial leverage, meaning it has a significant amount of debt, the interest payments on that debt, and especially they need to generate more revenue to cover those interest expenses. If we look at the Percentage of revenue growth, it is 29% from 20218 to 2022. And finally, the dividend payout ratio growth is 52%.

## Calculation of Project Cash Flow

After computing the three (06) elements needed (Revenue, Operating Income, Net Profit, EPS, Dividends Paid, Dividends Payout Ratio (for each Share)), we are calculated the project cash flow for the next five (06) years (2023-2028). The calculation is given below-

### FOR SK Thread & Industries Limited (SKTRIMS)

Forecasted						
	2023	2024	2025	2026	2027	2028
Revenue	658,673,956.03	574,358,907.12	500,836,796.67	436,726,050	380,821,945	332,073,971
Opr Inc	113,046,751.83	98,575,946.78	85,957,509.85	74,954,324.46	65,359,626.70	56,993,119.91
Net Profit	86,968,191.50	98,451,059.86	111,450,071.82	126,165,411.78	142,823,695.58	161,681,460.33
EPS	1.934366147	1.280667868	1.316639659	1.491845731	1.684115649	
Dividends Paid	36,775,733.10	41,631,426.83	47,128,243.38	53,350,833.57	60,395,025.11	68,369,298.36
Dividends Payout Ratio (for each Share)	0.36040457	0.407990683	0.461859842	0.522841629	0.591875163	0.670023558

**Analysis:** The forecasted revenue is gradually decreasing because of changes in insurance regulations that affect the pricing and sale of insurance products. Regulatory shifts may impose new requirements and restrictions or impact the ability to adjust premiums, which can influence revenue. For that, their operating income is low. Internal factors such as operational inefficiencies, increased administrative expenses, or difficulties in managing risk can decrease active income. A healthy financial performance characterized by consistent earnings growth and a robust balance sheet can give the company the confidence to increase dividends. Investors often look for companies with a solid financial foundation when considering dividend-paying stocks.

## FOR Karnaphuli Insurance Company Ltd. (KARNAPHULI)

	Forecasted					
	2023	2024	2025	2026	2027	2028
Revenue	123,910,292.40	134,747,136.33	146,531,740.00	159,346,992	173,283,029	188,437,873
Opr Inc	37,018,297.91	40,255,813.61	43,776,473.28	47,605,039.89	51,768,442.12	56,295,963.74
Net Profit	83,500,478.81	90,803,194.67	98,744,585.41	107,380,507.74	116,771,703.43	126,984,226.55
EPS	1.867576456	2.026065962	2.198795248	2.392701157	2.603699687	
Dividends Paid	44,241,479.81	48,110,714.58	52,318,341.69	56,893,955.97	61,869,740.55	67,280,693.18
Dividends Payout Ratio (for each Share)	0.985708327	1.071915591	1.165662299	1.267607829	1.378469226	1.499026248

**Analysis:** Forecasted revenue is gradually increasing, which means they sell more units; it may benefit from economies of scale. It means that the average cost per unit decreases, leading to improved profitability and the potential for revenue growth. Its operating income will increase in the next five years because it anticipates an increase in the demand for its insurance products, which may forecast higher premium payments. This growth in premiums can contribute to the rise in operating income. They experience substantial financial performance; with growing revenues and profits, they may share more of their earnings with shareholders through dividends. FOR Karnaphuli Insurance Company Ltd., the dividend payout ratio is increasing because Insurance companies are known for their relatively stable and predictable cash flows, especially those focusing on long-term insurance products. This stability allows them to commit to consistent dividend payments.

## Gordon Growth Model (GGM)

One method for determining a stock's intrinsic value in financial valuation is the Gordon Growth Model (GGM).

### FOR SK Thread & Industries Limited (SKTRIMS)

Gordon Model CF	0.34	0.366508818	0.39324343	0.421928172	0.452705293	
Year Parameter	1	2	3	4	5	
Terminal Value Gordon Model					-48.11303638	-66.36822745
Total Gordon CF	0.34	0.366508818	0.39324343	0.421928172	-65.91552216	
Intrinsic Value/Share	1.52	using Gordon Method				
Industry PE Ratio	18.34					
Intrinsic Value/Share	12.28823206	using Industry P/E				
Current Mkt Price	27.9	Highly overvalued				

**Analysis:** In the GGM, the current market price of FOR SK Thread & Industries Limited is 27.9, but the Gordon model, intrinsic value per share, is 1.52, which is highly overvalued. That means market value is not supported by its underlying financial metrics, industry trends, or market fundamentals. And the PE ratio is 18.34.

### FOR Karnaphuli Insurance Company Ltd. (KARNAPHULI)

Gordon Model CF	0.90	0.893569872	0.887206356	0.880888158	0.874614955	
Year Parameter	1	2	3	4	5	
Terminal Value Gordon Model					57.09055026	98.55086495
Total Gordon CF	0.90	0.893569872	0.88720636	0.880888158	99.42547991	
Intrinsic Value/Share	3.56	using Gordon Method				
Industry PE Ratio	23.2					
Intrinsic Value/Share	34.77740896	using Industry P/E				
Current Mkt Price	34.8	Highly overvalued				

**Analysis:** In the GGM, the current market price of FOR Karnaphuli Insurance Company Ltd. is 34.8, but the Gordon model intrinsic value per share is 3.56, which is highly overvalued. That means market value is not supported by its underlying financial metrics, industry trends, or market fundamentals. And the PE ratio is 23.2.



## Sensitivity Gordon Model

### SK Trims & Industries Ltd. (SKTRIMS):

#### FOR SKTRIMS Sensitivity Gordon Model (Growth rate)

Growth rate (Using gordon model)	Required Return					
1.52	15%	16%	17%	18%	19%	20%
6.0%	1.224511591	1.198551963	1.173466963	1.149218212	1.125769366	1.103085995
6.5%	1.224511591	1.198551963	1.173466963	1.149218212	1.125769366	1.103085995
7.0%	1.224511591	1.198551963	1.173466963	1.149218212	1.125769366	1.103085995
7.5%	1.224511591	1.198551963	1.173466963	1.149218212	1.125769366	1.103085995
8.0%	1.224511591	1.198551963	1.173466963	1.149218212	1.125769366	1.103085995
8.5%	1.224511591	1.198551963	1.173466963	1.149218212	1.125769366	1.103085995
9.0%	1.224511591	1.198551963	1.173466963	1.149218212	1.125769366	1.103085995

**Analysis:** Gordon Growth model used to intrinsic value of a stock based on a future series of dividends that grow at a constant rate. We have done sensitivity analysis. And then We have calculated expect price point. We have changed the require rate of retune 15% to 20% in here, on the other hand, change the long-term growth rate is 6% to 9% as well. According to the table, the maximum value of sensitivity Gordon model is 1.22%. Conversely the minimum value is 1.10%.

#### FOR SKTRIMS Sensitivity Gordon Model (P/E Ratio)

PE Value	Required Return					
12.28823206	15%	16%	17%	18%	19%	20%
20	13.40047117	13.40047117	13.40047117	13.40047117	13.40047117	13.40047117
25	16.75058896	16.75058896	16.75058896	16.75058896	16.75058896	16.75058896
30	20.10070675	20.10070675	20.10070675	20.10070675	20.10070675	20.10070675
35	23.45082454	23.45082454	23.45082454	23.45082454	23.45082454	23.45082454
40	26.80094233	26.80094233	26.80094233	26.80094233	26.80094233	26.80094233
45	30.15106012	30.15106012	30.15106012	30.15106012	30.15106012	30.15106012
50	33.50117791	33.50117791	33.50117791	33.50117791	33.50117791	33.50117791

**Analysis:** We have measured P/E value by the help of sensitivity Gordon model. We have taken random value for P/E ratio. Conversely, have taken the random require rate of return. Which is 15% to 20%. Form the table, the maximum rate is being 33.50%. And the minimum rate is 13.40%.

**Karnaphuli Insurance Company Ltd. (KARNAPHULI):**

**FOR KARNAPHULI Sensitivity Gordon Model (Growth rate)**

Growth rate (Using gordon model)	Required Return					
3.56	15%	16%	17%	18%	19%	20%
6.0%	3.158860635	3.093235474	3.029798811	2.968455205	2.90911426	2.85169031
6.5%	3.158860635	3.093235474	3.029798811	2.968455205	2.90911426	2.85169031
7.0%	3.158860635	3.093235474	3.029798811	2.968455205	2.90911426	2.85169031
7.5%	3.158860635	3.093235474	3.029798811	2.968455205	2.90911426	2.85169031
8.0%	3.158860635	3.093235474	3.029798811	2.968455205	2.90911426	2.85169031
8.5%	3.158860635	3.093235474	3.029798811	2.968455205	2.90911426	2.85169031
9.0%	3.158860635	3.093235474	3.029798811	2.968455205	2.90911426	2.85169031

**Analysis:** A sensitivity analysis has been performed. Next, we computed the expected price point. Here, we have adjusted the required rate of return from 15% to 20%; however, we have also adjusted the long-term growth rate from 6% to 9%. According to the table, the Gordon model's maximum sensitivity value is 3.15%. On the opposite hand, 2.85% is the minimum value.

**FOR KARBAPHULI Sensitivity Gordon Model (P/E Ratio)**

PE Value	Required Return					
34.77740896	15%	16%	17%	18%	19%	20%
20	29.98052497	29.98052497	29.98052497	29.98052497	29.98052497	29.98052497
25	37.47565621	37.47565621	37.47565621	37.47565621	37.47565621	37.47565621
30	44.97078745	44.97078745	44.97078745	44.97078745	44.97078745	44.97078745
35	52.4659187	52.4659187	52.4659187	52.4659187	52.4659187	52.4659187
40	59.96104994	59.96104994	59.96104994	59.96104994	59.96104994	59.96104994
45	67.45618118	67.45618118	67.45618118	67.45618118	67.45618118	67.45618118
50	74.95131242	74.95131242	74.95131242	74.95131242	74.95131242	74.95131242

**Analysis:** Using the support of the Gordon model of sensitivity, we have determined the P/E value. For the P/E ratio, we have selected random value. On the other hand, have chosen the random required rate of return. This ranges from 15% to 20%. Based on the table, 74.95% is the maximum rate. 29.98% is the minimal rate as well.

## Portfolio Analysis

KARNAPHULI is a riskier investment than SHTRIMS. KARNAPHULI has a higher mean than SKTRIMS, but it also has a higher standard deviation. This means that KARNAPHULI is more volatile, and there is a greater chance of both gains and losses.

Summary Statistics	SKTRIMS	KARNAPHULI
Mean	9.53894E-06	0.001538626
Std Dev	0.027556324	0.031857959
Covariance	-4.13234E-05	
Risk Free Rate	0.000297414	

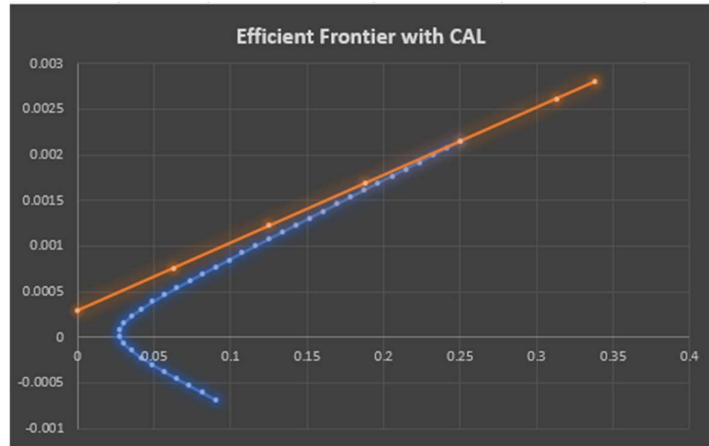
Investors who are willing to take on more risk may prefer to invest in KARNAPHULI, in the hope of earning a higher return. However, investors who are risk-averse may prefer to invest in SKTRIMS, even though it has a lower mean.

The covariance between two stocks measures how they move together. A covariance of -4.13234E-05 means that SKTRIMS and KARNAPHULI have a negative correlation. This means that when one stock goes up, the other stock tends to go down.

The risk-free rate is the rate of return on an investment that is considered to be risk-free. In this case, the risk-free rate is 0.000297414 which is very much lower. As a result, both the stocks are not suitable for investment.

Further we analyzed these two companies by different weights in each company and calculated the expected return, standard deviation and the Sharpe Ratio. The weights are randomly distributed. Our results tell us SKTRIMS is generally considered to be a less risky portfolio than KARNAPHULI. This is because it has a lower allocation to stocks, which are the most volatile asset class. KARNAPHULI, on the other hand, has a higher allocation to stocks, which makes it more volatile but also gives it the potential for higher returns. SKTRIMS may be a better choice for investors who are risk-averse or who have shorter-term investment goals.

KARNAPHULI may be a better choice for investors who are willing to take on more risk in order to pursue potentially higher returns over the long term. SKTRIMS and KARNAPHULI are two different investment portfolios with different risk and return profiles. SKTRIMS is a



more diversified and less risky portfolio, while KARNAPHULI is a less diversified and riskier portfolio with the potential for higher returns over the long term. The best portfolio for an investor depends on their individual risk tolerance and investment goals. The SKTRIMS portfolio appears to be a more diversified and less risky portfolio than the KARNAPHULI portfolio.

The graph shows the efficient frontier with CAL and weights for two stocks, SKTRIMS and KARNAPHULI. The x-axis represents the standard deviation of return (risk) and the y-axis represents the expected return. The efficient frontier is a curved line that represents the set of portfolios that offer the highest possible expected returns for a given level of risk. The CAL is a straight line that is tangent to the efficient frontier. The CAL represents the line of maximum Sharpe ratio. The weights represent the percentage of each asset class in the portfolio.

In this case, the CAL suggests that investors should invest in both SKTRIMS and KARNAPHULI, but they should invest more in KARNAPHULI because it has a higher expected return. The higher the capital allocation line, the more likely we are to invest in either of these companies.

Capital Allocation Line		
Weights	Return	Std Dev
0	0.000297414	0
0.25	0.000760625	0.062554665
0.5	0.001223837	0.12510933
0.75	0.001687049	0.187663995
1	0.00215026	0.25021866
1.25	0.002613472	0.312773325
1.35	0.002798757	0.337795191

In our opinion, we should not invest in either of the companies because the expected return is too low. So compared to the risks, the return is not worthy.

## INVEST IN DSE MARKET IS PROFITABLE OR NOT

Investing in any stock market, including the Bangladesh stock market, carries both potential rewards and risks. It is important to consider investors' risk tolerance and investment goals before making any investment decisions.

Based on the report, it is possible that investing in the Bangladesh stock market could be profitable. The graph shows that the capital growth line is positive, which suggests that the stock market is growing. However, the graph also shows that the capital growth line is volatile, which means that there is a risk of losing money in the short term.

Here are some factors to consider when deciding whether to invest in the Bangladesh stock market:

- **Risk tolerance:** Amount of risk tolerance should be considered. The Bangladesh stock market is a relatively volatile market, so investors should be prepared for the possibility of losing money in the short term.
- **Investment horizon:** The Bangladesh stock market has historically outperformed other asset classes over the long term. However, there is no guarantee that this trend will continue. If investing for a shorter-term goal, investors may want to consider less risky investments.
- **Performance:** KARNAPHULI and SKTRIMS have lower Sharpe ratio, mean return, and standard deviation, indicating that it is less volatile and also offers lower returns. Investors seeking lower growth potential and willing to take on more riskier in DSE.

If investors are considering investing in the Bangladesh stock market, it is important to do our research and consult with a financial advisor to develop an investment plan that is right for us.

According to the report, investing in the Bangladesh stock market could be profitable, but it is important to carefully consider risk tolerance and investment goals before making any investment decisions.

## REASON for SWITCHING to INVEST in NASDAQ in US MARKET

### 1. Growth Return:

While the Dhaka Stock Exchange (DSE) has shown a positive (lowest) return over the years, NASDAQ in the US market has outperformed it significantly. NASDAQ has a higher Sharpe ratio, mean return, and standard deviation, indicating that it is more volatile but also offers higher returns. Investors seeking higher growth potential and willing to take on more risk may find NASDAQ more appealing. However, investors should carefully consider their risk tolerance and financial goals before making any investment decisions.

### 2. Greater Liquidity and Diversification:

NASDAQ is one of the most liquid exchanges globally, meaning that it is incredibly easy to buy and sell shares of stocks listed on the exchange. This liquidity provides investors with the flexibility to access their funds quickly and efficiently. Additionally, NASDAQ offers a diverse range of companies across various sectors, including technology, healthcare, consumer goods, and financials. This diversification can help reduce overall portfolio risk by mitigating the impact of sector-specific fluctuations.

### 3. Aligning with CAL Line and Risk Management:

The CAL line in Dhaka suggests that investors should invest in a portfolio that includes both risky and risk-free assets. Investing in NASDAQ can help investors achieve a more balanced portfolio by increasing their exposure to potentially high-growth assets, aligning with the risk-return profile suggested by the CAL line. However, it is essential to acknowledge that NASDAQ is a more volatile market than the DSE market, so investors should be prepared for the possibility of larger price swings.

### 4. Cost Considerations and Currency Exchange:

While investing in NASDAQ offers numerous advantages, it is crucial to consider the associated costs. Currency exchange fees and commissions can impact the overall investment return. Investors should carefully evaluate these costs and ensure they are adequately compensated by the potential returns.

## **5. Higher Potential Returns:**

NASDAQ has consistently outperformed the Dhaka Stock Exchange (DSE) over the long term. NASDAQ has the potential to generate significantly higher returns for investors compared to the DSE. Historically, NASDAQ has exhibited superior growth rates and has been a haven for innovation and disruption, leading to substantial wealth creation for investors.

Financial analysis reveals unsatisfactory yearly returns and negative portfolio Sharp Ratio for two DSE stocks those we are selecting. The decision to switch to the US market is driven by its substantial size, hosting the world's largest and most valuable corporations, with a 55% global market share and a historical 70% chance of market growth.

Overall, NASDAQ presents a compelling investment opportunity for investors seeking higher-growth potential, greater liquidity, exposure to global innovation, and portfolio diversification. However, investors should carefully consider the risks associated with investing in a more volatile market and factor in the associated costs. Ultimately, the decision to switch investments to NASDAQ should align with an investor's risk tolerance, financial goals, and long-term investment strategy.

## CONCLUSION

In conclusion, the Portfolio Optimization Project centered on strategic investment in Dhaka Stock Exchange (DSE) stocks, specifically SK Trims & Industries Ltd. (SKTRIMS) and Karnaphuli Insurance Company Ltd. (KARNAPHULI). Through an extensive methodology encompassing Ratio Analysis, Portfolio Optimization, DDM Valuation, Gordon Growth Model Analysis, Sensitivity Analysis, and Cash Flow Calculation, the study aimed to construct an optimized portfolio.

However, the analysis revealed unsatisfactory yearly returns and negative portfolio Sharpe Ratio for the selected DSE stocks. Consequently, the project advocates a strategic shift towards the US market, particularly NASDAQ, citing higher growth potential, greater liquidity, and exposure to global innovation. The decision is supported by NASDAQ's historical outperformance and the potential for substantial returns. It is emphasized that investors should carefully consider the risks associated with the more volatile US market and evaluate currency exchange costs. Ultimately, the recommendation to transition aligns with the pursuit of enhanced returns, global exposure, and portfolio diversification.

**[N.B.: Report part-2 will be showing that investing in NASDAQ stock in US market. Because investing in DSE stock is not profitable. So that, we will optimize the portfolio in US market to generate a better profit.]**



## References

- Dhaka Stock Exchange* . (n.d.). Retrieved from <https://www.dsebd.org/displayCompany.php?name=KARNAPHULI>
- Dhaka Stock Exchange* . (n.d.). Retrieved from <https://www.dsebd.org/displayCompany.php?name=SKTRIMS>
- investing.com*. (n.d.). Retrieved from <https://www.investing.com/equities/sk-trims-industries>
- investing.com*. (n.d.). Retrieved from <https://www.investing.com/equities/karnaphuli-insurance-co-ltd>
- Karnaphuli Insurance Ltd.* (n.d.). Retrieved from <https://www.kiclbd.com/>
- Lankabangla BD.* (n.d.). Retrieved from [https://lankabd.com/Company/Search?searchText=KARNAPHULI&cn=Karnaphuli\\_Insurance\\_Company\\_Ltd.\\_\(KARNAPHULI\)](https://lankabd.com/Company/Search?searchText=KARNAPHULI&cn=Karnaphuli_Insurance_Company_Ltd._(KARNAPHULI))
- LankaBangla BD.* (n.d.). Retrieved from [https://lankabd.com/Company/Search?searchText=SKTRIMS&cn=SK\\_Trims\\_\\_\\_Industries\\_Limited\\_\(SKTRIMS\)](https://lankabd.com/Company/Search?searchText=SKTRIMS&cn=SK_Trims___Industries_Limited_(SKTRIMS))
- SK Trims & Industries Limited.* (n.d.). Retrieved from <https://www.sktrimsin.com/>