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COMPARATIVE RISK AND RETURN ANALYSIS OF TATA MOTORS, ITC LTD., AND THE MARKET: EVIDENCE FROM JANUARY–MARCH 2024

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This study investigates and compares the risk-return profiles of two prominent Indian companies: TATA Motors and ITC Ltd. in relation to the broader market, represented by the BSE Sensex, over the period from January 1, 2024, to March 28, 2024. Using monthly and quarterly data, average return is used as a measure of performance while standard deviation serves as a proxy for risk. The findings indicate divergent behavior between the two companies: TATA Motors demonstrated higher returns with increased risk and a strong negative correlation with the market, while ITC Ltd. showed relatively stable, market-aligned movements. The analysis offers insights into the strategic placement of these stocks for investors with varying risk appetites and objectives.

KEYWORDS: *Stock Market Analysis, Risk and Return, Correlation Analysis, Investor Strategy, Portfolio Diversification*

INTRODUCTION

In the realm of portfolio management and equity investment, understanding the trade-off between risk and return is fundamental. Investors, whether institutional or individual, aim to maximize returns while minimizing risk exposure. This paper focuses on the performance of two significant stocks in the Indian equity market TATA Motors, a major automobile manufacturer, and ITC Ltd., a diversified conglomerate compared to the broader market performance represented by the BSE Sensex.

Given the dynamic post-pandemic economic recovery and sectoral volatility, especially in early 2024, it is imperative to assess how these two companies have navigated short-term market conditions. By analyzing both monthly and quarterly return-risk profiles over the first quarter of 2024, this study aims to uncover patterns that can inform both short-term tactical investments and long-term strategic portfolio construction

OBJECTIVES OF THE STUDY

- To compute and compare the monthly and quarterly returns of TATA Motors, ITC Ltd., and the BSE Sensex.
- To measure and interpret the standard deviation (risk) associated with each of the assets.
- To analyze the correlation between the returns of the individual stocks and the market.
- To derive investment insights based on the comparative risk-return and correlation profiles.

METHODOLOGY

- **Time Period:** January 1, 2024 – March 28, 2024
- **Data Frequency:** Monthly and quarterly closing prices
- **Sources:** BSE official data, company reports
- **Returns Calculation:**

$$Return = \frac{P_t - P_{t-1}}{P_{t-1}} \times 100$$

- **Risk Calculation**
  Standard deviation of returns was used as the risk metric.
- **Correlation**
  Pearson correlation coefficient was computed to assess the strength and direction of relationships between stock returns and market returns.

DATA ANALYSIS AND FINDINGS

DATA

ITC Limited						
Date	**Open**	**High**	**Low**	**Close**	**Adj Close**	**Volume**
2024-01-01	463.500000	469.950012	462.649994	468.049988	461.275299	9346277
2024-01-02	470.000000	471.350006	463.600006	470.350006	463.542023	10519771
2024-01-03	470.250000	480.700012	469.350006	477.250000	470.342163	24036012
2024-01-04	480.000000	481.450012	474.200012	476.399994	469.504456	11786959
2024-01-05	479.399994	479.399994	472.000000	473.950012	467.089935	9209405
2024-01-08	475.000000	475.500000	464.549988	465.500000	458.762238	8003177
2024-01-09	467.500000	469.950012	463.649994	464.549988	457.825958	5696780
2024-01-10	464.549988	466.750000	460.049988	463.299988	456.594055	5896123
2024-01-11	464.100006	466.549988	461.100006	462.649994	455.953461	6534775
2024-01-12	463.250000	467.700012	460.350006	466.700012	459.944855	9354326
2024-01-15	470.000000	470.500000	466.100006	467.600006	460.831848	6902156
2024-01-16	467.799988	475.000000	464.250000	472.299988	465.463776	12066347
2024-01-17	471.399994	477.000000	465.200012	466.600006	459.846313	11108698
2024-01-18	465.250000	467.850006	454.549988	465.500000	458.762238	9143784
2024-01-19	468.549988	473.000000	466.399994	471.500000	464.675385	12203322
2024-01-23	473.750000	473.750000	456.399994	459.299988	452.651947	8404513
2024-01-24	460.100006	467.399994	458.100006	463.600006	456.889740	21626183
2024-01-25	463.549988	464.950012	452.100006	455.649994	449.054779	19677700
2024-01-29	455.899994	457.250000	447.500000	449.799988	443.289459	17869152
2024-01-30	447.000000	453.700012	437.399994	438.049988	431.709534	43514448
2024-01-31	440.000000	442.500000	438.700012	441.549988	435.158875	19882944
2024-02-01	442.000000	447.750000	439.299988	442.899994	436.489349	19165409
2024-02-02	445.000000	447.200012	439.500000	440.100006	433.729889	17156021
2024-02-05	442.000000	443.649994	436.549988	438.049988	431.709534	12041897
2024-02-06	440.000000	440.899994	429.500000	431.399994	425.155792	18764371
2024-02-07	435.000000	435.000000	430.799988	431.799988	425.549988	12880824
2024-02-08	429.000000	429.100006	408.600006	414.549988	414.549988	48183882
2024-02-09	410.100006	424.200012	408.600006	415.500000	415.500000	32283965
2024-02-12	417.549988	418.000000	406.049988	406.850006	406.850006	10906914
2024-02-13	406.899994	410.799988	403.299988	406.750000	406.750000	15606705
2024-02-14	406.000000	412.250000	404.399994	411.549988	411.549988	12150077
2024-02-15	413.000000	414.549988	403.149994	403.899994	403.899994	20383983
2024-02-16	405.000000	409.549988	399.399994	404.600006	404.600006	37518847
2024-02-19	405.000000	412.750000	404.600006	409.250000	409.250000	16949793
2024-02-20	410.450012	410.450012	404.299988	406.100006	406.100006	14084218
2024-02-21	407.000000	410.100006	401.299988	403.350006	403.350006	19414653
2024-02-22	406.899994	415.149994	403.450012	414.450012	414.450012	18604659
2024-02-23	415.899994	415.899994	410.500000	411.399994	411.399994	11147636
2024-02-26	411.100006	413.049988	407.299988	409.200012	409.200012	7982145
2024-02-27	410.000000	412.750000	408.549988	411.149994	411.149994	7783743

2024-02-28	411.149994	412.350006	406.799988	408.299988	408.299988	8617768
2024-02-29	409.000000	411.049988	404.500000	406.299988	406.299988	14895144
2024-03-01	408.899994	413.149994	407.500000	409.500000	409.500000	12395632
2024-03-04	412.250000	412.950012	408.450012	409.100006	409.100006	6840352
2024-03-05	409.649994	411.399994	403.950012	406.149994	406.149994	9733507
2024-03-06	406.500000	409.950012	400.700012	407.850006	407.850006	11106855
2024-03-07	407.850006	414.950012	403.649994	413.549988	413.549988	23020545
2024-03-11	416.799988	418.299988	408.000000	409.399994	409.399994	17620081
2024-03-12	406.500000	406.500000	399.350006	404.450012	404.450012	34882639
2024-03-13	435.000000	438.000000	421.149994	422.450012	422.450012	101612428
2024-03-14	421.950012	425.500000	418.000000	419.649994	419.649994	30764728
2024-03-15	417.200012	428.549988	415.250000	419.100006	419.100006	73253754
2024-03-18	419.000000	420.700012	416.899994	417.450012	417.450012	15933704
2024-03-19	418.000000	419.549988	408.700012	409.549988	409.549988	20994563
2024-03-20	410.000000	416.649994	409.549988	415.700012	415.700012	19609321
2024-03-21	419.000000	422.000000	416.200012	421.250000	421.250000	19227982
2024-03-22	421.250000	429.649994	421.250000	428.600006	428.600006	38861818
2024-03-26	425.549988	429.200012	425.549988	427.649994	427.649994	10274145
2024-03-27	427.000000	428.899994	426.450012	428.000000	428.000000	12227545
2024-03-28	428.000000	433.250000	427.000000	428.350006	428.350006	27933211

TATA MOTORS						
Date	**Open**	**High**	**Low**	**Close**	**Adj Close**	**Volume**
2024-01-01	785	798.700012	781.049988	790.599976	790.599976	12570717
2024-01-02	800.5	804	779	784.400024	784.400024	13791090
2024-01-03	786.049988	790	776.25	781.450012	781.450012	8559060
2024-01-04	798	801.799988	791.299988	795.75	795.75	14298444
2024-01-05	799	805.900024	787.099976	790.950012	790.950012	11091198
2024-01-08	798.400024	800.349976	787.5	789.099976	789.099976	7668471
2024-01-09	799.950012	809.200012	793.150024	799.799988	799.799988	12872757
2024-01-10	800	811	792.650024	808.450012	808.450012	9980044
2024-01-11	813.5	817.5	808.450012	815.650024	815.650024	11075167
2024-01-12	818.150024	818.549988	809.150024	816.450012	816.450012	7664094
2024-01-15	820	820.400024	810.299988	812.450012	812.450012	4835856
2024-01-16	812.450012	827	812.450012	818.849976	818.849976	10159066
2024-01-17	811	813.700012	804	805.549988	805.549988	7895439
2024-01-18	807	822.950012	797	819.049988	819.049988	11500495
2024-01-19	823.849976	826	819.5	823.549988	823.549988	5706888
2024-01-23	824.900024	827.599976	796.299988	800.450012	800.450012	9436209
2024-01-24	802.400024	812	788.5	810.900024	810.900024	7217542
2024-01-25	814	814.150024	800.299988	811.849976	811.849976	10109720
2024-01-29	811.849976	843.799988	811.049988	841	841	12823686
2024-01-30	843	885.950012	842.849976	858.849976	858.849976	19734613

2024-01-31	865.200012	896.5	865.200012	884.200012	884.200012	24562392
2024-02-01	900	900.150024	876.299988	878.5	878.5	14505885
2024-02-02	886	895.75	876.849976	878.75	878.75	13003437
2024-02-05	934	950	915.349976	926.799988	926.799988	38686871
2024-02-06	936.400024	941.299988	928.400024	939.549988	939.549988	12714803
2024-02-07	944	944	928.049988	933.799988	933.799988	7913010
2024-02-08	937	939.700012	918.799988	924.299988	924.299988	11576253
2024-02-09	926	927.400024	906.049988	915	915	7904881
2024-02-12	916.099976	925	908	911.599976	911.599976	7286778
2024-02-13	911.599976	919.099976	894	906.900024	906.900024	8574218
2024-02-14	900	919.950012	894.349976	918.299988	918.299988	6570939
2024-02-15	923.700012	927	916.349976	920.549988	920.549988	6430799
2024-02-16	925	948.799988	924.099976	938.599976	938.599976	12826164
2024-02-19	942.950012	942.950012	931.049988	932.599976	932.599976	4632214
2024-02-20	934.450012	934.650024	920.400024	926.349976	926.349976	4733639
2024-02-21	926.349976	937.200012	916.5	921.049988	921.049988	6011018
2024-02-22	924.650024	933.849976	914.599976	932.299988	932.299988	6437014
2024-02-23	933.099976	939.799988	929.400024	937.400024	937.400024	7047473
2024-02-26	937.099976	945	930.700012	936.950012	936.950012	5600234
2024-02-27	936.75	965	935.5	962.700012	962.700012	12810206
2024-02-28	966.150024	976	950.299988	958.049988	958.049988	15219187
2024-02-29	959	959.25	942.900024	950.200012	950.200012	10346657
2024-03-01	958.950012	980.400024	956.700012	977.400024	977.400024	10645369
2024-03-04	993.25	995	980.099976	987.200012	987.200012	6084495
2024-03-05	1027	1065.599976	1005.349976	1021.900024	1021.900024	59811033
2024-03-06	1025	1030.650024	1009	1017.650024	1017.650024	14214823
2024-03-07	1025	1047	1014.049988	1039.300049	1039.300049	16877082
2024-03-11	1034.75	1035.949951	1021	1028	1028	7502450
2024-03-12	1027.800049	1037	1011.299988	1016.5	1016.5	8763820
2024-03-13	1019	1021	963.549988	973.200012	973.200012	16564155
2024-03-14	964.950012	982	955.400024	967.75	967.75	22931801
2024-03-15	968.400024	979.75	940	945.849976	945.849976	23390913
2024-03-18	945.849976	974.799988	936.650024	972.450012	972.450012	12121719
2024-03-19	968.549988	970.599976	951.599976	957.75	957.75	9483750
2024-03-20	960.900024	965.150024	921.200012	940.450012	940.450012	13900321
2024-03-21	951	969.25	946	964.900024	964.900024	11074207
2024-03-22	964.900024	986.200012	950.349976	979.799988	979.799988	13638296
2024-03-26	977	995	976	986.200012	986.200012	9461531
2024-03-27	991.599976	995	976.700012	978.650024	978.650024	6640537
2024-03-28	982.5	999.900024	979	992.799988	992.799988	9862996

BSE SENSEX				
Date	**Open**	**High**	**Low**	**Close**
2024-01-01	72218.39	72561.91	72031.23	72271.94
2024-01-02	72332.85	72332.85	71613.74	71892.48
2024-01-03	71832.62	71862	71303.97	71356.6
2024-01-04	71678.93	71954.79	71546.6	71847.57
2024-01-05	72016.71	72156.48	71779.83	72026.15
2024-01-08	72113.25	72181.77	71301.04	71355.22
2024-01-09	71770.91	72035.47	71307.27	71386.21
2024-01-10	71383.2	71733.84	71110.98	71657.71
2024-01-11	71907.75	71999.47	71543.19	71721.18
2024-01-12	72148.07	72720.96	71982.29	72568.45
2024-01-15	73049.87	73402.16	72909	73327.94
2024-01-16	73331.95	73427.59	72960.29	73128.77
2024-01-17	71998.93	72484.8	71429.3	71500.76
2024-01-18	71018.86	71451.29	70665.5	71186.86
2024-01-19	71786.74	71895.64	71542.74	71683.23
2024-01-23	71868.2	72039.2	70234.55	70370.55
2024-01-24	70165.49	71149.61	70001.6	71060.31
2024-01-25	71022.1	71049.46	70319.04	70700.67
2024-01-29	70968.1	72010.22	70880.54	71941.57
2024-01-30	72000.2	72142.23	71075.72	71139.9
2024-01-31	71073.04	71851.39	70846.04	71752.11
2024-02-01	71998.78	72151.02	71574.89	71645.3
2024-02-02	71977.56	73089.4	71948.77	72085.63
2024-02-05	72269.12	72385.93	71602.14	71731.42
2024-02-06	71970.82	72261.4	71625.18	72186.09
2024-02-07	72548.5	72559.21	71938.22	72152
2024-02-08	72473.42	72473.42	71230.62	71428.43
2024-02-09	71410.29	71676.49	71200.31	71595.49
2024-02-12	71722.31	71756.58	70922.57	71072.49
2024-02-13	71292.08	71662.74	70924.3	71555.19
2024-02-14	71035.25	71938.59	70809.84	71822.83
2024-02-15	72061.47	72164.97	71644.44	72050.38
2024-02-16	72406.02	72545.33	72218.1	72426.64
2024-02-19	72627.6	72881.93	72308.68	72708.16
2024-02-20	72727.87	73130.69	72510.24	73057.4
2024-02-21	73267.48	73267.8	72450.56	72623.09
2024-02-22	72677.51	73256.39	72081.36	73158.24
2024-02-23	73394.44	73413.93	73022	73142.8
2024-02-26	73044.81	73092.26	72666.82	72790.13
2024-02-27	72723.53	73161.3	72660.13	73095.22
2024-02-28	73162.82	73223.11	72222.29	72304.88

2024-02-29	72220.57	72730	72099.32	72500.3
2024-03-01	72606.31	73819.21	72591.14	73745.35
2024-03-04	73903.09	73990.13	73747.01	73872.29
2024-03-05	73767.42	73915.54	73412.25	73677.13
2024-03-06	73587.7	74151.27	73321.48	74085.99
2024-03-07	74242.74	74245.17	73921.48	74119.39
2024-03-11	74175.93	74187.35	73433.91	73502.64
2024-03-12	73516.42	74004.16	73342.12	73667.96
2024-03-13	73993.4	74052.75	72515.71	72761.89
2024-03-14	72570.1	73364.3	72497.19	73097.28
2024-03-15	72886.77	72998.07	72484.82	72643.43
2024-03-18	72587.3	72985.89	72314.16	72748.42
2024-03-19	72462.94	72490.09	71933.35	72012.05
2024-03-20	72036.86	72402.67	71674.42	72101.69
2024-03-21	72507.36	72882.46	72416.03	72641.19
2024-03-22	72231.66	73115.62	72172.09	72831.94
2024-03-26	72396.97	72705.29	72363.03	72470.3
2024-03-27	72692.16	73138.73	72600.73	72996.31
2024-03-28	73149.34	74190.31	73120.33	73651.35

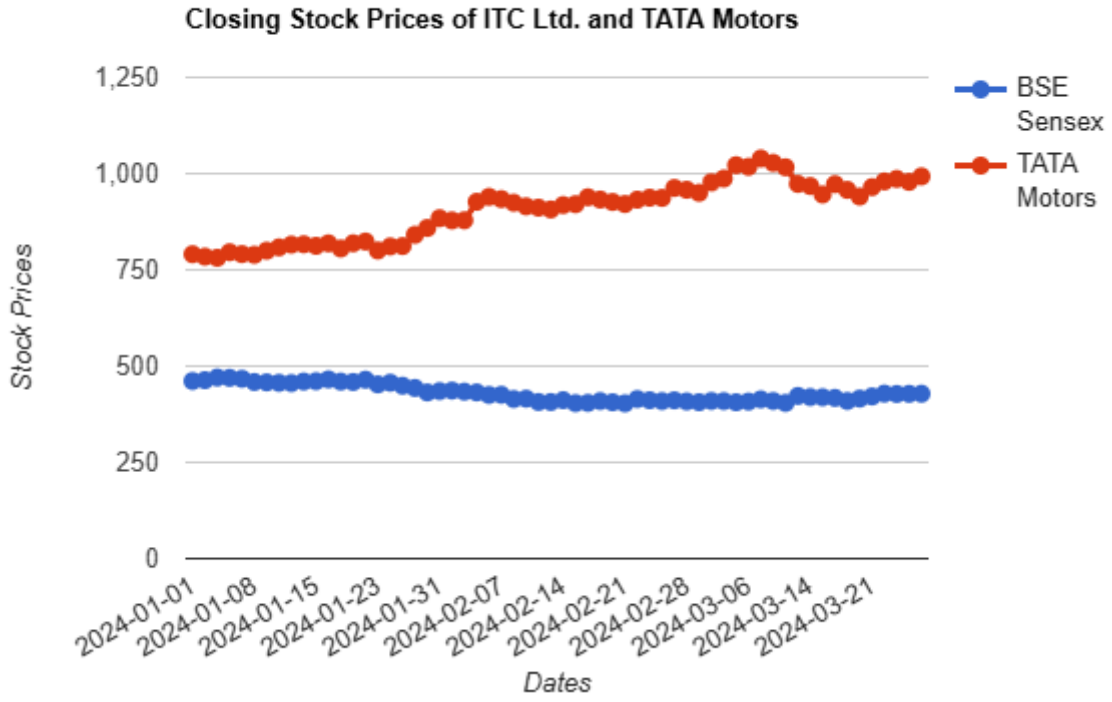
Source: https://www.bseindia.com/Indices/IndexArchiveData.html

ANALYSIS

The returns of ITC Ltd. TATA Motors and the Market is represented in the following table:

Date	Return of ITC	Return of TATA Motors	Return of Market
2024-01-01			
2024-01-02	0.49%	-0.78%	-0.53%
2024-01-03	1.47%	-0.38%	-0.75%
2024-01-04	-0.18%	1.83%	0.69%
2024-01-05	-0.51%	-0.60%	0.25%
2024-01-08	-1.78%	-0.23%	-0.93%
2024-01-09	-0.20%	1.36%	0.04%
2024-01-10	-0.27%	1.08%	0.38%
2024-01-11	-0.14%	0.89%	0.09%
2024-01-12	0.88%	0.10%	1.18%
2024-01-15	0.19%	-0.49%	1.05%
2024-01-16	1.01%	0.79%	-0.27%
2024-01-17	-1.21%	-1.62%	-2.23%
2024-01-18	-0.24%	1.68%	-0.44%
2024-01-19	1.29%	0.55%	0.70%
2024-01-23	-2.59%	-2.80%	-1.83%
2024-01-24	0.94%	1.31%	0.98%
2024-01-25	-1.71%	0.12%	-0.51%
2024-01-29	-1.28%	3.59%	1.76%
2024-01-30	-2.61%	2.12%	-1.11%
2024-01-31	0.80%	2.95%	0.86%

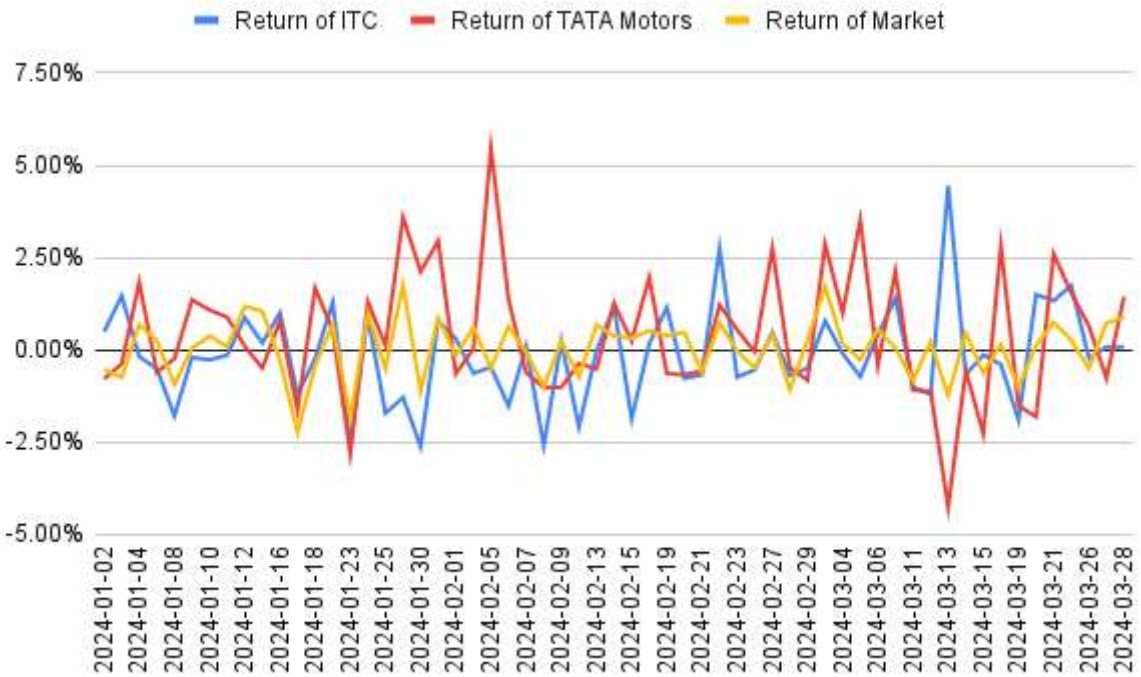
2024-02-01	0.31%	-0.64%	-0.15%
2024-02-02	-0.63%	0.03%	0.61%
2024-02-05	-0.47%	5.47%	-0.49%
2024-02-06	-1.52%	1.38%	0.63%
2024-02-07	0.09%	-0.61%	-0.05%
2024-02-08	-2.58%	-1.02%	-1.00%
2024-02-09	0.23%	-1.01%	0.23%
2024-02-12	-2.08%	-0.37%	-0.73%
2024-02-13	-0.02%	-0.52%	0.68%
2024-02-14	1.18%	1.26%	0.37%
2024-02-15	-1.86%	0.25%	0.32%
2024-02-16	0.17%	1.96%	0.52%
2024-02-19	1.15%	-0.64%	0.39%
2024-02-20	-0.77%	-0.67%	0.48%
2024-02-21	-0.68%	-0.57%	-0.59%
2024-02-22	2.75%	1.22%	0.74%
2024-02-23	-0.74%	0.55%	-0.02%
2024-02-26	-0.53%	-0.05%	-0.48%
2024-02-27	0.48%	2.75%	0.42%
2024-02-28	-0.69%	-0.48%	-1.08%
2024-02-29	-0.49%	-0.82%	0.27%
2024-03-01	0.79%	2.86%	1.72%
2024-03-04	-0.10%	1.00%	0.17%
2024-03-05	-0.72%	3.51%	-0.26%
2024-03-06	0.42%	-0.42%	0.55%
2024-03-07	1.40%	2.13%	0.05%
2024-03-11	-1.00%	-1.09%	-0.83%
2024-03-12	-1.21%	-1.12%	0.22%
2024-03-13	4.45%	-4.26%	-1.23%
2024-03-14	-0.66%	-0.56%	0.46%
2024-03-15	-0.13%	-2.26%	-0.62%
2024-03-18	-0.39%	2.81%	0.14%
2024-03-19	-1.89%	-1.51%	-1.01%
2024-03-20	1.50%	-1.81%	0.12%
2024-03-21	1.34%	2.60%	0.75%
2024-03-22	1.74%	1.54%	0.26%
2024-03-26	-0.22%	0.65%	-0.50%





Monthly Returns			
Month	**ITC**	**TATA Motors**	**BSE SENSEX**
January	-0.28%	0.57%	-0.03%
February	-0.32%	0.35%	0.05%
March	0.30%	0.27%	0.09%
Monthly Risk			
Month	**ITC**	**TATA Motors**	**BSE SENSEX**
January	1.24%	1.52%	1.03%
February	1.19%	1.57%	0.57%
March	1.44%	2.12%	0.74%

Quarterly Returns			
Quarter 1 (January - March)	**ITC**	**TATA Motors**	**BSE SENSEX**
	-0.10%	0.40%	0.04%
Quarterly Risk			
Quarter 1 (January - March)	**ITC**	**TATA Motors**	**BSE SENSEX**
	1.29%	1.74%	0.78%
Correlation between ITC, TATA Motors and BSE SENSEX			
Correlation between ITC and TATA Motors	**Correlation between ITC and BSE SENSEX**	**Correlation between TATA Motors and BSE SENSEX**	
-68.93%	71.38%	-99.94%	



TATA Motors consistently delivered positive returns, albeit with higher volatility, while ITC Ltd. showed mixed performance with moderate risk. The market, as reflected by the Sensex, exhibited minimal movement and relatively lower risk. Over the full quarter, TATA Motors emerged as the best-performing asset in terms of returns, albeit at a higher risk. ITC Ltd. underperformed, showing a negative return with slightly lower risk.

Correlation Analysis

- **TATA Motors vs BSE Sensex:** -99.94% (Strong negative correlation)
- **ITC Ltd. vs BSE Sensex:** +71.38% (Strong positive correlation)
- **TATA Motors vs ITC Ltd.:** -68.93% (Moderate to strong negative correlation)

Through the above analysis it can be seen that There were noticeable performance patterns in the stock market between January 2024 and March 2024 for TATA Motors and ITC Ltd. TATA Motors generated returns of 0.57%, 0.35%, and 0.27% over the same time, in contrast to ITC Ltd.'s -0.28%, -0.32%, and 0.30% per month. -0.03%, 0.05%, and 0.09% had been the returns of the market, as indicated by the BSE Sensex. The monthly risk levels for ITC Ltd. were 1.24%, 1.19%, and 1.44%, whilst TATA Motors had higher risk levels of 1.52%, 1.57%, and 2.12%. At 1.03%, 0.57%, and 0.74%, the BSE Sensex showed signs of risks.

The conclusions of the analysis of the quarterly data for the first quarter of 2024 demonstrated that ITC Ltd. had a return of -0.10% with a risk of 1.29%, TATA Motors had a return of 0.40% with a risk of 1.74%, and the BSE Sensex had a return of 0.04% with a risk of 0.78%. The correlation analysis showed that both TATA Motors and ITC Ltd. had a significant negative correlation of -68.93%, indicating that their returns frequently moved in opposite directions; ITC Ltd. had a positive correlation of 71.38% with the BSE Sensex, indicating that its

returns generally moved in line with the market; on the other hand, TATA Motors had a nearly perfect negative correlation of -99.94% with the BSE Sensex, indicating an almost complete inverse relationship with the movements of the market.

CONCLUSION

The comparative analysis of returns and risk for TATA Motors, ITC Ltd., and the BSE Sensex between January and March 2024 reveals distinct patterns in performance and correlation. TATA Motors delivered higher returns with higher volatility and demonstrated a strong inverse relationship with the market. In contrast, ITC Ltd., although yielding lower and occasionally negative returns, showed greater alignment with market movements and lower risk.

These findings hold important implications for portfolio construction. Investors with a higher risk appetite seeking uncorrelated diversification may consider TATA Motors, while those aiming for more market-consistent and stable performance may prefer ITC Ltd. Understanding such relationships helps investors tailor their strategies based on risk tolerance, return expectations, and diversification needs.

REFERENCES

https://www.bseindia.com/Indices/IndexArchiveData.html