

SP2 – Indian IT Sector Stock Price Analysis

Course: FAC413

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Instructor – Dr. Jaideep Ghosh

Data Window: January 3, 2023 – June 28, 2024

Data Source: Yahoo Finance (via Python yfinance)

GitHub - <https://github.com/omchitlangia/IT-STOCKS-ANALYSIS>

1. Introduction

This study analyzes the daily closing prices of four major Indian IT sector companies, HCL Technologies, Infosys, Tata Consultancy Services (TCS), and Wipro, over the period from January 3, 2023, to June 28, 2024. The objective is to examine price behavior, volatility, temporal trends, and comovement across firms using descriptive statistics and correlation analysis.

2. Data Collection and Cleaning

Daily closing price data were collected using Python from Yahoo Finance. To ensure a perfectly balanced panel, only trading dates common to all four firms were retained; any date missing data for at least one firm was removed for all firms. Corporate actions were examined, and no stock split events were found within the study window.

The screenshot displays a VS Code editor window titled "IT-STOCKS-ANALYSIS". The Explorer sidebar on the left shows a project structure with folders for ".env", "0_instructions", "1_data", "processed", "2_code", "3_outputs", "figures", "tables", and "4_report". The "1_data" folder is expanded, showing "it_sector_balanced_close_2023_2024.csv". The main editor area shows the content of this CSV file, which contains daily closing prices for HCL, Infosys, TCS, and Wipro from 2023-01-03 to 2024-02-28. The bottom panel shows the OUTPUT window with the command "ls 1_data/processed" and its output, listing various generated files such as "correlation_matrices.xlsx", "full_period_statistics.csv", "HCL_scatter_full_period.png", and "Wipro_2024_Q2_scatter.png".

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4 2023-01-05,1844.0999755859375,1475.199951171875,3311.10009765625,193.4499969482422
5 2023-01-06,1832.800048828125,1448.5,3211.550048828125,191.0
6 2023-01-09,1867.449951171875,1484.449951171875,3319.949951171875,195.8999938964844
7 2023-01-10,1863.8499755859375,1469.75,3286.39990234375,196.5249938964844
8 2023-01-11,1854.800048828125,1471.25,3328.699951171875,196.9250030517578
9 2023-01-12,1871.6500244140625,1480.5999755859375,3334.35009765625,197.25
10 2023-01-13,1877.800048828125,1503.6500244140625,3374.550048828125,196.9499969482422
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26 2023-02-07,1128.25,1562.4000244140625,3472.550048828125,200.25
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ls 3_outputs/figures/full_period
ls 3_outputs/figures/quarterly
ls 3_outputs/figures/time_series

it_sector_balanced_close_2023_2024.csv  it_sector_balanced_close_2023_2024.xlsx
correlation_matrices.xlsx                mean_by_quarter_pivot.xlsx
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HCL_scatter_full_period.png              Infosys_scatter_full_period.png
HCL_2023_Q1_scatter.png                  Infosys_2023_Q1_scatter.png
HCL_2023_Q2_scatter.png                  Infosys_2023_Q2_scatter.png
HCL_2023_Q3_scatter.png                  Infosys_2023_Q3_scatter.png
HCL_2024_Q1_scatter.png                  Infosys_2024_Q1_scatter.png
HCL_2024_Q2_scatter.png                  Infosys_2024_Q2_scatter.png
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omchitlangia@main IT-STOCKS-ANALYSIS %
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3. Full-Period Descriptive Statistics

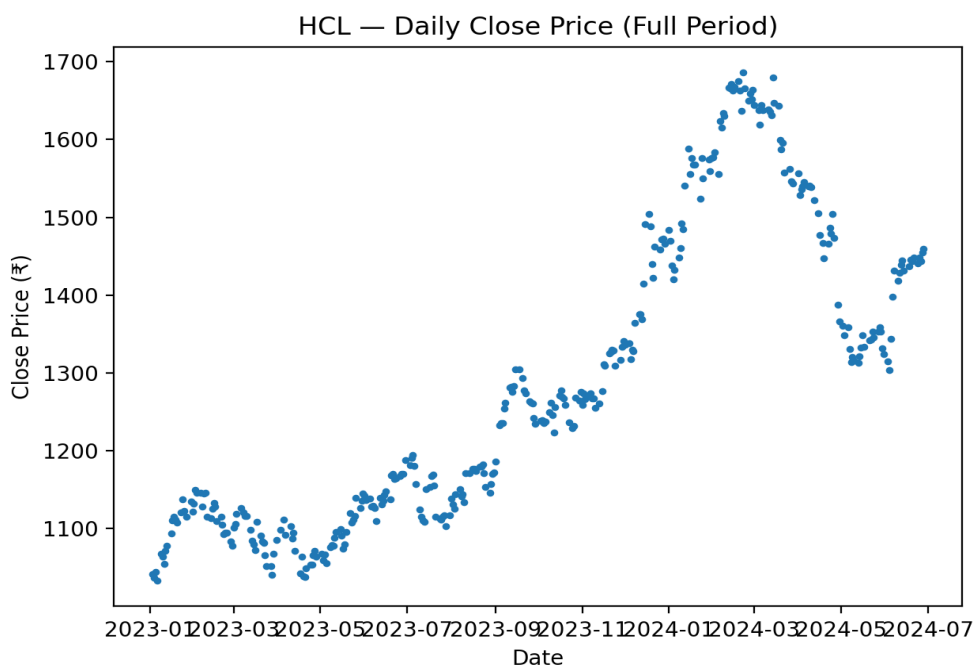
For the full sample period, key descriptive statistics were computed for each company, including mean, standard deviation, median, mode, range, quartiles, interquartile range, coefficient of variation, and the average slope of prices over time. Scatterplots of daily prices illustrate overall trends and dispersion.

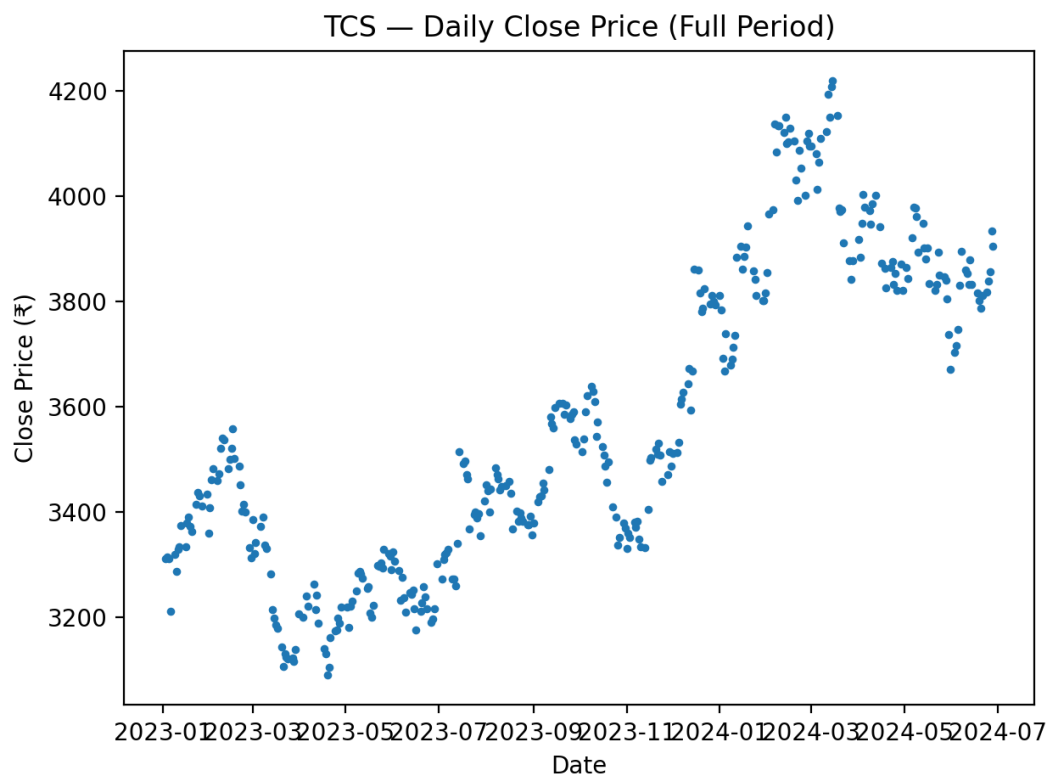
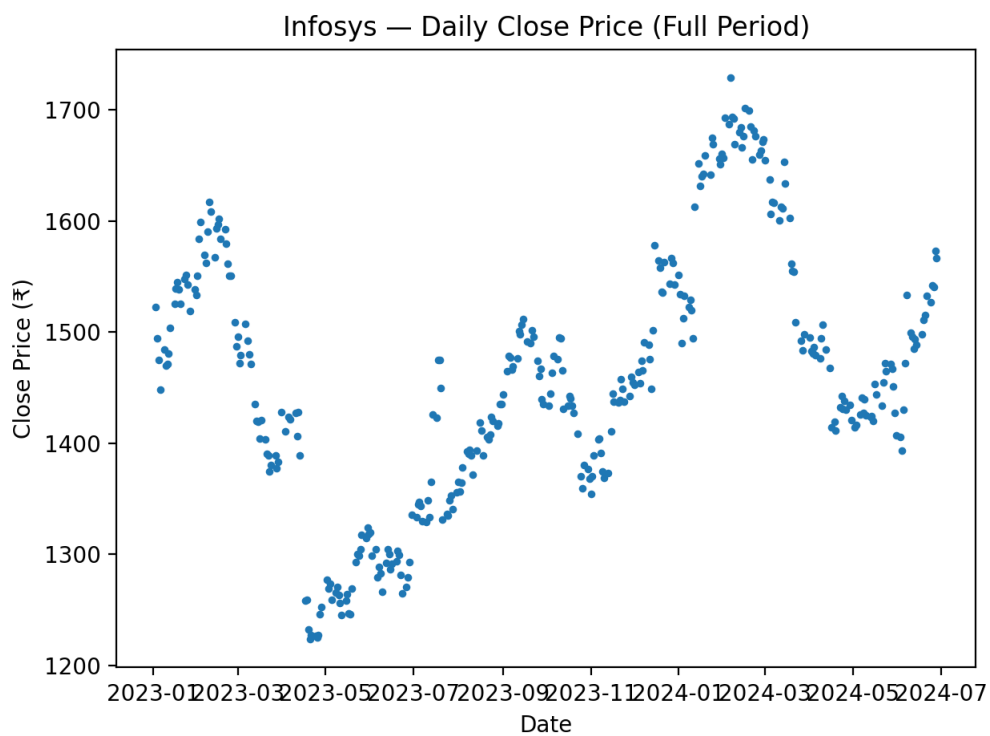
Company	N (days)	Mean	SD	Median	Mode	Min	Max	Range
HCL	364	1284.975	187.2839	1255.675	1063.85	1032.8	1686.4	653.6
Infosys	364	1457.879	114.2167	1454.375	1414.45	1223.4	1729.45	506.0499
TCS	364	3564.547	289.8056	3489.65	3220.7	3089.6	4219.25	1129.65
Wipro	364	213.3174	22.23852	204.3125	191.15	178.1	271.5	93.39999

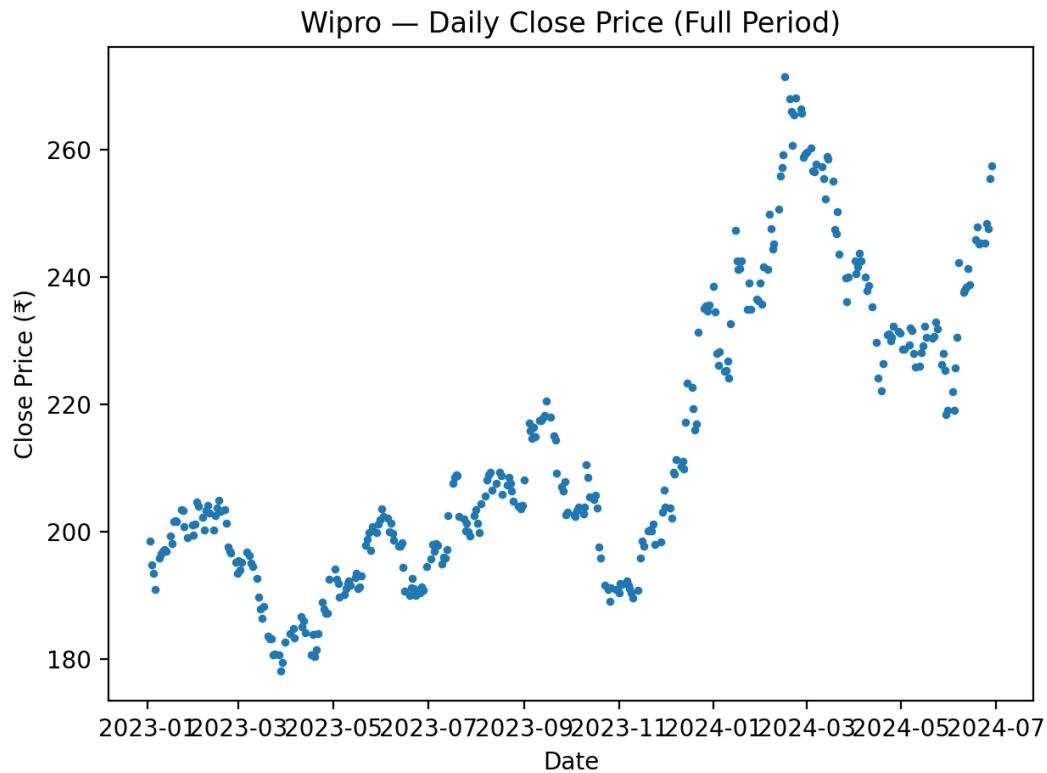
Full period descriptive statistics

Company	Q1	Q2 (Median)	Q3	IQR	Coeff. of Variation (SD/Mean)	Avg Slope (₹/day)
HCL	1121.062	1255.675	1441.5	320.4375	0.145749	0.996243
INFOSYS	1389.087	1454.375	1532.588	143.5	0.078344	0.257729
TCS	3330.3	3489.65	3831.737	501.4375	0.081302	1.526754
WIPRO	196.8187	204.3125	231.0125	34.19375	0.104251	0.111953

Full period Quartiles table / Slope



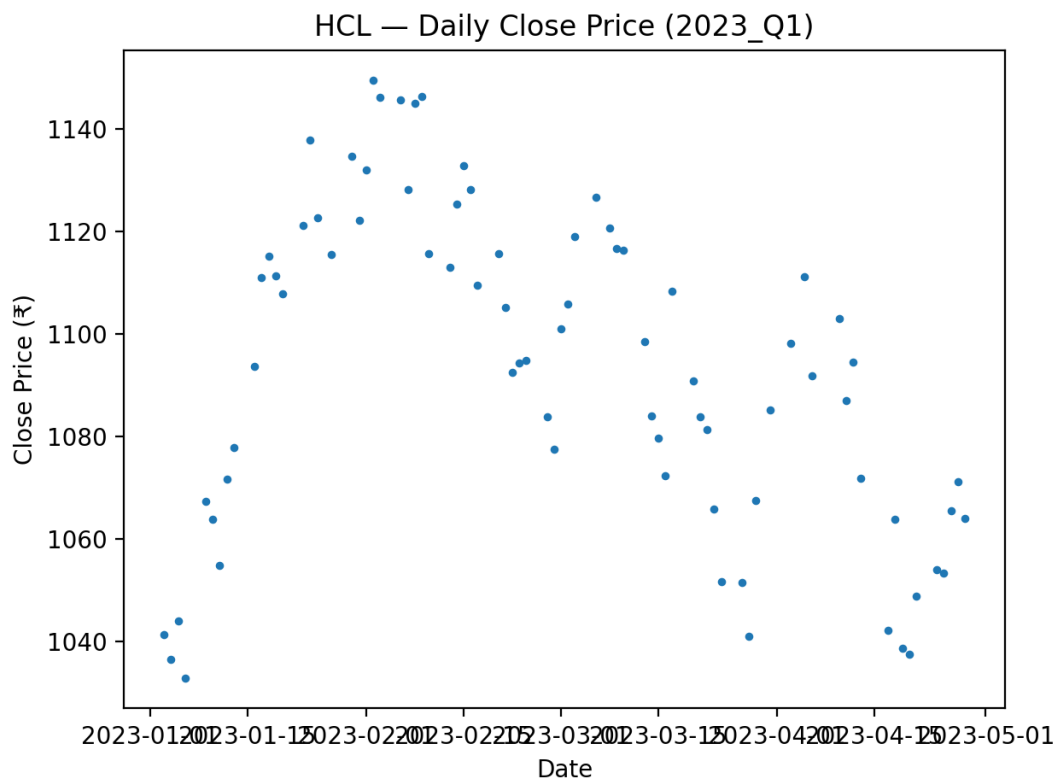
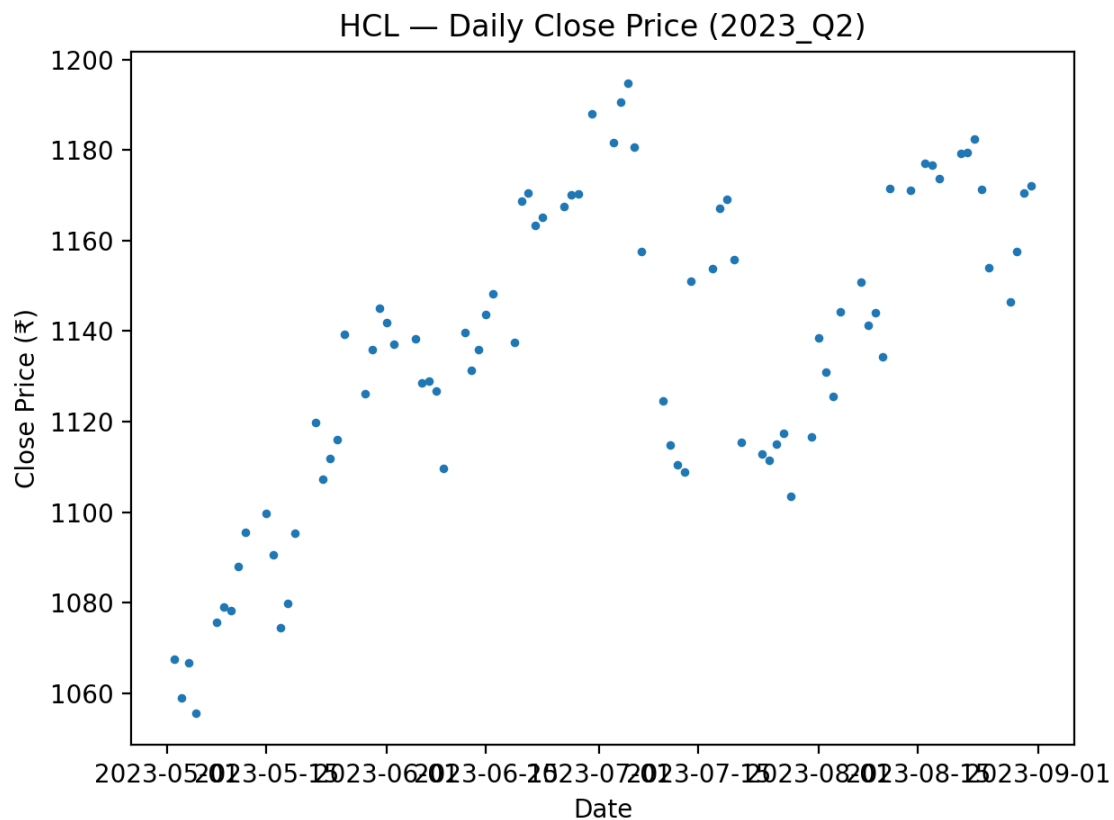


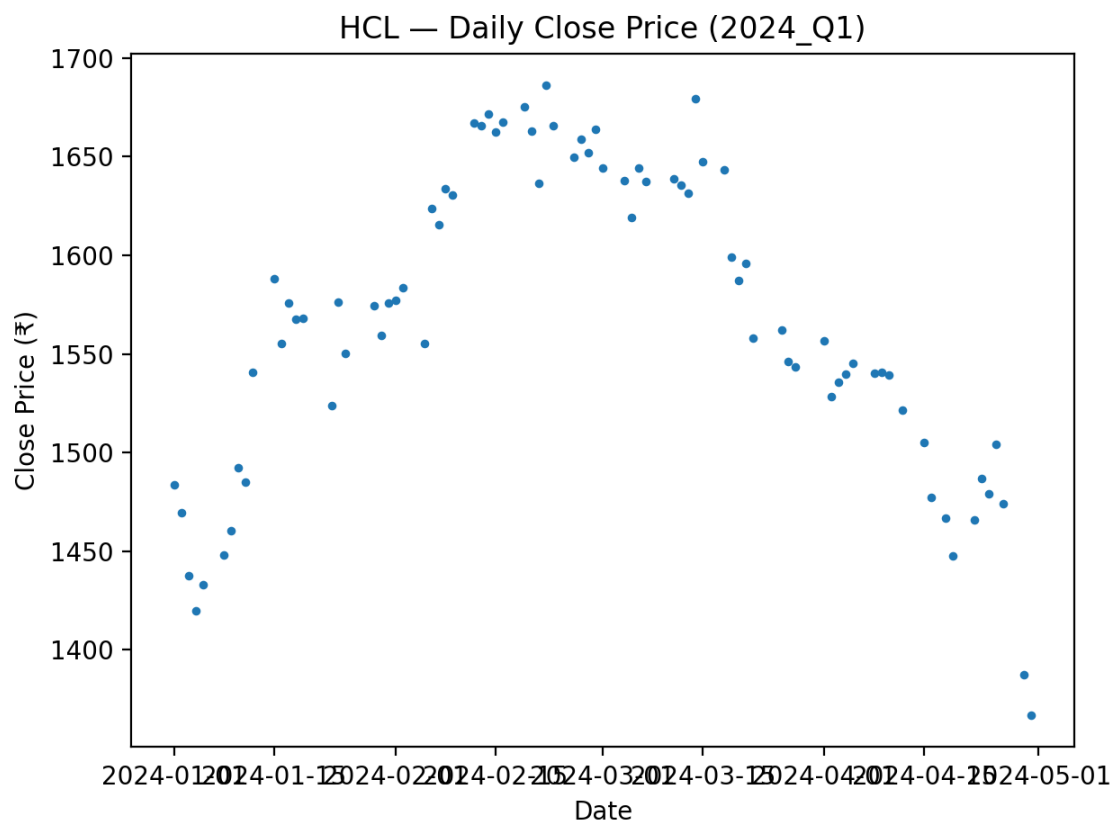
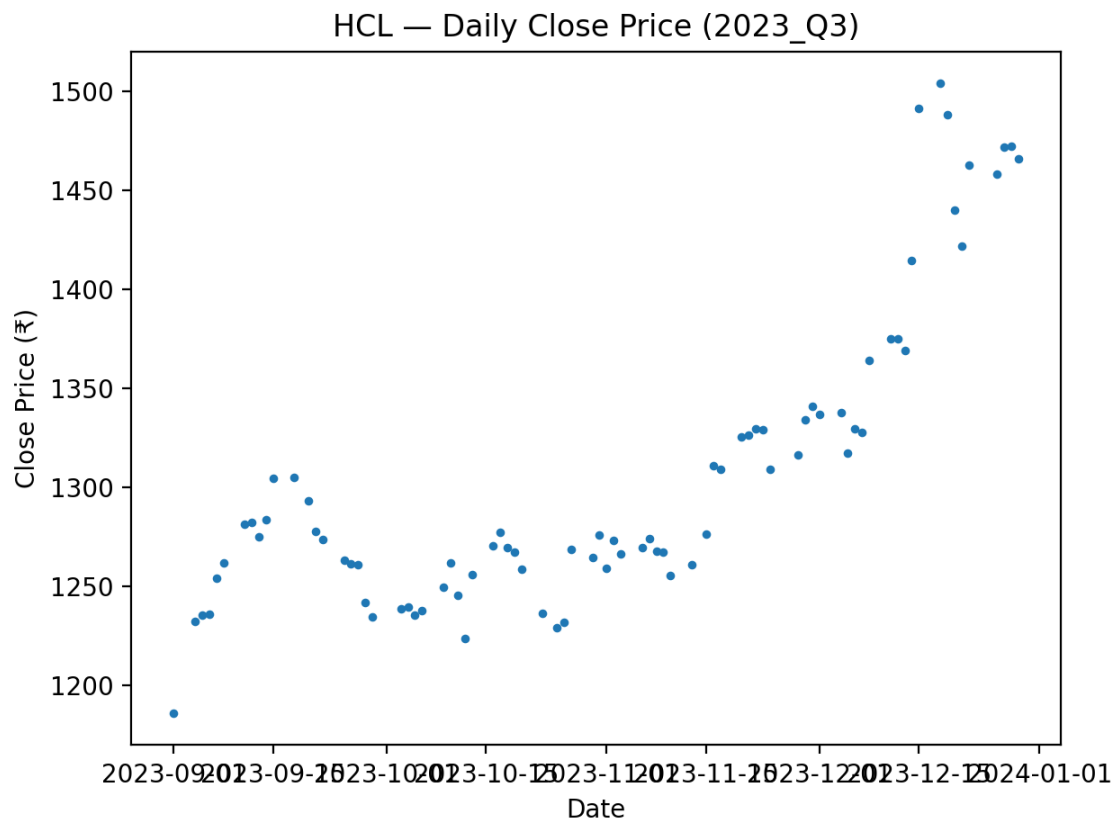


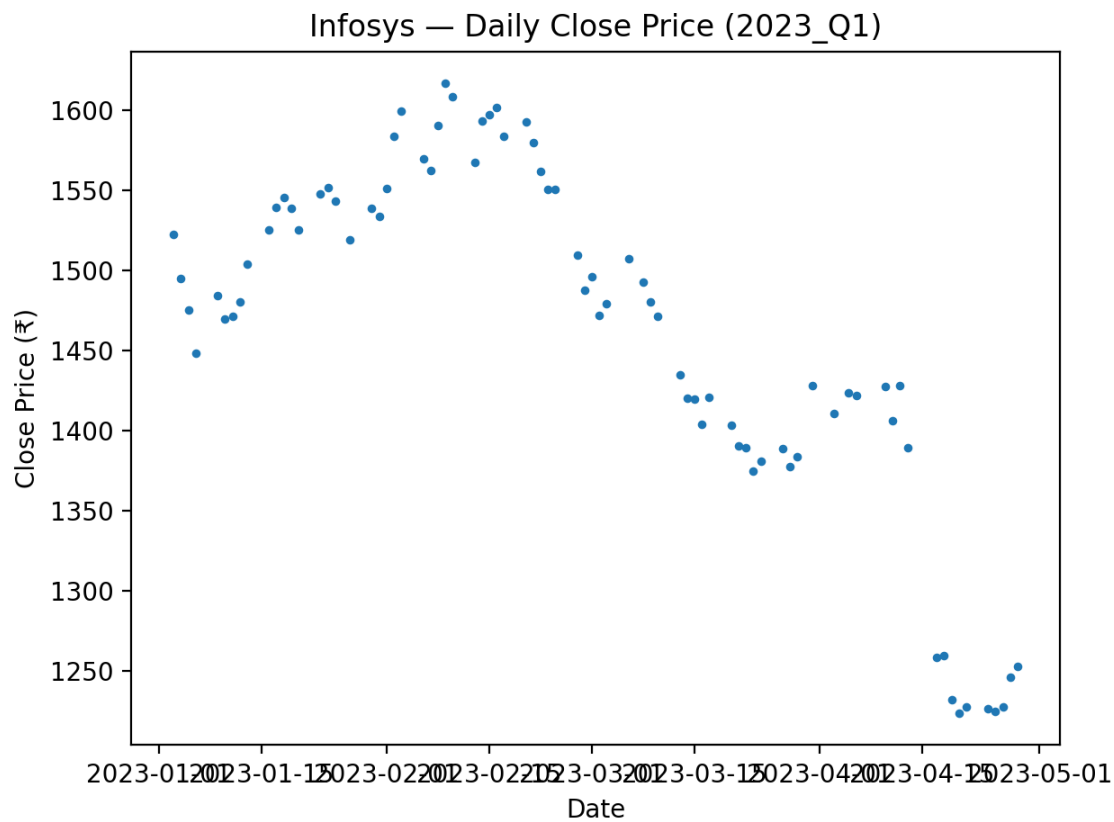
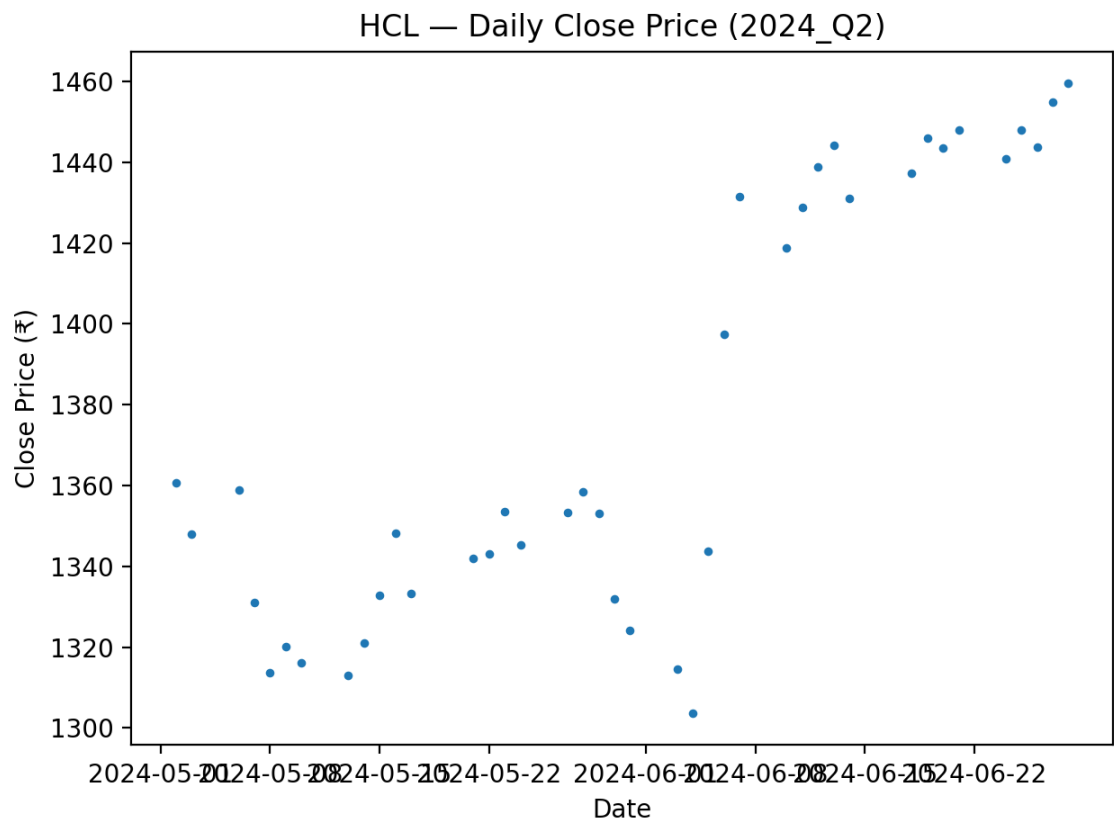
Overall, TCS exhibited the highest average price level, while Wipro traded at significantly lower levels. Relative volatility, as measured by the coefficient of variation, varied across firms, indicating differences in risk profiles.

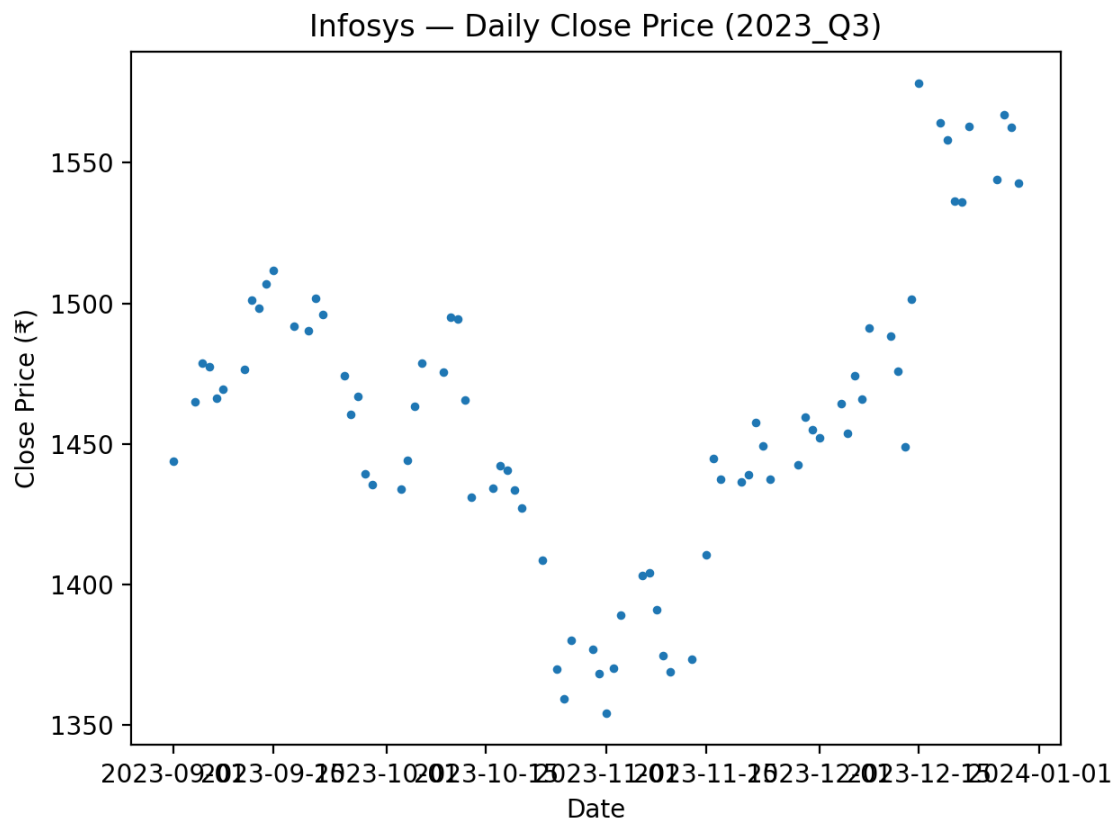
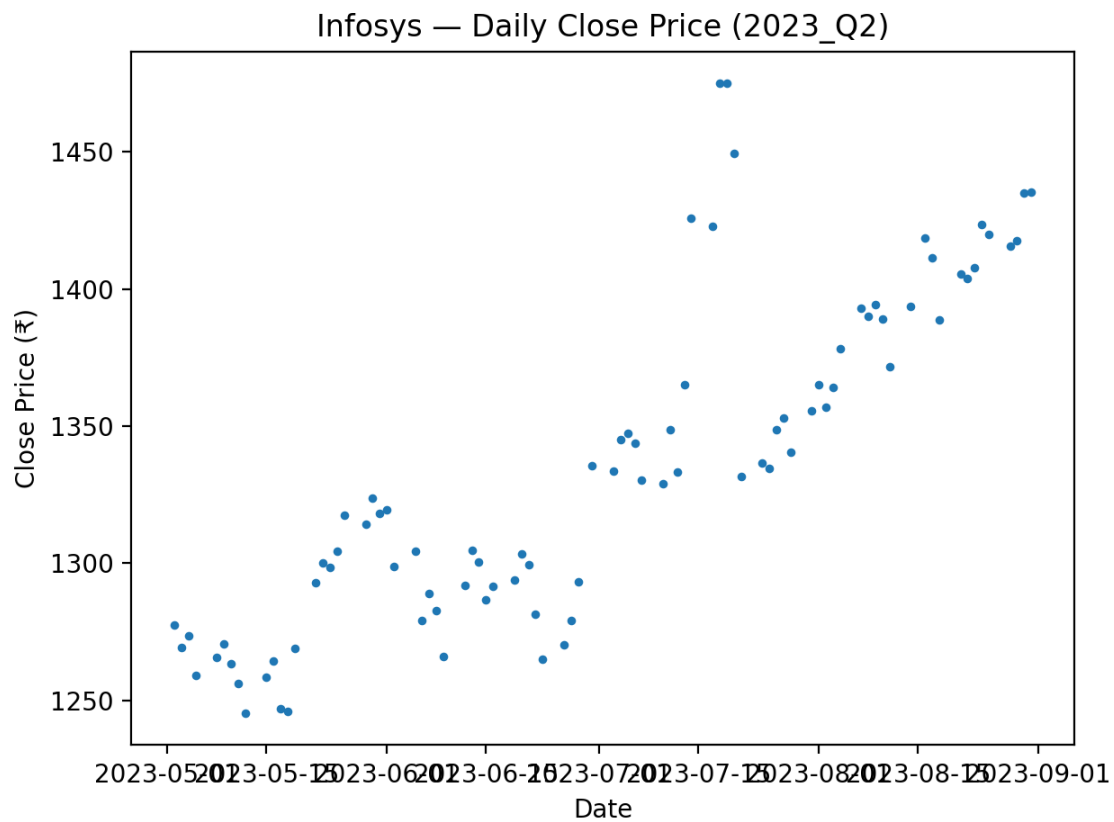
4. Quarterly Analysis (4-Month Quarters)

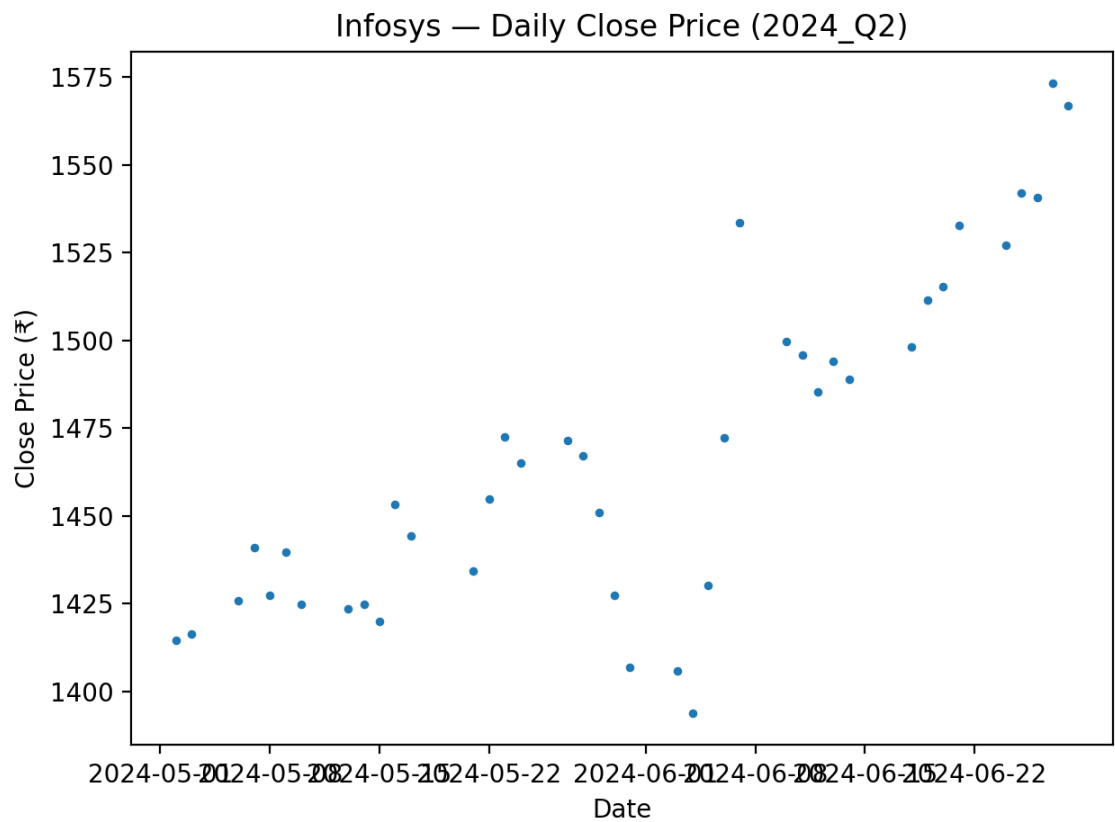
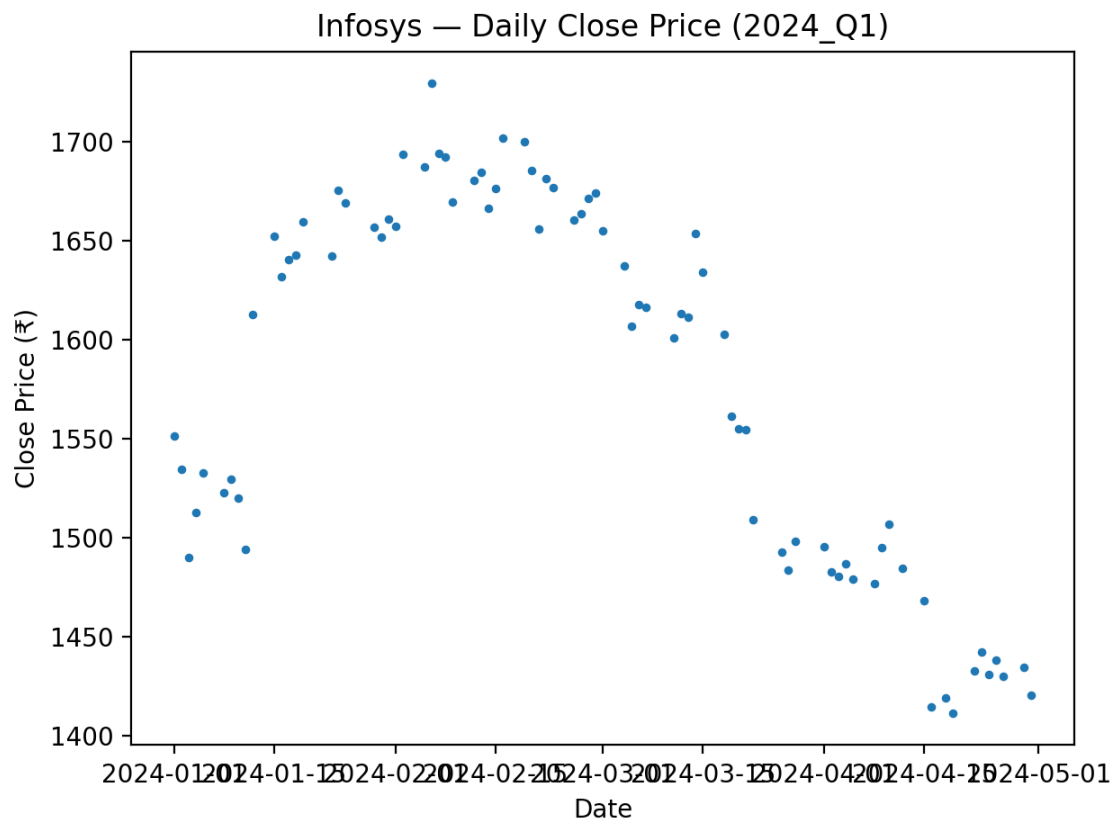
The data were divided into approximate four-month quarters to capture temporal variation. Within each quarter, the same set of descriptive statistics and time-series slopes were computed. Quarterly scatterplots reveal changes in price trends and volatility across periods.

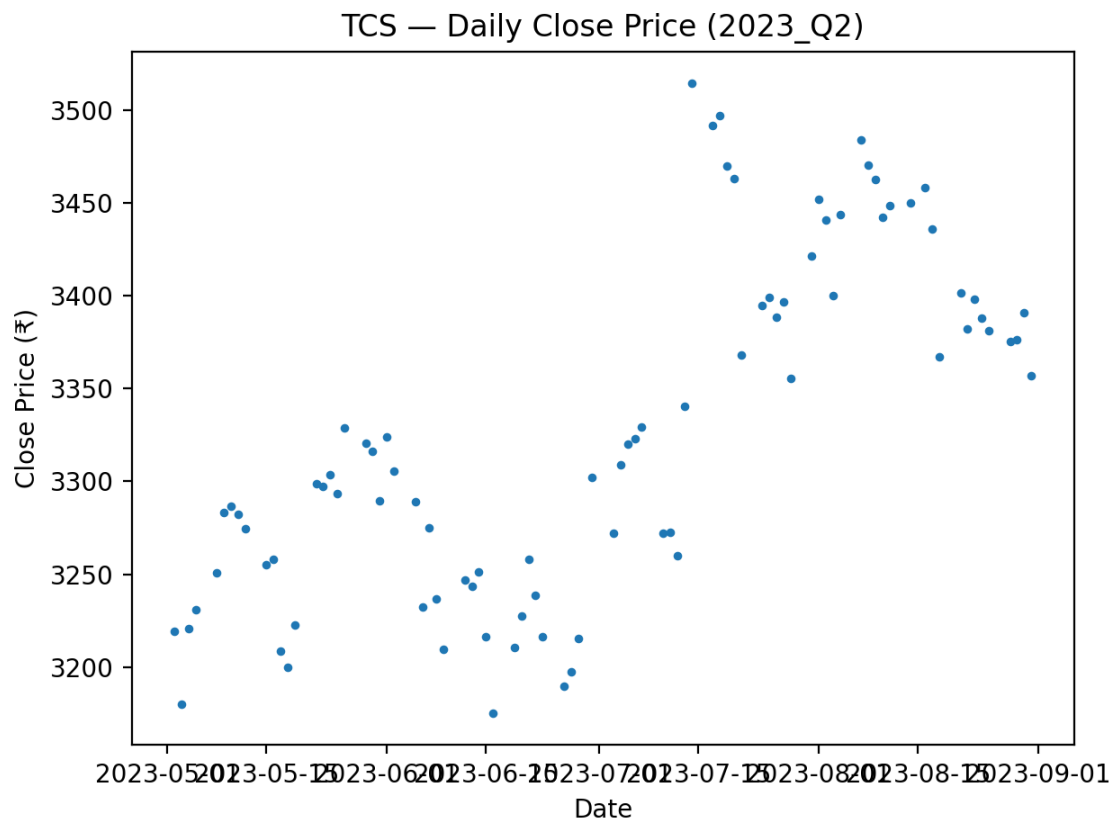
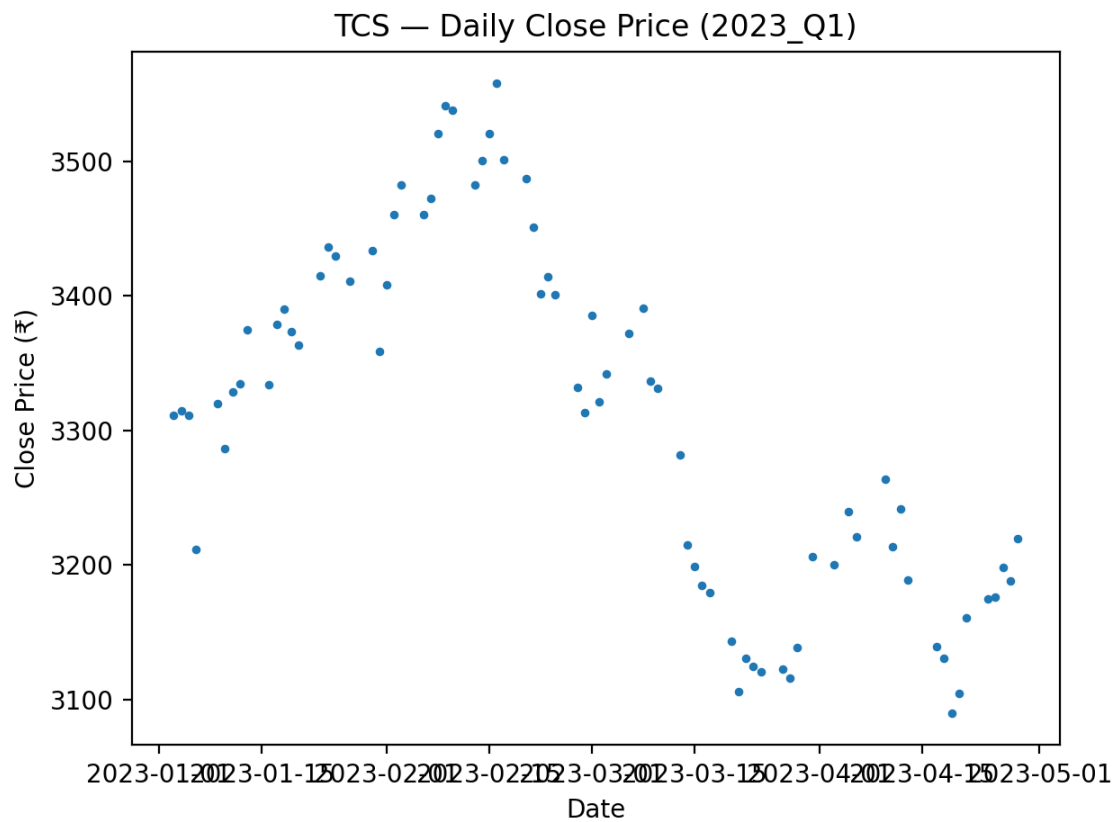


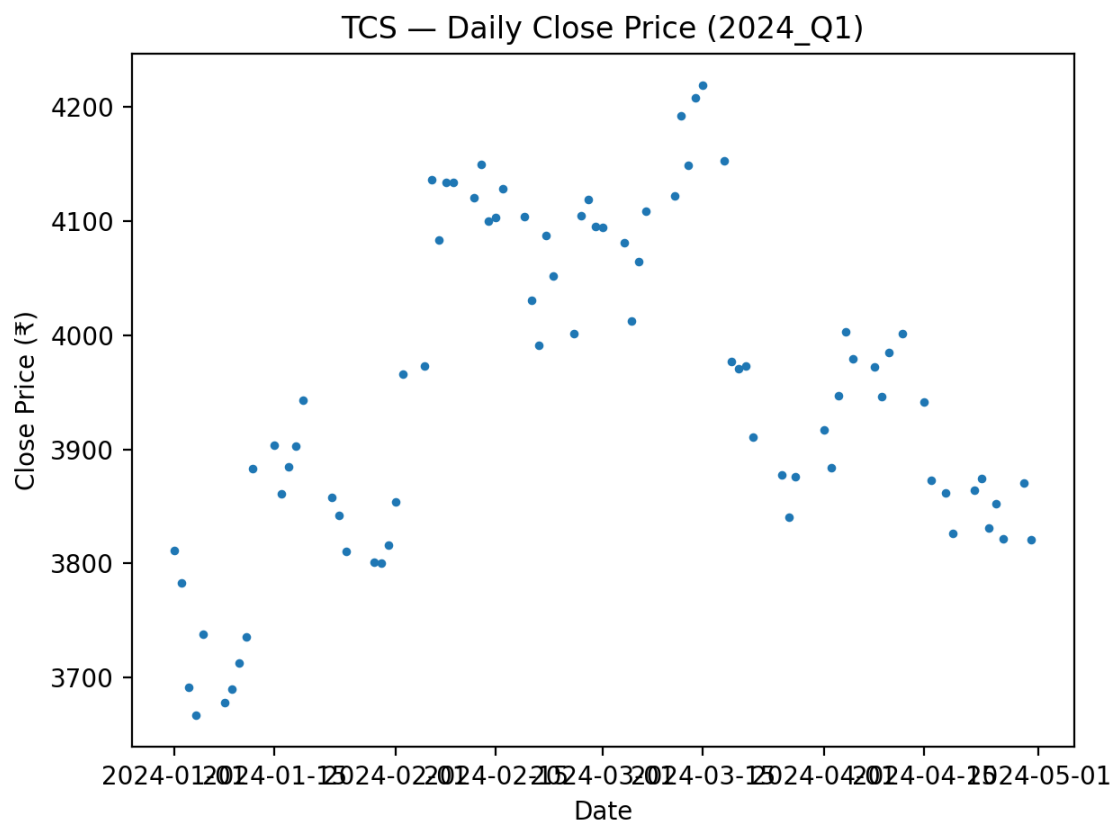
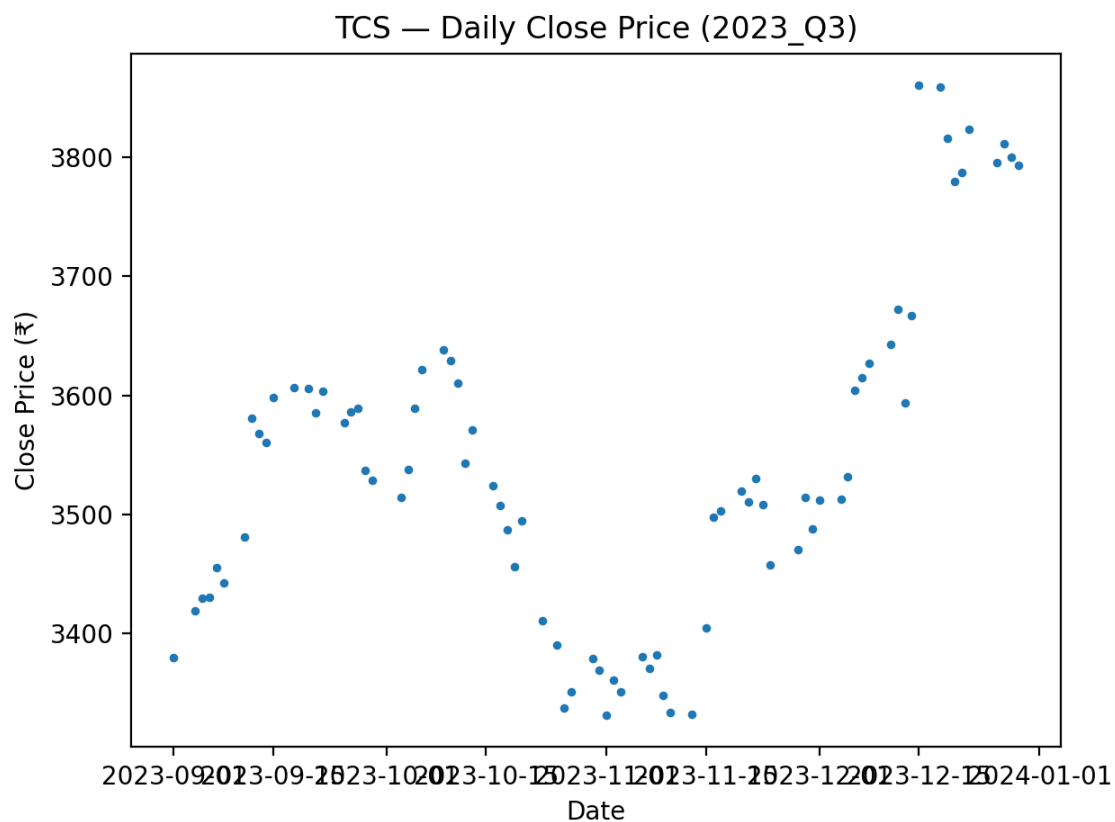


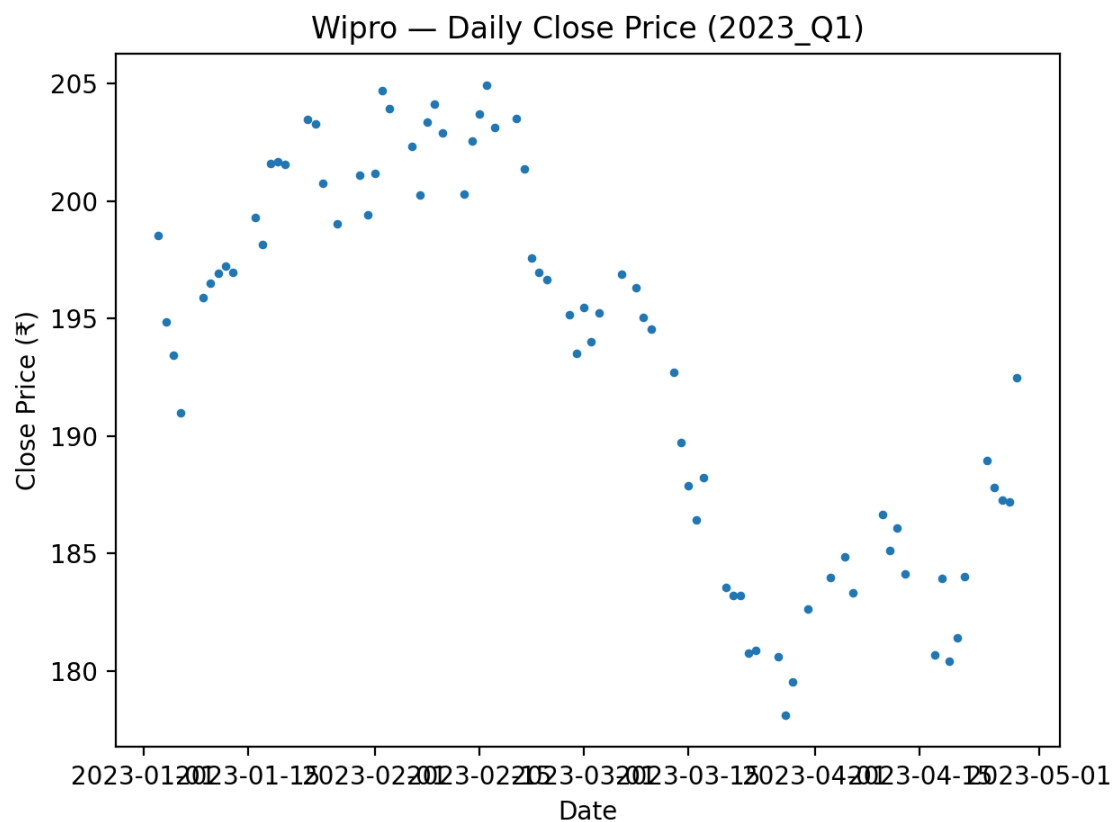
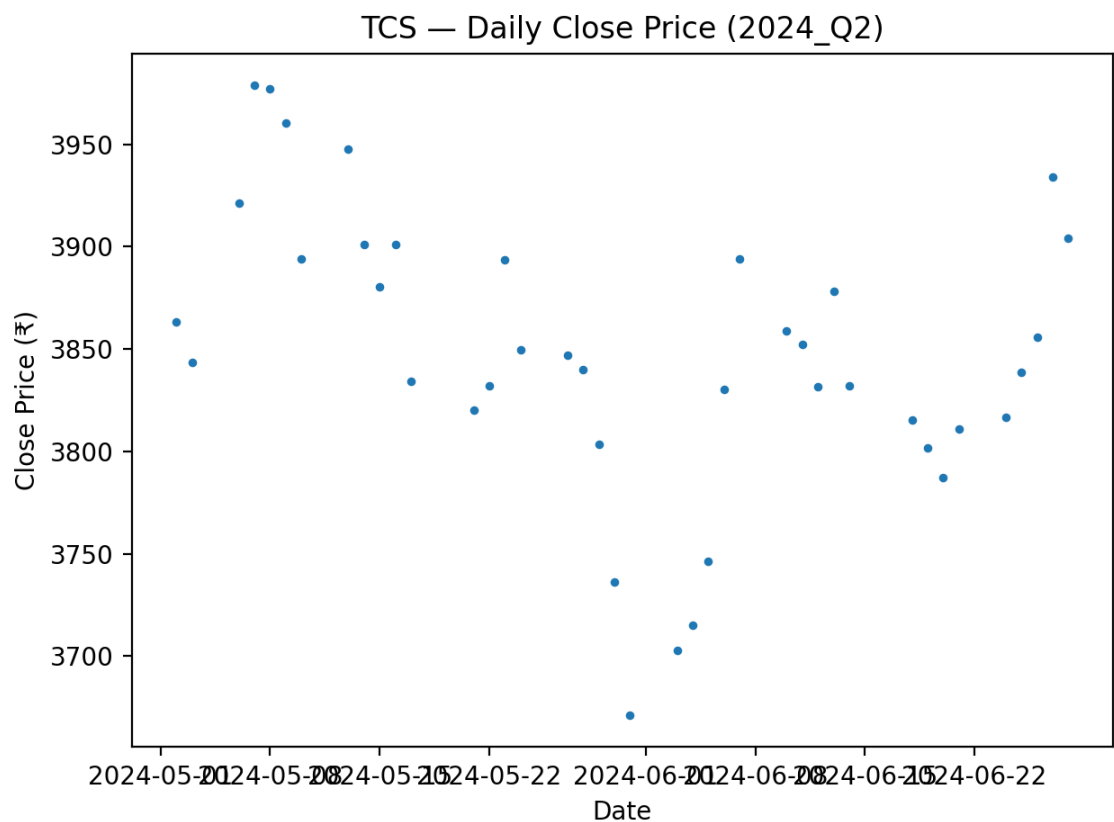


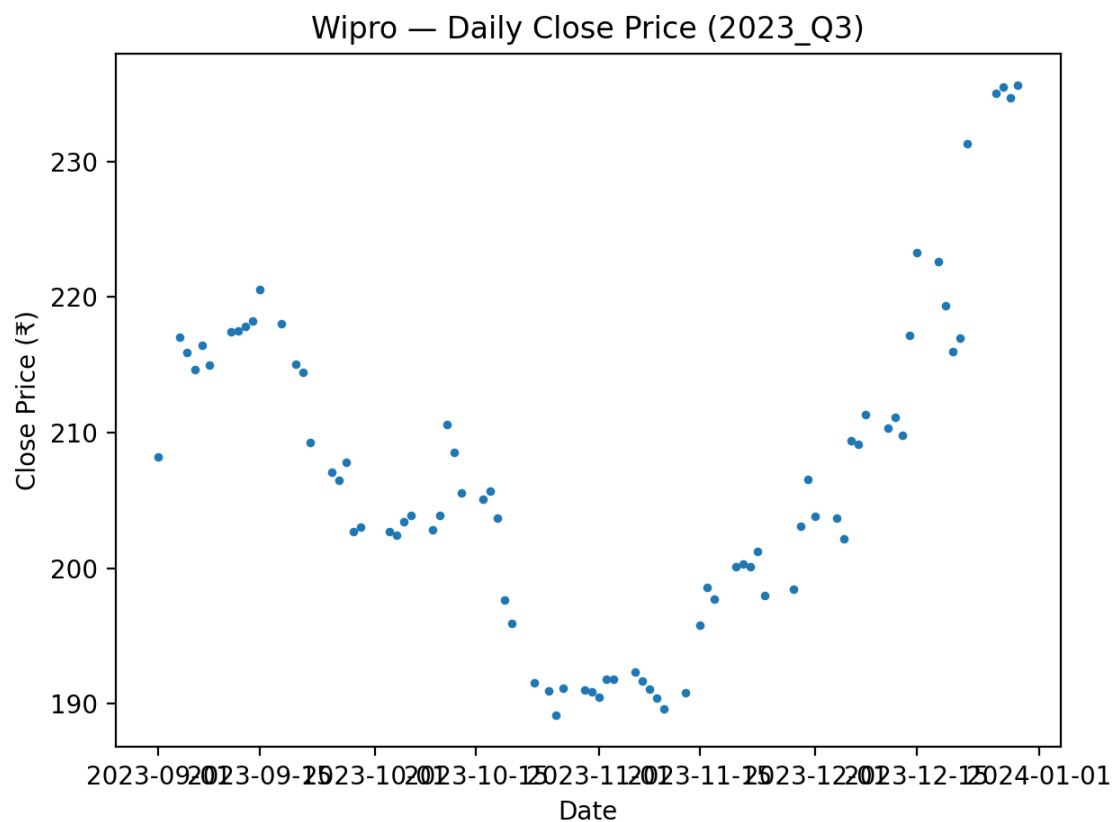
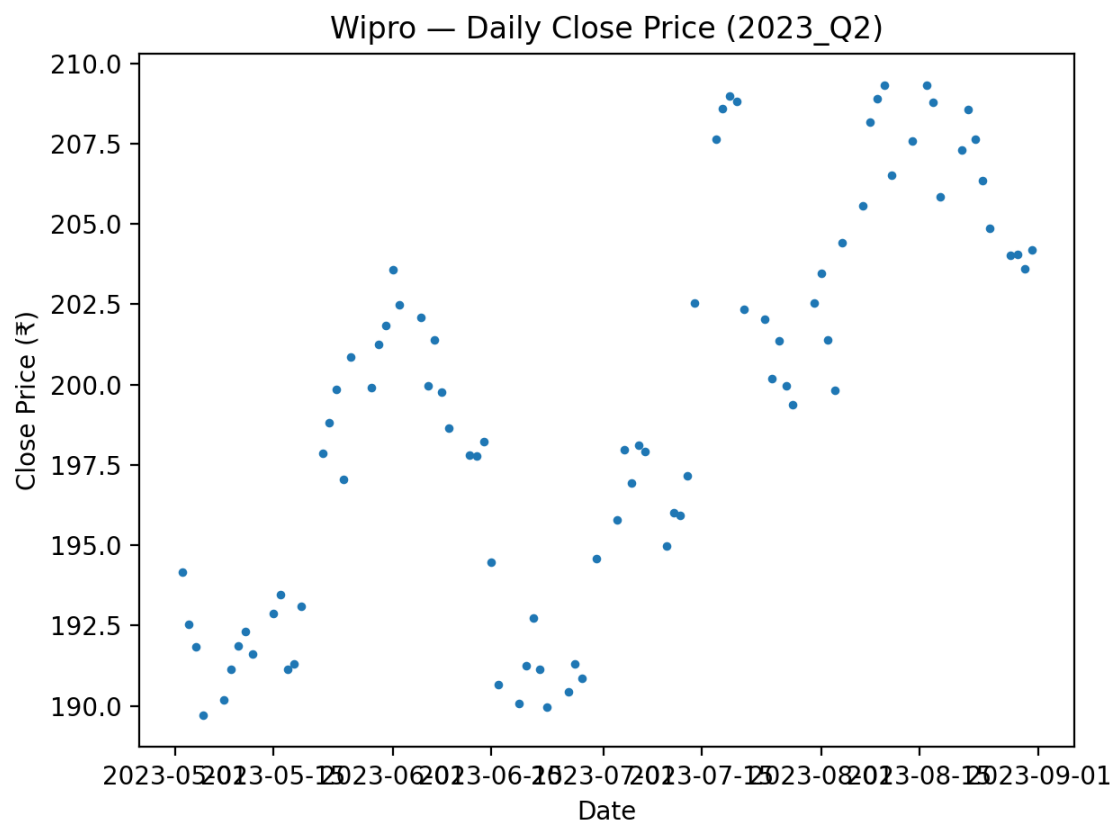


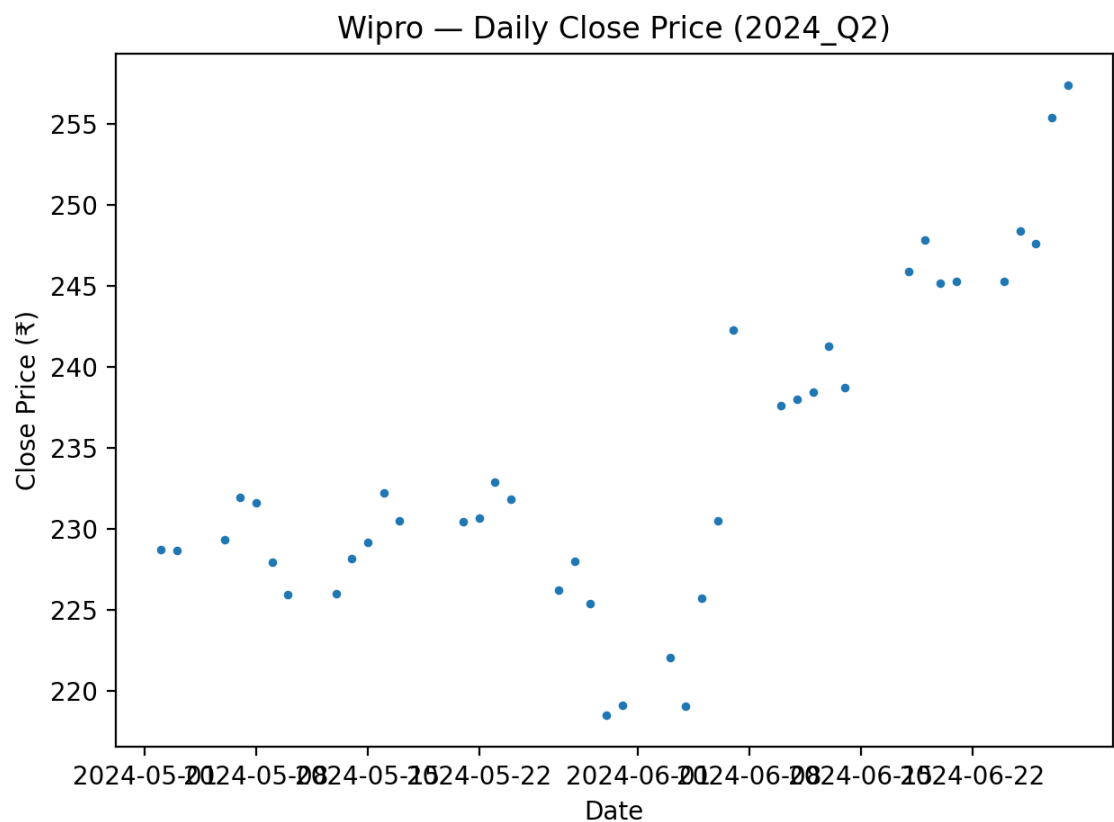
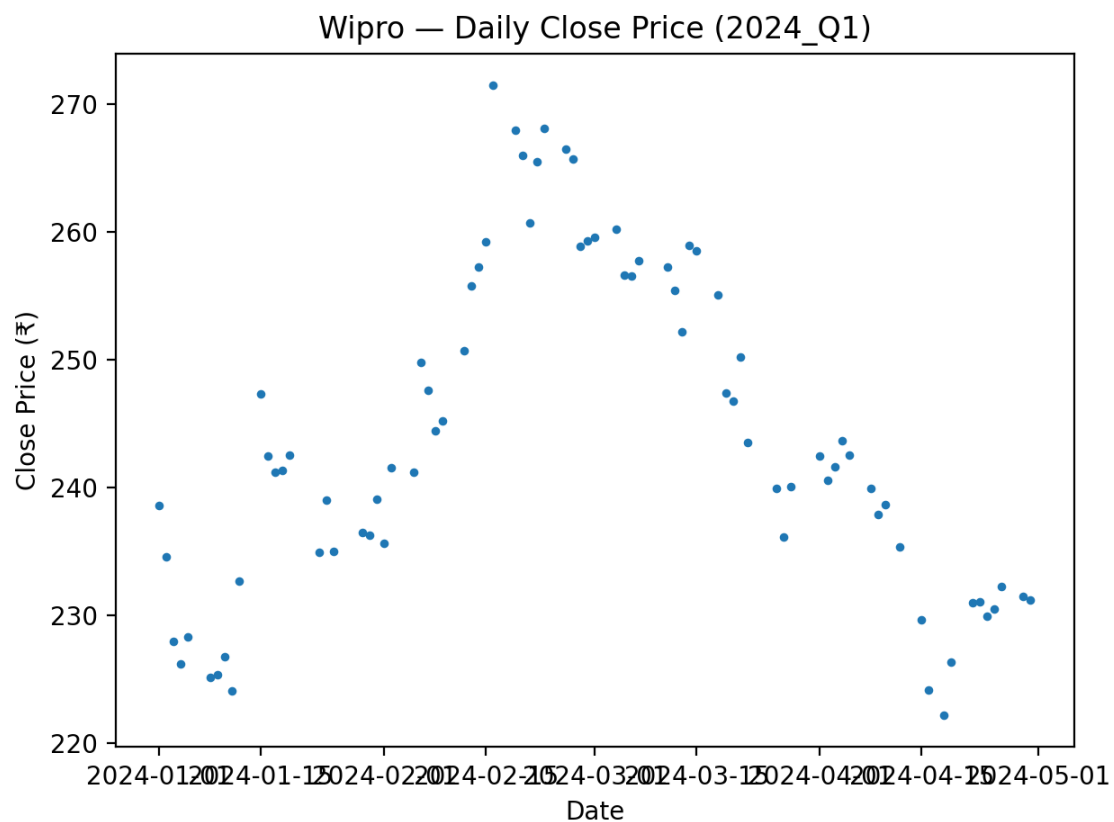












5. Trends Across Quarters and Correlation Analysis

Average daily prices and standard deviations were plotted across quarters to study temporal behavior. Prices generally increased into early 2024, followed by mild stabilization. Volatility was not constant and showed clustering in specific quarters, suggesting shifts in market uncertainty.

Quarter	HCL	Infosys	TCS	Wipro
2023 Q1	1092.717	1461.794	3310.981	193.4179
2023 Q2	1135.632	1334.624	3324.94	199.2895
2023 Q3	1305.147	1459.323	3540.126	206.7203
2024 Q1	1566.856	1580.157	3952.29	243.9878
2024 Q2	1376.865	1467.796	3847.512	234.135

Table 5A. Mean by quarter

Quarter	HCL	Infosys	TCS	Wipro
2023 Q1	31.62262	109.3003	130.4506	7.98997
2023 Q2	34.1781	59.30007	90.7402	6.015281
2023 Q3	74.32392	53.54004	137.8739	11.78099
2024 Q1	78.04068	93.68119	140.162	12.7997
2024 Q2	53.21257	47.76882	70.33753	9.796644

Table 5B. Standard Deviation by quarter

Pearson correlation coefficients were computed for each quarter and for the pooled dataset. Results indicate strong positive correlations among the IT firms, reflecting common sectoral drivers. However, correlation strength varied across quarters, highlighting periods of stronger or weaker comovement.

Quarter	HCL	Infosys	TCS	Wipro
2023 Q1	31.62262	109.3003	130.4506	7.98997
2023 Q2	34.1781	59.30007	90.7402	6.015281
2023 Q3	74.32392	53.54004	137.8739	11.78099
2024 Q1	78.04068	93.68119	140.162	12.7997
2024 Q2	53.21257	47.76882	70.33753	9.796644

Table 6A. Correlation Matrix

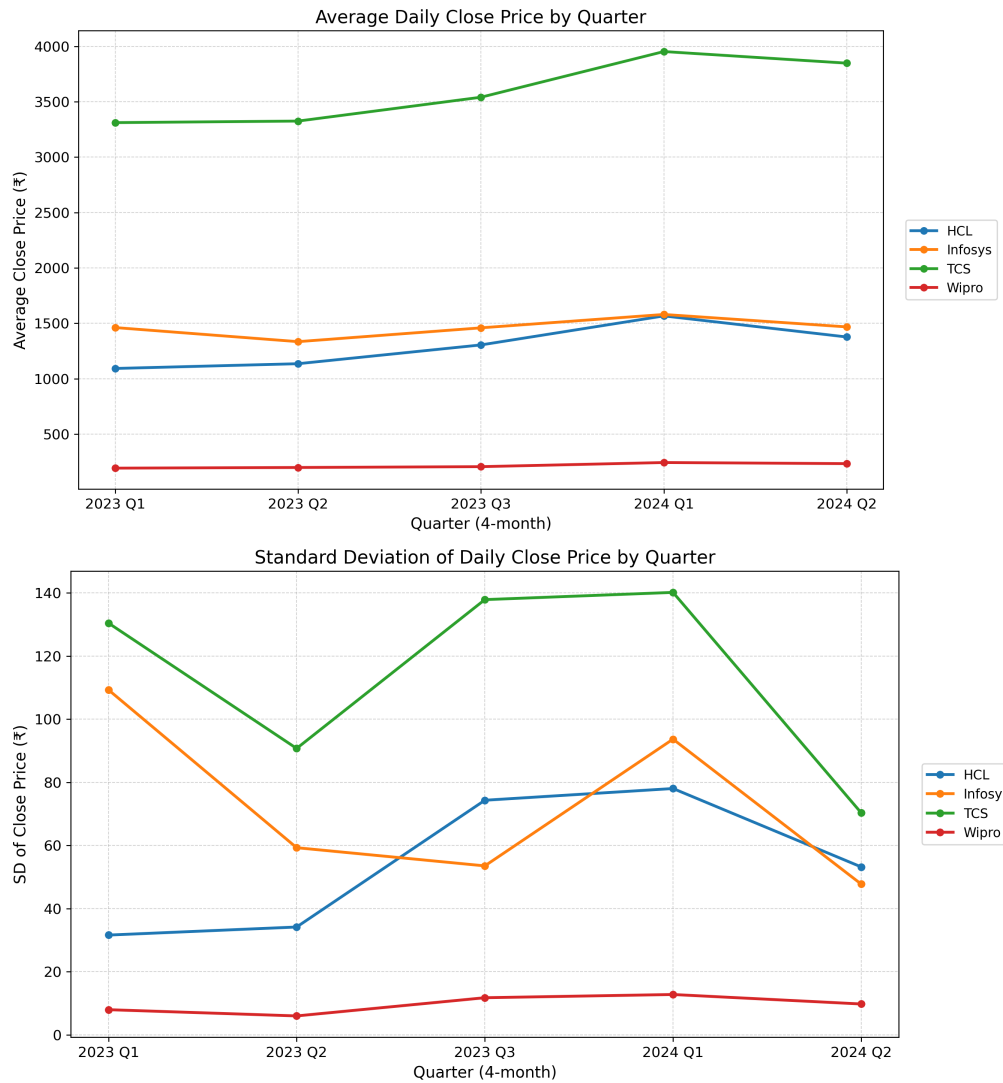
Quarter	Company	N (days)	Mean	SD	Median	Mode	Min	Max	Range
2023_Q1	HCL	78	1092.717	31.62262	1094.425	1063.85	1032.8	1149.6	116.7999
2023_Q1	Infosys	78	1461.794	109.3003	1480.5	1223.4	1223.4	1617	393.6
2023_Q1	TCS	78	3310.981	130.4506	3325.075	3089.6	3089.6	3558.05	468.45
2023_Q1	Wipro	78	193.4179	7.98997	195.2	183.2	178.1	204.95	26.84999
2023_Q2	HCL	86	1135.632	34.1781	1138.4	1135.85	1055.55	1194.8	139.25
2023_Q2	Infosys	86	1334.624	59.30007	1329.675	1245.2	1245.2	1475.2	230
2023_Q2	TCS	86	3324.94	90.7402	3307.225	3174.9	3174.9	3514.65	339.75
2023_Q2	Wipro	86	199.2895	6.015281	199.8	191.15	189.7	209.325	19.625
2023_Q3	HCL	80	1305.147	74.32392	1275.625	1309.15	1185.8	1504.3	318.5
2023_Q3	Infosys	80	1459.323	53.54004	1460.125	1354.15	1354.15	1578.4	224.25
2023_Q3	TCS	80	3540.126	137.8739	3526.325	3330.65	3330.65	3861	530.3501
2023_Q3	Wipro	80	206.7203	11.78099	205.3125	203.725	189.125	235.65	46.52499
2024_Q1	HCL	80	1566.856	78.04068	1567.75	1366.6	1366.6	1686.4	319.8
2024_Q1	Infosys	80	1580.157	93.68119	1612.075	1411.25	1411.25	1729.45	318.2
2024_Q1	TCS	80	3952.29	140.162	3946.925	3666.8	3666.8	4219.25	552.45
2024_Q1	Wipro	80	243.9878	12.7997	241.5875	242.525	222.175	271.5	49.325
2024_Q2	HCL	40	1376.865	53.21257	1353.425	1303.55	1303.55	1459.6	156.0499
2024_Q2	Infosys	40	1467.796	47.76882	1459.95	1393.65	1393.65	1573.35	179.7
2024_Q2	TCS	40	3847.512	70.33753	3845.225	3670.95	3670.95	3978.95	308
2024_Q2	Wipro	40	234.135	9.796644	231.125	230.5	218.475	257.425	38.94998

Table 6B. Descriptive Statistics across quarters

Quarter	Company	Q1	Q2 (Median)	Q3	IQR	Coeff. of Variation (SD/Mean)	Slope (₹/day)
2023_Q1	HCL	1067.462	1094.425	1116.15	48.68756	0.028939	-0.30089
2023_Q1	Infosys	1404.612	1480.5	1547.35	142.7375	0.074771	-2.48641
2023_Q1	TCS	3198.337	3325.075	3410.375	212.0377	0.039399	-2.52362
2023_Q1	Wipro	186.1625	195.2	200.6562	14.49375	0.041309	-0.17715
2023_Q2	HCL	1113.4	1138.4	1167.425	54.02496	0.030096	0.616547
2023_Q2	Infosys	1287.338	1329.675	1386.188	98.85001	0.044432	1.414256
2023_Q2	TCS	3250.713	3307.225	3396.362	145.6498	0.027291	1.848471
2023_Q2	Wipro	193.65	199.8	203.9187	10.26874	0.030184	0.121027
2023_Q3	HCL	1258.862	1275.625	1329.588	70.72507	0.056947	1.685866
2023_Q3	Infosys	1434.113	1460.125	1491.313	57.20001	0.036688	0.334854
2023_Q3	TCS	3438.9	3526.325	3606.075	167.1751	0.038946	1.672533
2023_Q3	Wipro	198.3188	205.3125	215.2688	16.95	0.05699	0.042704
2024_Q1	HCL	1517.388	1567.75	1637.725	120.3375	0.049807	-0.28399
2024_Q1	Infosys	1493.812	1612.075	1661.575	167.7625	0.059286	-1.57966
2024_Q1	TCS	3853.662	3946.925	4088.913	235.2502	0.035463	0.832347
2024_Q1	Wipro	234.8625	241.5875	255.9938	21.13126	0.05246	-0.01172

2024 Q2	HCL	1332.638	1353.425	1437.587	104.95	0.038648	2.559038
2024 Q2	Infosys	1426.95	1459.95	1498.587	71.63742	0.032545	2.248106
2024 Q2	TCS	3816.375	3845.225	3893.912	77.53735	0.018281	-1.4317
2024 Q2	Wipro	228.0062	231.125	241.5438	13.53751	0.041842	0.406715

Table 6C. Quartile Data across Quarters and Slope Analysis



7. Conclusion

This analysis shows that while all four companies are influenced by shared IT sector dynamics, they differ in price levels, volatility, and short-term trends. TCS and Infosys display strong comovement, whereas Wipro shows relatively more idiosyncratic behavior. Quarterly analysis highlights the importance of temporal segmentation in understanding market behavior.