Comparing S&P 500 Sector Performance During Covid

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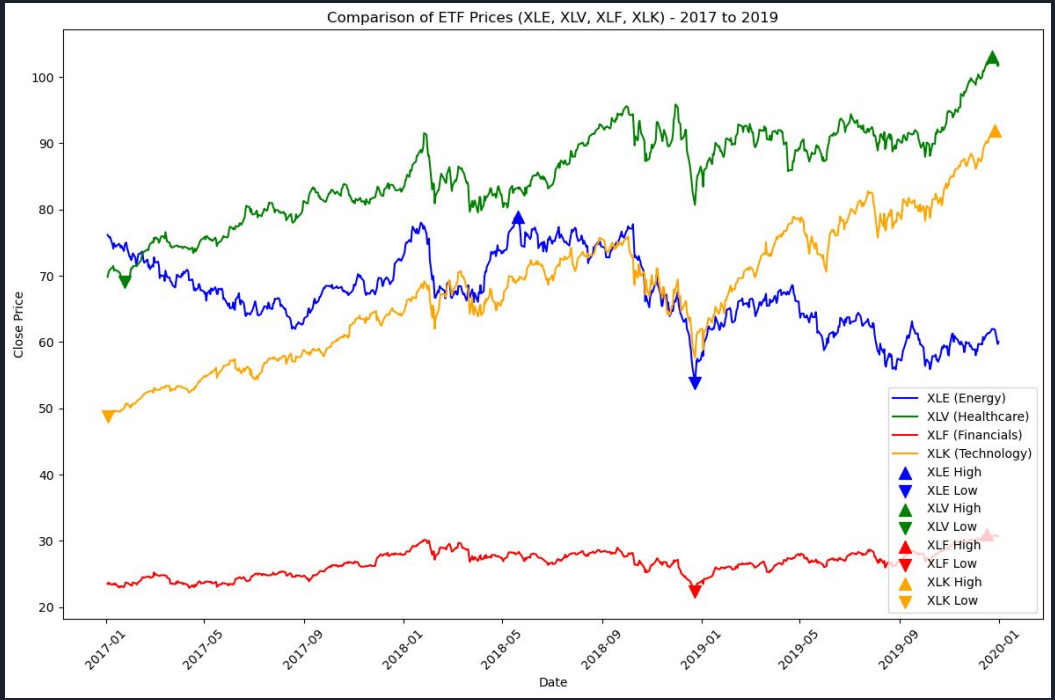
Pre Covid Analysis

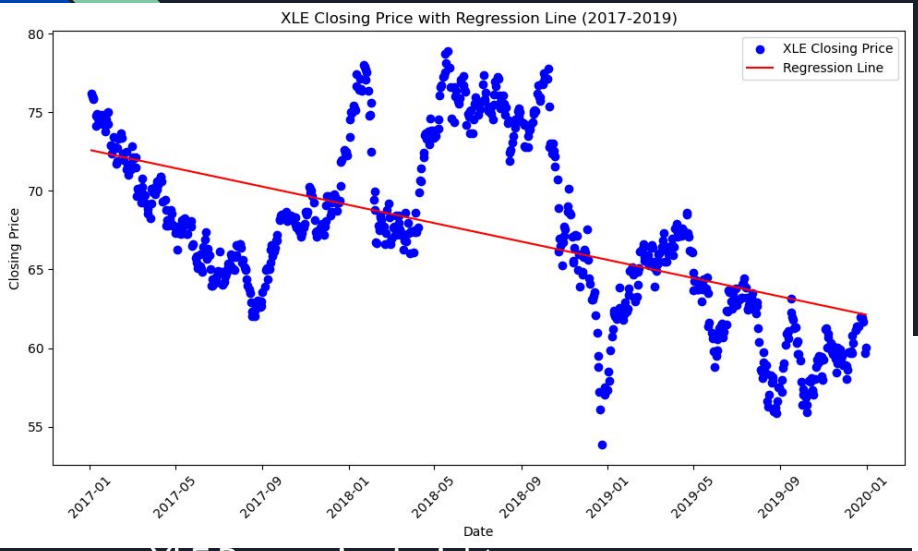
Comparison of Closing prices (All Sectors)



How were the 4 sectors performing prior to COVID ?

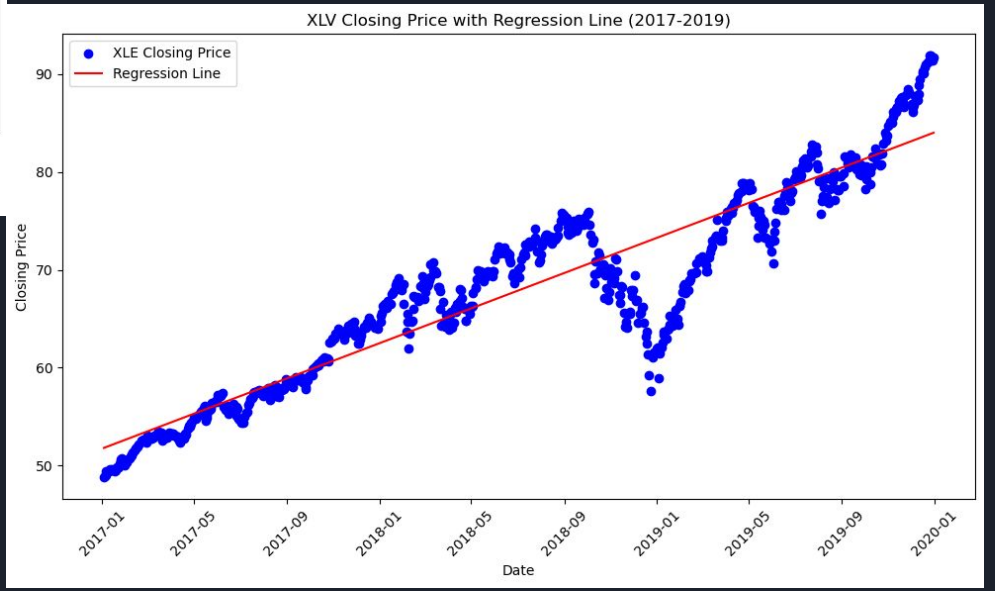
Best Performing sector
Worst Performing Sector
Key World events

Pre Covid Analysis

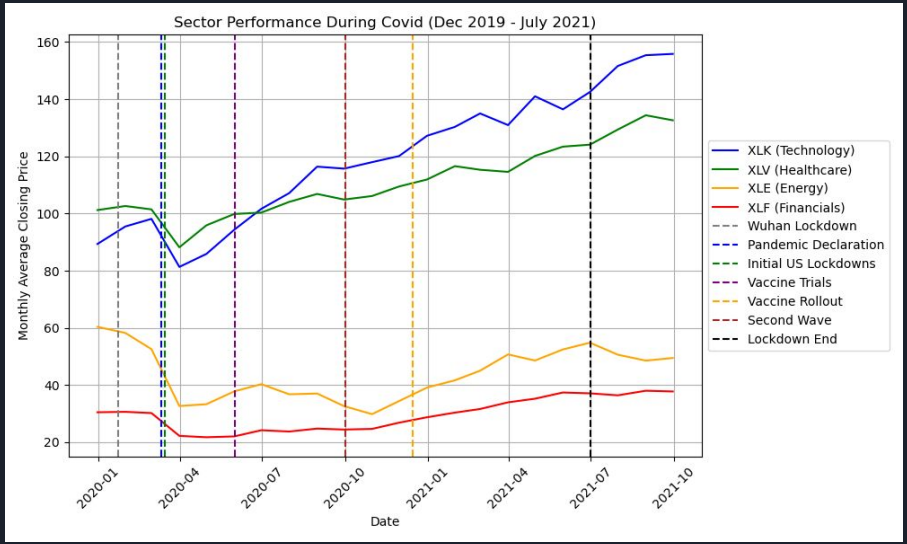


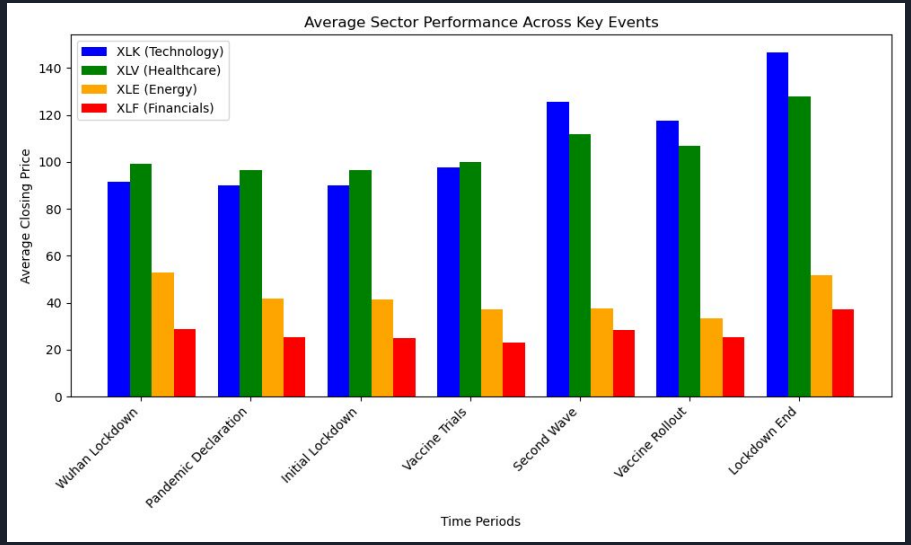
XLE Regression Insights

XLV Regression Insights



COVID ANALYSIS (KEY EVENTS)





T-TESTS FOR 60 DAY PERIODS

Event	Sector	T-Statistic	P-Value	Significant (P < 0.05)
Wuhan Lockdown	Technology (XLK)	-1.237	0.224	No
Pandemic Declaration	Technology (XLK)	0.755	0.455	No
Initial US Lockdowns	Technology (XLK)	1.495	0.143	No
Vaccine Trials	Technology (XLK)	-0.561	0.578	No
Second Wave	Technology (XLK)	0.313	0.756	No
Vaccine Rollout	Technology (XLK)	0.432	0.668	No
Lockdown End	Technology (XLK)	0.015	0.988	No
Wuhan Lockdown	Healthcare (XLV)	-1.306	0.2	No
Pandemic Declaration	Healthcare (XLV)	0.81	0.423	No
Initial US Lockdowns	Healthcare (XLV)	1.652	0.106	No
Vaccine Trials	Healthcare (XLV)	-0.76	0.452	No
Second Wave	Healthcare (XLV)	0.6	0.552	No
Vaccine Rollout	Healthcare (XLV)	0.149	0.882	No
Lockdown End	Healthcare (XLV)	0.404	0.688	No
Wuhan Lockdown	Energy (XLE)	-1.682	0.101	No
Pandemic Declaration	Energy (XLE)	1.45	0.155	No
Initial US Lockdowns	Energy (XLE)	2.418	0.02	Yes
Vaccine Trials	Energy (XLE)	-1.483	0.146	No
Second Wave	Energy (XLE)	1.663	0.104	No
Vaccine Rollout	Energy (XLE)	-0.485	0.63	No
Lockdown End	Energy (XLE)	-1.049	0.3	No
Wuhan Lockdown	Financials (XLF)	-1.488	0.145	No
Pandemic Declaration	Financials (XLF)	0.609	0.546	No
Initial US Lockdowns	Financials (XLF)	1.457	0.153	No
Vaccine Trials	Financials (XLF)	-0.993	0.327	No
Second Wave	Financials (XLF)	1.101	0.277	No
Vaccine Rollout	Financials (XLF)	-0.018	0.986	No
Lockdown End	Financials (XLF)	0.299	0.767	No

DISCUSSION

The analysis revealed some interesting insights:

• The Energy sector (XLE) showed a statistically significant change in returns during the initial US lockdowns (p-value = 0.020), likely reflecting disruptions in energy consumption.
• Other sectors, such as Technology (XLK) and Healthcare (XLV), demonstrated resilience, with no statistically significant changes in the 60-day windows around key COVID-19 events.
• The absence of statistically significant impacts in many cases suggests that while market volatility was evident during COVID-19, the returns did not deviate significantly over the periods analyzed.

Limitations
• The analysis only considered specific COVID-19-related events and their 60-day windows. Other external factors during the same periods were not accounted for.
• Using a paired T-test assumes that returns are normally distributed, which is not always true for financial data.

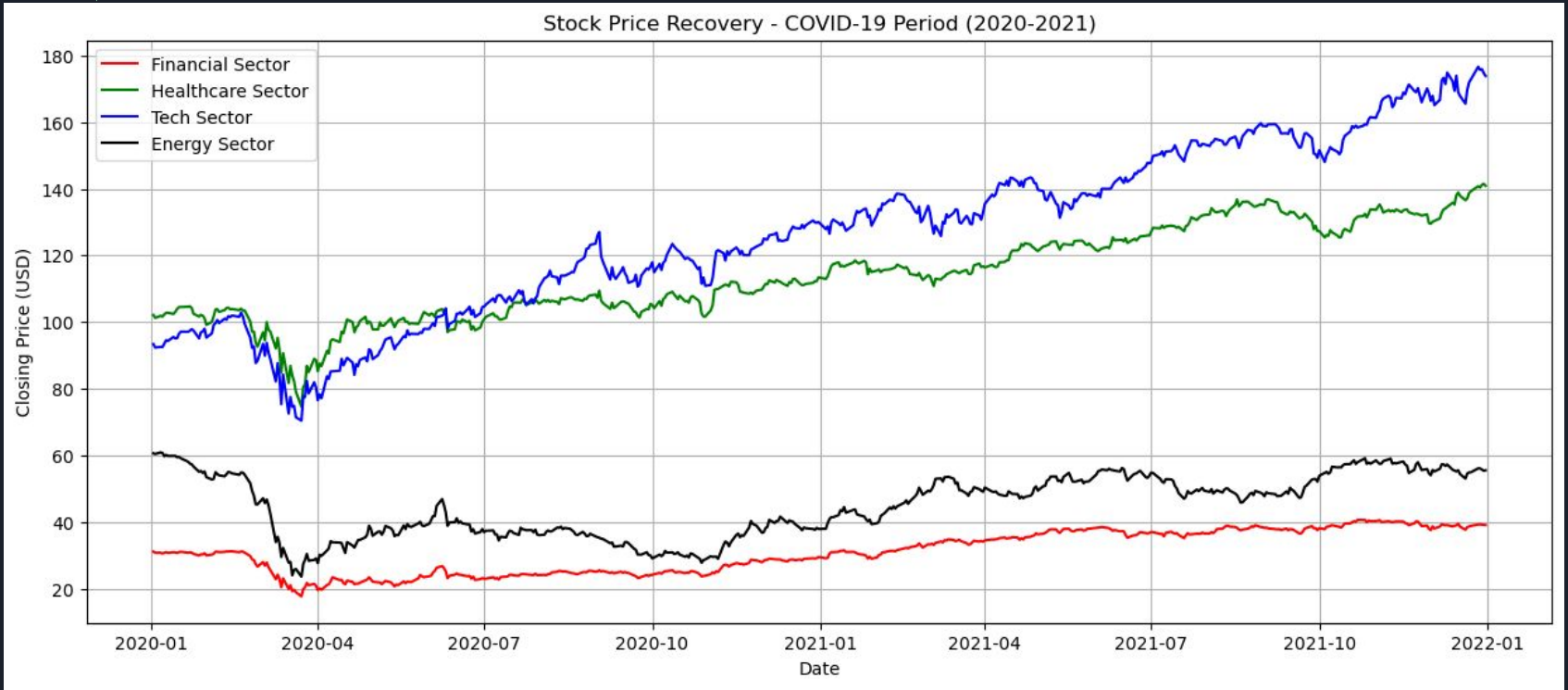
Conclusion
The analysis demonstrated that, while some events had noticeable impacts on specific sectors (ex. Energy during initial lockdowns), the overall effects across all sectors were not statistically significant for most of the COVID-19-related events analyzed.

Future Work
• Consider a more comprehensive analysis with alternative statistical tests
• Consider other events may have impacted stock movement during Covid-19

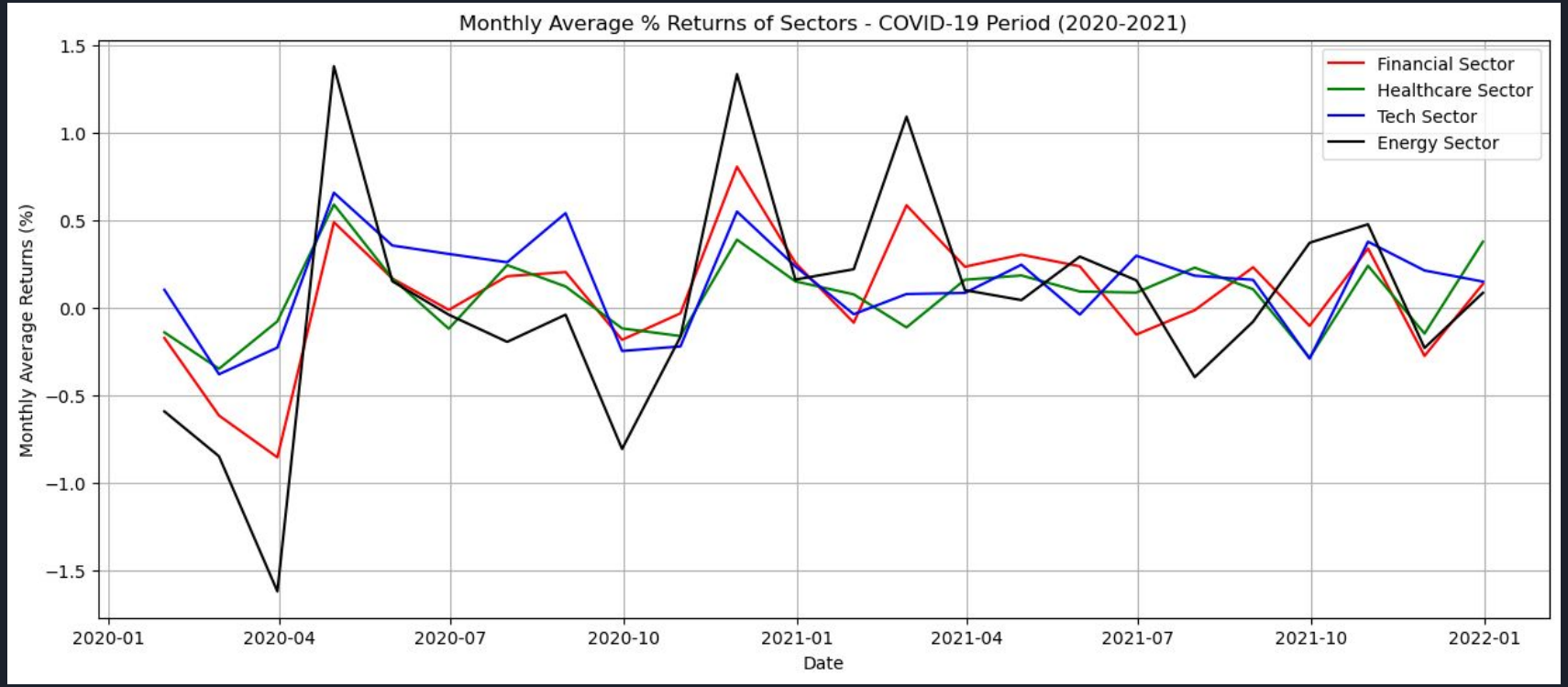
Question:
What were the key differences in the recovery patterns of the Financial, Healthcare, Technology and Energy sectors post-COVID?

Data Source: Alpha Vantage API

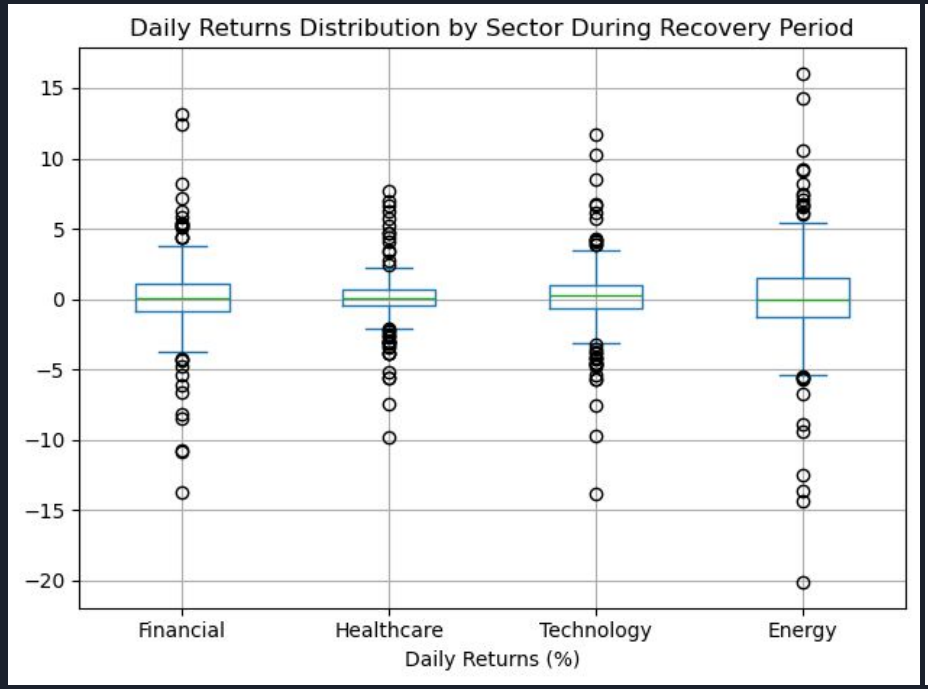
Stock Prices - 2020-2021

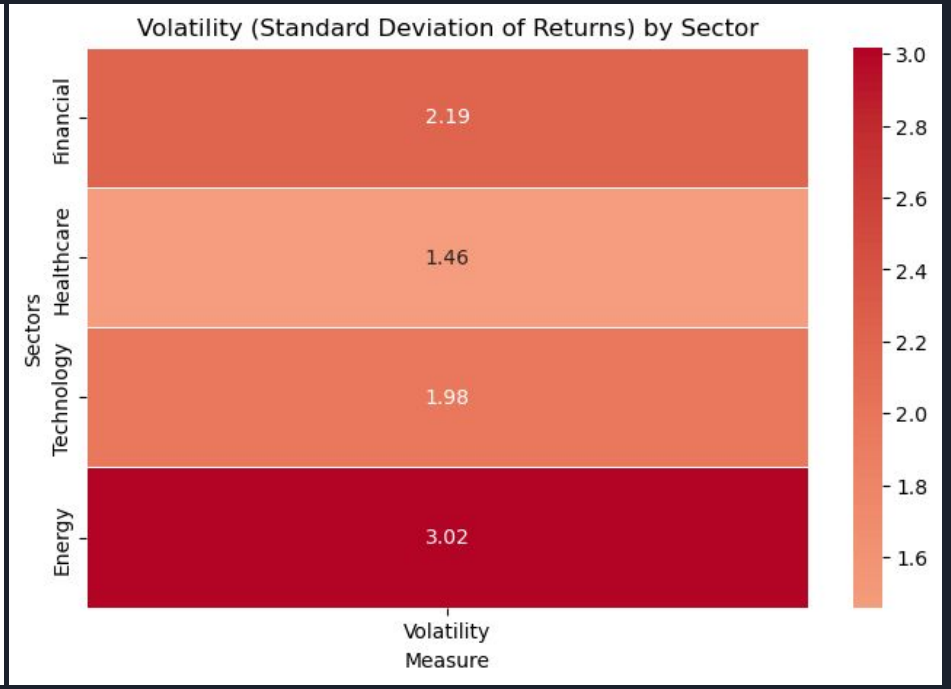


Monthly Average Returns

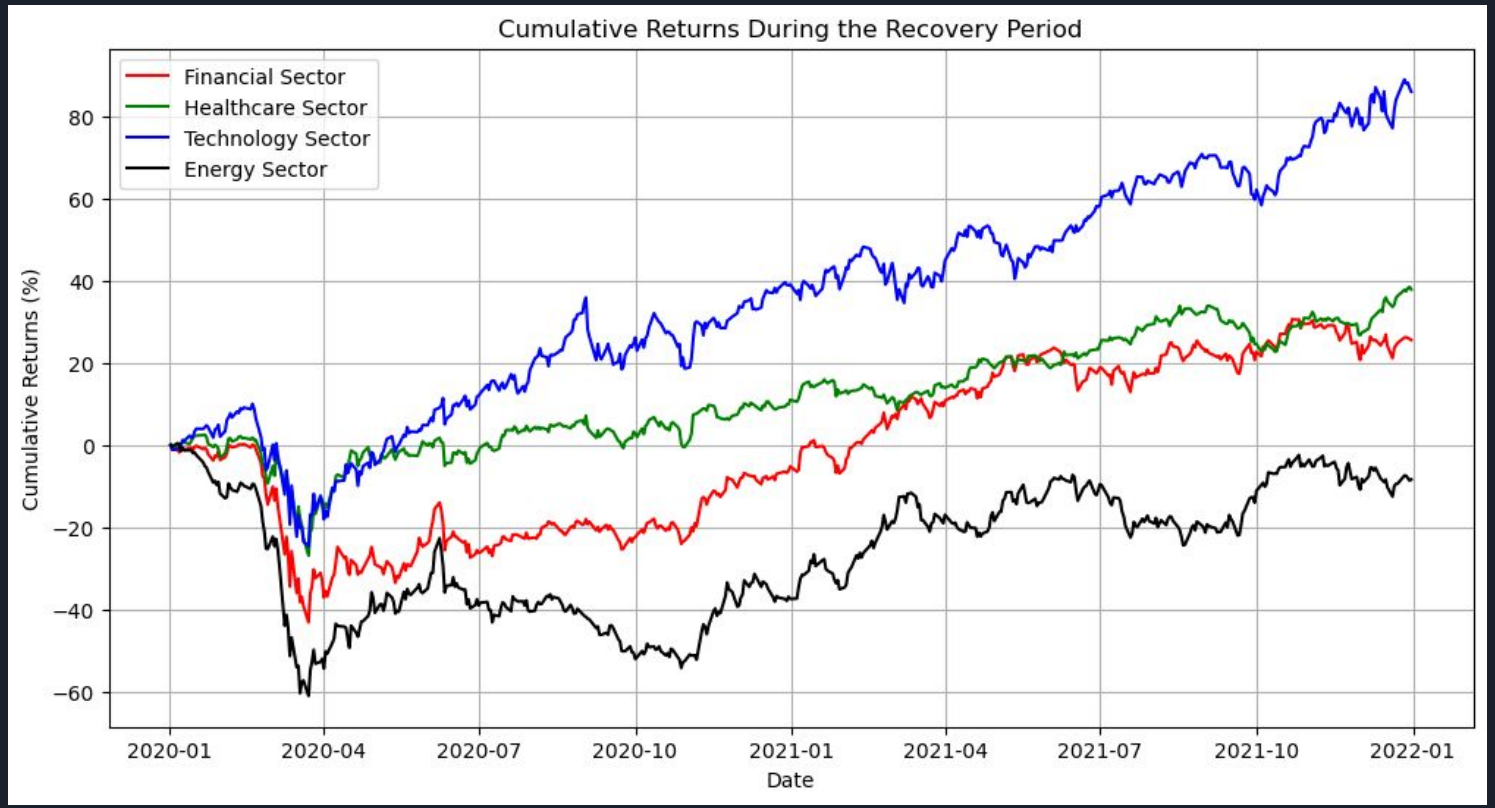


Volatility Analysis

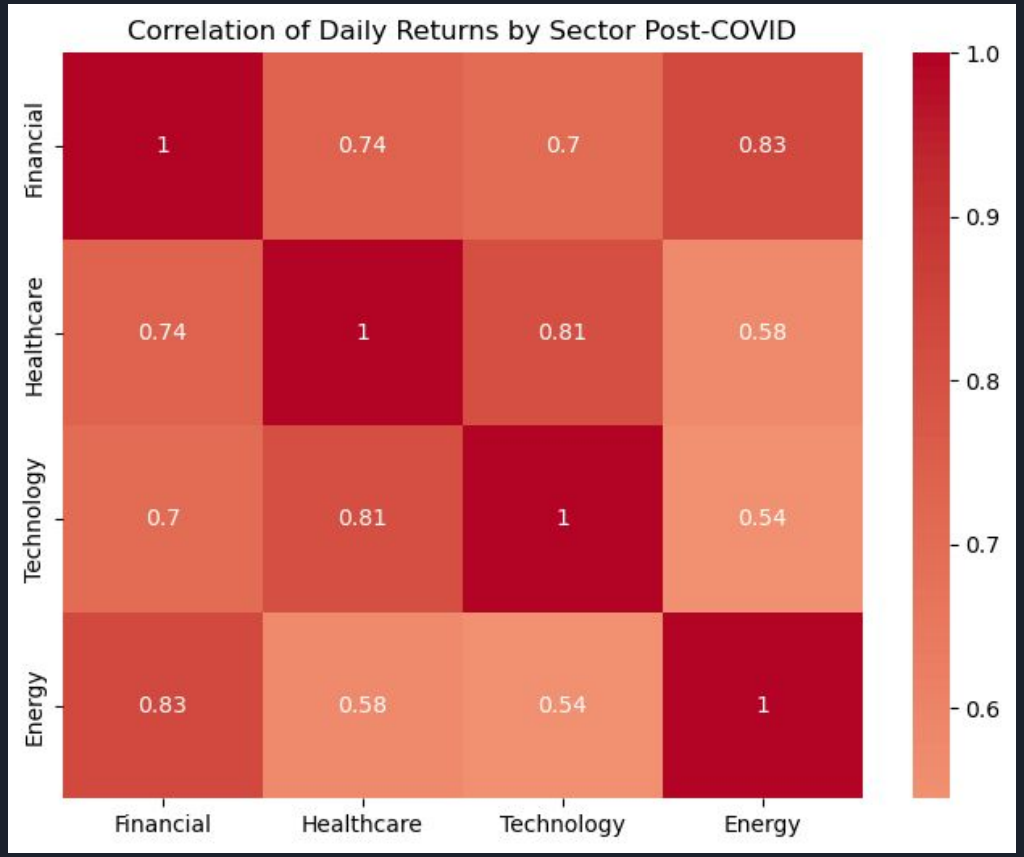




Cumulative Returns



Correlation Analysis



Conclusion

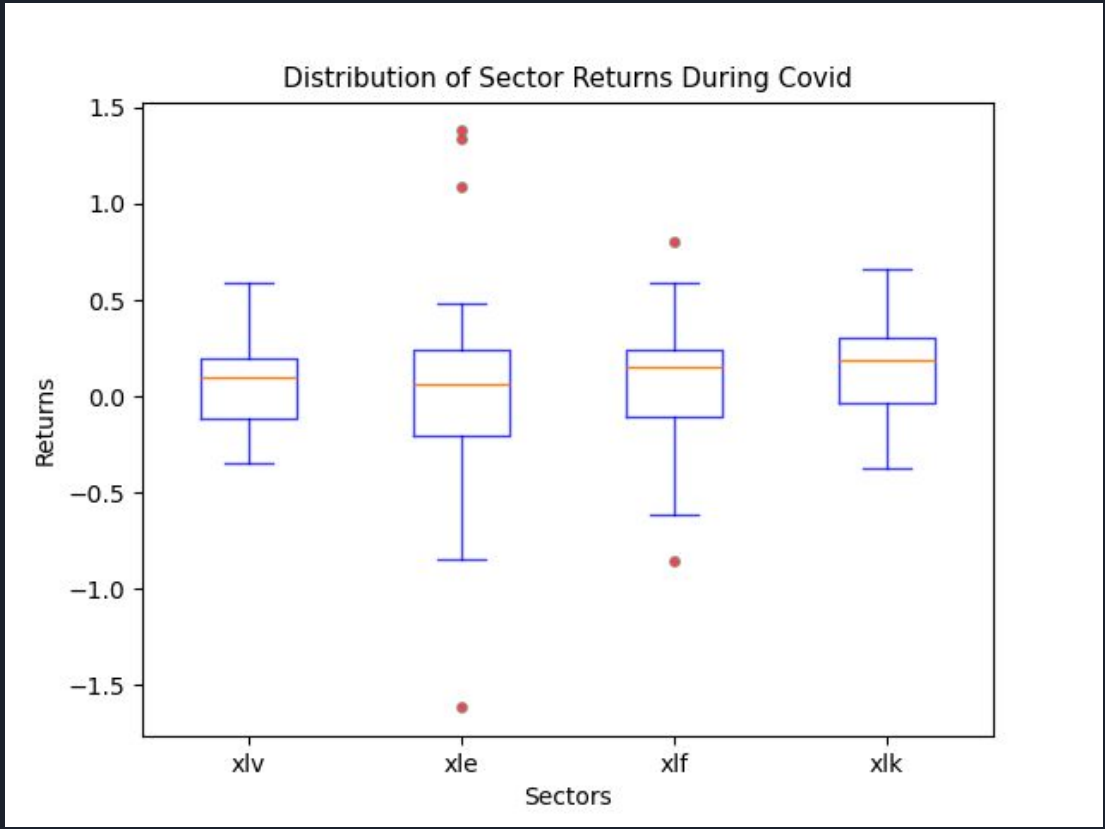
The primary observations of this analysis are as follows:

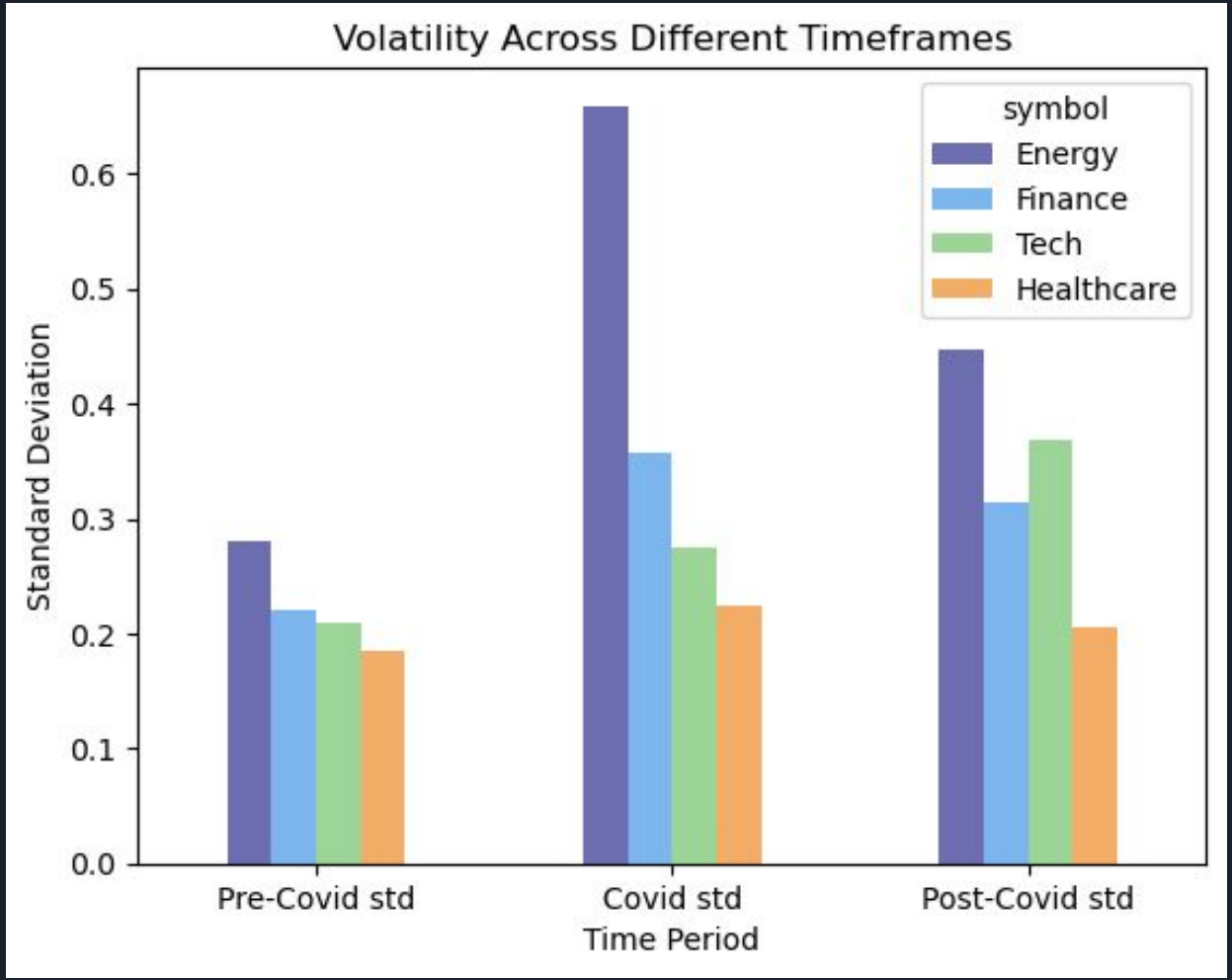
- The Energy sector had the highest volatility, the lowest % returns, the longest recovery time and the sharpest drop at the start of the pandemic.
- However, a regression analysis could not be used to effectively assess the relationship between these factors.

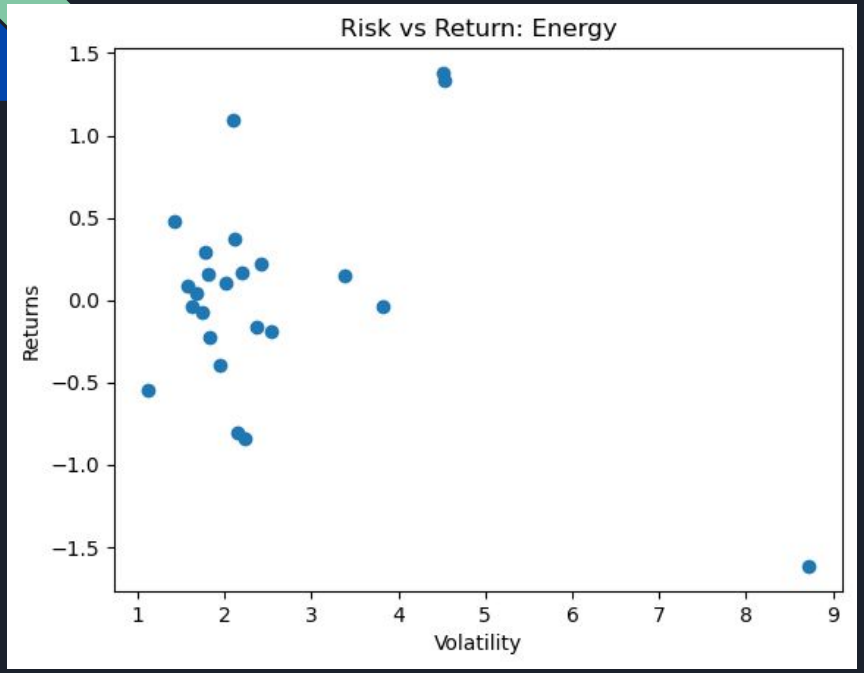
- The Energy and Financial sectors were the most closely correlated in performance, owing to the macroeconomic factors and recessionary pressures in the economy.
- However, the Healthcare and Technology sectors exhibited the strongest and fastest recoveries by the end of 2021.
- This was likely affected by government and private initiatives towards treatments and vaccine developments, and overall demand for medical goods and services in an increasingly digital world.

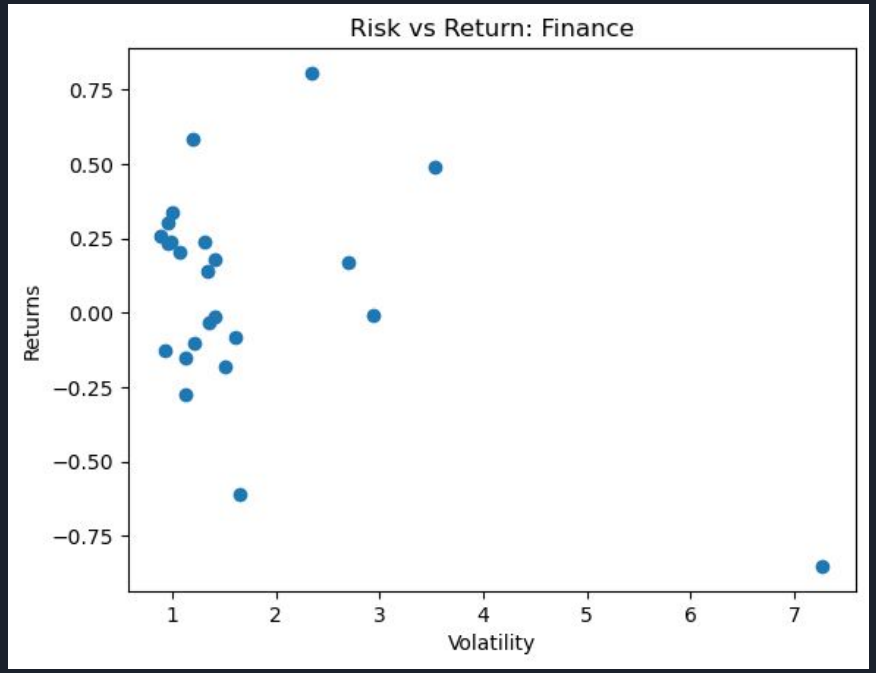
Question:
Which sectors from Technology, Healthcare, Energy and Finance experienced the most volatility, and which showed resilience during Covid?

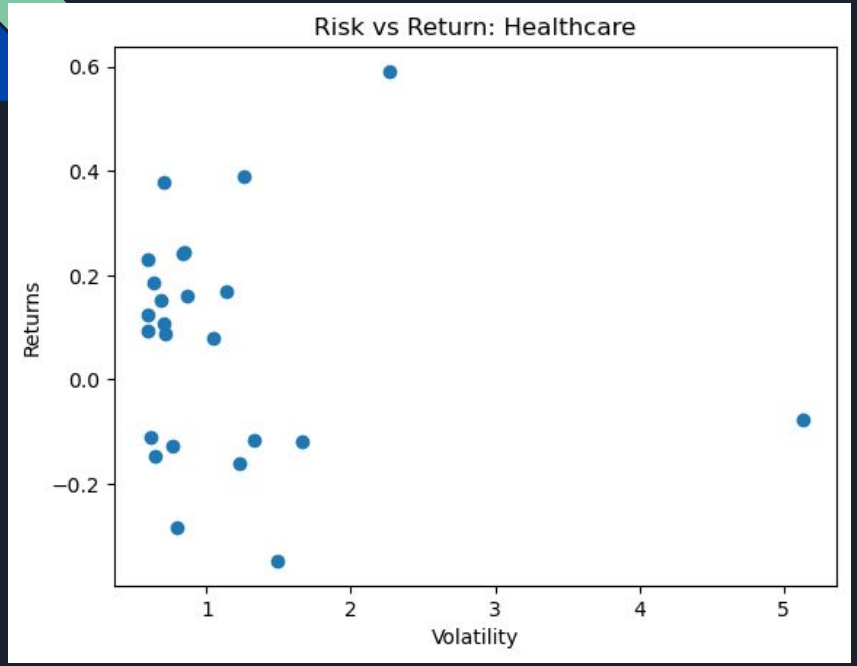
Data Source: Alpha Vantage API

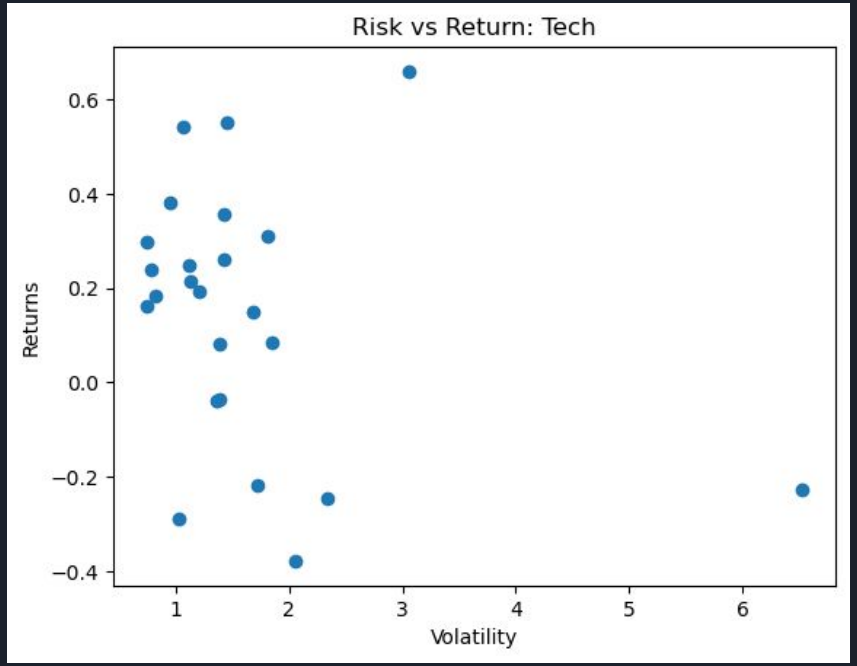

Distribution of Sector Returns During Covid
Returns
1.5
1.0
0.5
0.0
−0.5
−1.0
−1.5
xlv
xle
xlf
xlk
Sectors


Volatility Across Different Timeframes
symbol
Energy
Finance
Tech
Healthcare
Standard Deviation
0.0
0.1
0.2
0.3
0.4
0.5
0.6
Pre-Covid std
Covid std
Post-Covid std
Time Period


Risk vs Return: Energy
Returns
Volatility
1.5
1.0
0.5
0.0
−0.5
−1.0
−1.5
1
2
3
4
5
6
7
8
9


Risk vs Return: Finance
Returns
Volatility
0.75
0.50
0.25
0.00
−0.25
−0.50
−0.75
1
2
3
4
5
6
7


Risk vs Return: Healthcare
Returns
Volatility
0.6
0.4
0.2
0.0
−0.2
1
2
3
4
5


Risk vs Return: Tech
Returns
Volatility
0.6
0.4
0.2
0.0
−0.2
−0.4
1
2
3
4
5
6

Conclusion:

Volatile sector: Energy (XLE)

Resilient: Healthcare (XLV)