In [122…
```
import pandas as pd
import matplotlib.pyplot as plt
```

Financial Analysis of Microsoft, Apple, and Tesla (2022–2024)

Data Source

Data extracted from the SEC filings: [SEC Edgar] https://www.sec.gov/search-filings

In [123…
```
df = pd.read_csv('MSFT_TSLA_AAPL.csv')
df.head()
```

Out[123…

	Company	Fiscal Year	Total Revenue	Net Income	Total Assets	Total Liabilities	Cash Flow from Operating Activities
0	Microsoft	2024	245122000000	88136000000	512163000000	243686000000	118548000000
1	Microsoft	2023	211915000000	72361000000	411976000000	205753000000	87582000000
2	Microsoft	2022	198270000000	72738000000	364840000000	198298000000	89035000000
3	Tesla	2024	97690000000	7153000000	122070000000	48390000000	14923000000
4	Tesla	2023	96773000000	14974000000	106618000000	43009000000	13256000000

In [124…
```
df['Fiscal Year'] = pd.to_numeric(df['Fiscal Year'], errors='coerce')
df['Fiscal Year'] = df['Fiscal Year'].fillna(0).astype(int)
```

Sorting dataframe by company and year

In [125…
```
df.sort_values(['Company', 'Fiscal Year'], ascending=[True, True], inplace=True)
```

Growth rates for Revenue, Net income, Assets and Cash flow from Operations Activities

In [126…
```
# Revenue growth
df['Revenue Growth (%)'] = df.groupby('Company')['Total Revenue'].pct_change() * 100

# Net income growth
df['Net Income Growth (%)'] =df.groupby('Company')['Net Income'].pct_change() * 100
```

In [127…
```
# Asset growth
df['Asset Growth (%)'] = df.groupby('Company')['Total Assets'].pct_change() * 100
# Cash Flow growth
df['Operating Cash Flow Growth (%)'] = df.groupby('Company')['Cash Flow from Operating Activities'].pct_change() * 100
```

In [128…
```
# Debt Ratio
df['Debt Ratio (%)'] = (df['Total Liabilities'] / df['Total Assets']) * 100
```

In [129…
```
df.head(9)
```

Out[129…

	Company	Fiscal Year	Total Revenue	Net Income	Total Assets	Total Liabilities	Cash Flow from Operating Activities	Revenue Growth (%)	Net Income Growth (%)	Asset Growth (%)	Operating Cash Flow Growth (%)	Debt Ratio (%)
8	Apple	2022	394328000000	99803000000	352755000000	302083000000	122151000000	NaN	NaN	NaN	NaN	86
7	Apple	2023	383285000000	96995000000	352583000000	290437000000	110543000000	-3	-3	-0	-10	82
6	Apple	2024	391035000000	93736000000	364980000000	308030000000	118254000000	2	-3	4	7	84
2	Microsoft	2022	198270000000	72738000000	364840000000	198298000000	89035000000	NaN	NaN	NaN	NaN	54
1	Microsoft	2023	211915000000	72361000000	411976000000	205753000000	87582000000	7	-1	13	-2	50
0	Microsoft	2024	245122000000	88136000000	512163000000	243686000000	118548000000	16	22	24	35	48
5	Tesla	2022	81462000000	12587000000	82338000000	36440000000	14724000000	NaN	NaN	NaN	NaN	44
4	Tesla	2023	96773000000	14974000000	106618000000	43009000000	13256000000	19	19	29	-10	40
3	Tesla	2024	97690000000	7153000000	122070000000	48390000000	14923000000	1	-52	14	13	40

In [134…
```
pd.set_option('display.float_format', '{:.3f}'.format)
```

Calculated growth without Null/NaN values

In [135…
```
df_growth[['Company', 'Fiscal Year', 'Revenue Growth (%)', 'Net Income Growth (%)','Asset Growth (%)','Operating Cash Flow Growth (
```

Out[135…

	Company	Fiscal Year	Revenue Growth (%)	Net Income Growth (%)	Asset Growth (%)	Operating Cash Flow Growth (%)
7	Apple	2023	-2.800	-2.814	-0.049	-9.503
6	Apple	2024	2.022	-3.360	3.516	6.976
1	Microsoft	2023	6.882	-0.518	12.920	-1.632
0	Microsoft	2024	15.670	21.800	24.319	35.357
4	Tesla	2023	18.795	18.964	29.488	-9.970
3	Tesla	2024	0.948	-52.231	14.493	12.575

In [ ]:
```
```

Growth_Summary

In [136…
```
growth_summary = df.groupby('Company').agg({
    'Revenue Growth (%)': 'mean',
    'Net Income Growth (%)': 'mean',
    'Asset Growth (%)' : 'mean',
    'Operating Cash Flow Growth (%)' :'mean'
}).round(5).reset_index()
growth_summary
```

Out[136…

	Company	Revenue Growth (%)	Net Income Growth (%)	Asset Growth (%)	Operating Cash Flow Growth (%)
0	Apple	-0.389	-3.087	1.734	-1.264
1	Microsoft	11.276	10.641	18.619	16.862
2	Tesla	9.871	-16.633	21.991	1.303

Key Findings

- Highest Revenue Growth: Microsoft (15.67% in 2024)
- Lowest Revenue Growth: Apple (-2.80% in 2023)

- Highest Net Income Growth: Microsoft (21.80% in 2024)
- Lowest Net Income Growth: Tesla (-52% in 2024)

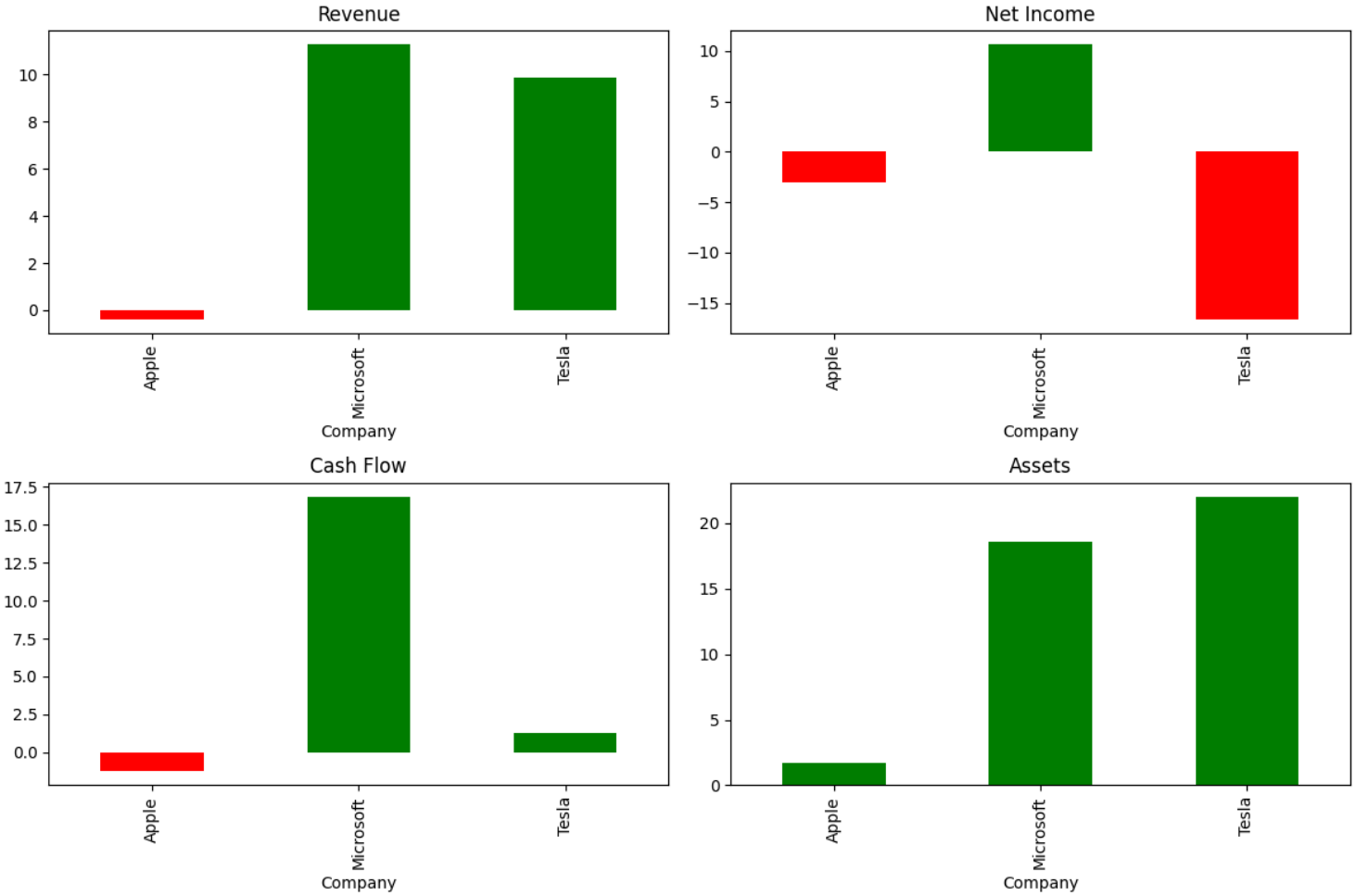
- Highest Financial Health: Microsoft (estimated debt ratio: 48–54%)
- Lowest Financial Health: Apple (estimated debt ratio: 82–86%)

- Highest perational Efficiency: Microsoft (35% operating cash flow growth in 2024)
- Lowest perational Efficiency: Apple (-9.50% operating cash flow growth in 2023)

Company Growth Snapshot: Green = Positive, Red = Negative

In [137…
```
fig, axes = plt.subplots(2, 2, figsize=(12, 8))

def color_map(series):
    return ['green' if v >= 0 else 'red' for v in series]

# Use growth_summary directly
growth_summary.set_index('Company', inplace=True)

growth_summary['Revenue Growth (%)'].plot(kind='bar', ax=axes[0,0], color=color_map(growth_summary['Revenue Growth (%)']))
axes[0,0].set_title('Revenue')

growth_summary['Net Income Growth (%)'].plot(kind='bar', ax=axes[0,1], color=color_map(growth_summary['Net Income Growth (%)']))
axes[0,1].set_title('Net Income')

growth_summary['Operating Cash Flow Growth (%)'].plot(kind='bar', ax=axes[1,0], color=color_map(growth_summary['Operating Cash Flow
axes[1,0].set_title('Cash Flow')

growth_summary['Asset Growth (%)'].plot(kind='bar', ax=axes[1,1], color=color_map(growth_summary['Asset Growth (%)']))
axes[1,1].set_title('Assets')
```

```
plt.tight_layout()
plt.show()
```



Conclusions

Highest Performance: Microsoft

Microsoft is top-performing company, showing consistent Revenue Growth (%), strong Asset Growth (%) and Operating Cash Flow Growth (%), with balanced Debt Ratio (%).

Apple Shows higher Debt Ratio (%) and weak Operating Cash Flow Growth (%), with low Revenue Growth (%).

Tesla: Demonstrates a large drop in Net Income Growth (%) (-52.23% in 2024), while Operating Cash Flow Growth (%) remains positive.

In [ ]: