ASSET-CLASS COMPARATIVE PERFORMANCE ANALYSIS

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Gold vs stock, bonds and cryptocurrencies: A comparative performance analysis

INTRODUCTION

This analysis compares the performance of different asset classes in short-term and long-term periods. Also, examining their return, volatility, and Sharpe ratio. Investors face challenges when choosing the asset class that offers a level of risk and return. Understanding how these assets perform over different times is important for making informed investment decisions.

Yahoo Finance API is the data that is used in this analysis. Performance metrics includes average return, volatility, and Sharpe ratio will be calculated for short terms (1 year) and long term periods (10 years)

The financial market is constantly evolving. Understanding the current and historical performance of the assets is crucial. This analysis was performed on the 5th of July 2024. It provides timely insight into how the asset is performed.

This insight will highlight

- which asset classes have performed well in one year
- which asset classes have performed well in the long term
- what is the ten year total return in each asset class
- which asset classes is suitable for different type of investors

This will help investors navigate their investment strategies with clarity and confidence.

METHADOLOGY

Data preparation

Collect the data from Yahoo Finance API libraries

```
import yfinance as yf
import pandas as pd
from datetime import datetime
import plotly.express as px
```

```
# Define the assets
assets = {
    'Gold': 'GC=F',
    'S&P 500': '^GSPC',
    '10Y Treasury': '^TNX',
    'Bitcoin': 'BTC-USD'
}
```

Set the current date using the python datetime libraries. The code analysis was performed on 10th of July 2024.

Define the start the data for the analysis. The date use for this analysis are:

- 2023 – 07- 01 (short term)
- 2019 – 07 -01 (long term)

```
# Define the start date and end date
start_date = '2023-07-01' # <------  you can change the start date
end_date = datetime.today().strftime('%Y-%m-%d')
```

Fetching the data

```python
# Fetch data
data = {}
for asset, ticker in assets.items():
    data[asset] = yf.download(ticker, start=start_date, end=end_date)

# Extract the adjusted closing prices
prices = pd.DataFrame({asset: data[asset]['Adj Close'] for asset in assets})
prices.dropna(inplace=True)

# Get the most recent date
most_recent_date = prices.index.max()

# Get the most recent adjusted closing prices
most_recent_prices = prices.loc[most_recent_date]

# Convert most recent prices to DataFrame and set the index
most_recent_prices_df = pd.DataFrame(most_recent_prices).T
most_recent_prices_df.index = [most_recent_date]

# Concatenate the historical data with the most recent prices
historical_data_with_recent = pd.concat([prices, most_recent_prices_df])

print("Historical Data with Most Recent Adjusted Closing Prices:")
historical_data_with_recent.tail(6)
```

	Gold	S&P 500	10Y Treasury	Bitcoin
2024-07-01	2327.600098	5475.089844	4.479	62851.980469
2024-07-02	2323.000000	5509.009766	4.436	62029.015625
2024-07-03	2359.800049	5537.020020	4.355	60173.921875
2024-07-05	2388.500000	5567.189941	4.272	56662.375000
2024-07-08	2366.399902	5572.850098	4.269	56621.164062
2024-07-08	2366.399902	5572.850098	4.269	56621.164062

Comparative analysis

Calculate the performance metric such as:

- Return
- Volatility
- Sharpe Ratio

```python
# Calculate daily returns
returns = prices.pct_change().dropna()

# Calculate cumulative returns
cumulative_returns = (1 + returns).cumprod()

# Calculate performance metrics
performance_metrics = pd.DataFrame({
    'Mean Return (%)': returns.mean() * 252 * 100,
    'Volatility (%)': returns.std() * (252**0.5) * 100,
    'Sharpe Ratio': returns.mean() / returns.std() * (252**0.5)
})
performance_metrics
```

✓ 0.0s

	Mean Return (%)	Volatility (%)	Sharpe Ratio
Gold	21.697200	13.317995	1.629164
S&P 500	22.782399	11.075623	2.056986
10Y Treasury	13.808531	24.925724	0.553987
Bitcoin	72.817228	48.948840	1.487619

Calculate the total return 10 years

This analysis also requires to calculate the total return in each asset for 10 year period.

Calculate total returns

```python
# Calculate total returns
initial_prices = prices.iloc[0]
final_prices = prices.iloc[-1]
total_returns = (final_prices - initial_prices) / initial_prices * 100
```

✓ 0.0s Python

```python
# Create a DataFrame for total returns
total_returns_df = pd.DataFrame(total_returns, columns=['Total Return (%)'])

print("\nTotal Returns:")
total_returns_df
```

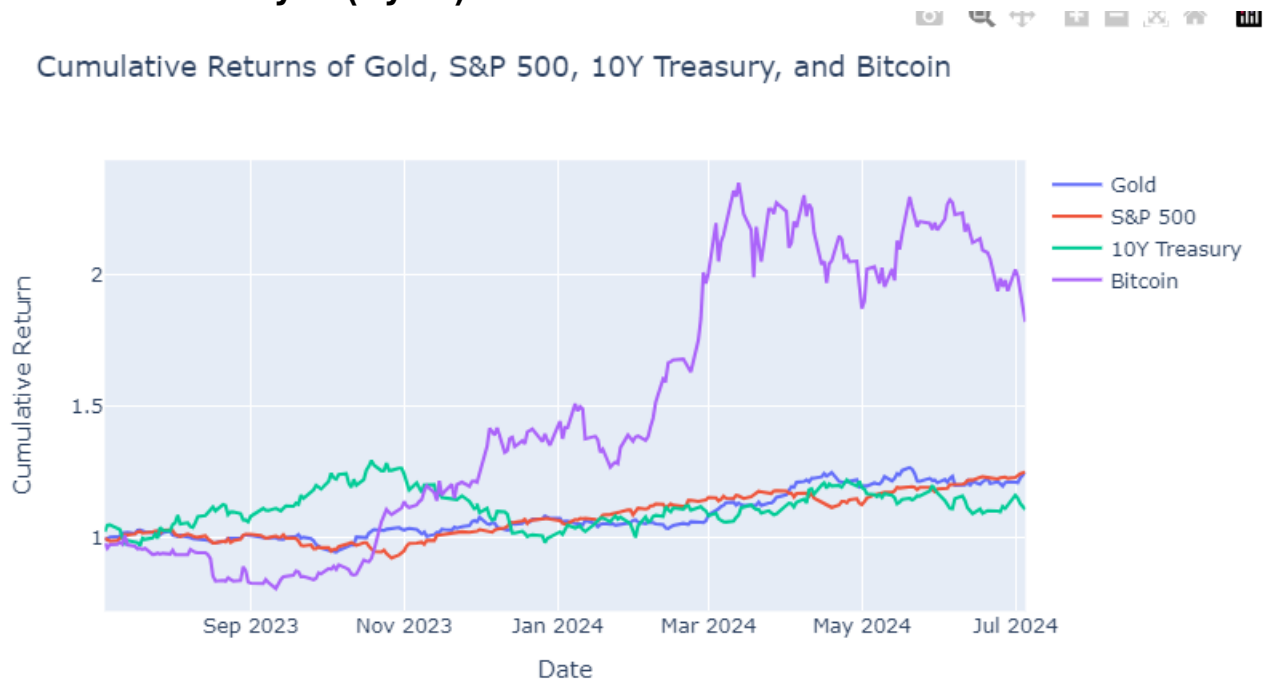
✓ 0.0s Python

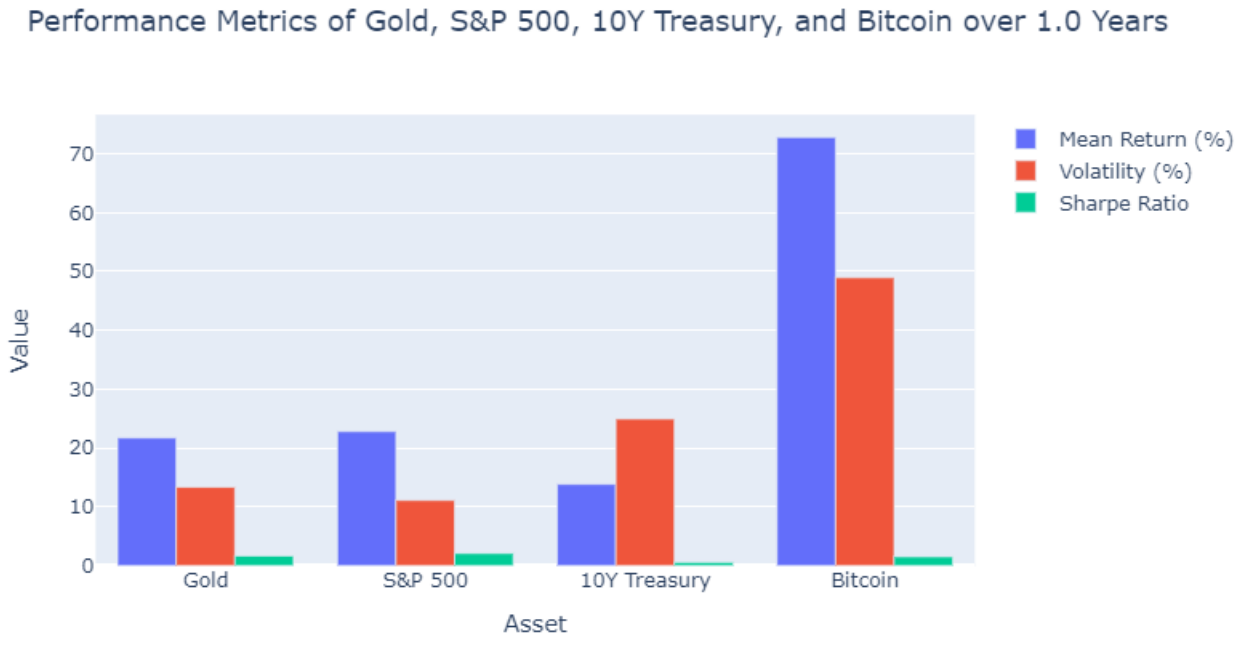
```
Total Returns:
```

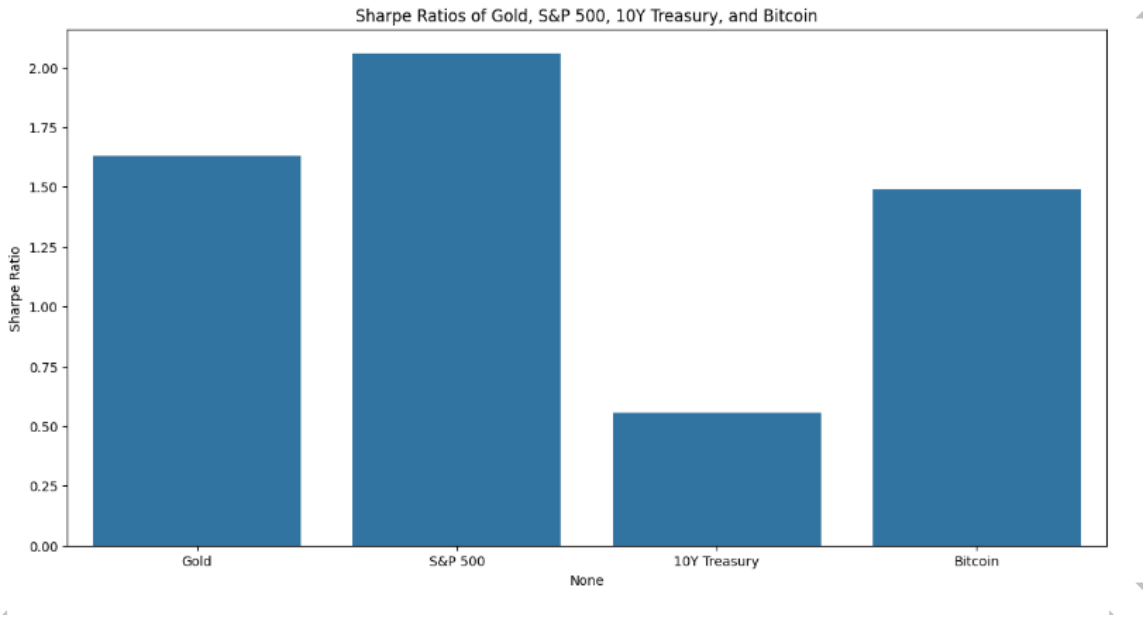
	Total Return (%)
Gold	92.109515
S&P 500	178.630282
10Y Treasury	65.384629
Bitcoin	12556.280678

RESULTS

Performance Analysis (1 year)







Bitcoin

- Average return 72.8%
- Volatility 49%
- Sharpe ration 1.45

Stock

- Average return 23%
- Volatility 11%
- Sharpe ratio 2.05

Gold

- Average return 21%
- Volatility 13%
- Sharpe ratio 1.63

10Y Treasury

- Average return 13%
- Volatility 25%
- Sharpe ratio 0.55

	Mean Return (%)	Volatility (%)	Sharpe Ratio
Gold	21.697200	13.317995	1.629164
S&P 500	22.782399	11.075623	2.056986
10Y Treasury	13.808531	24.925724	0.553987
Bitcoin	72.817228	48.948840	1.487619

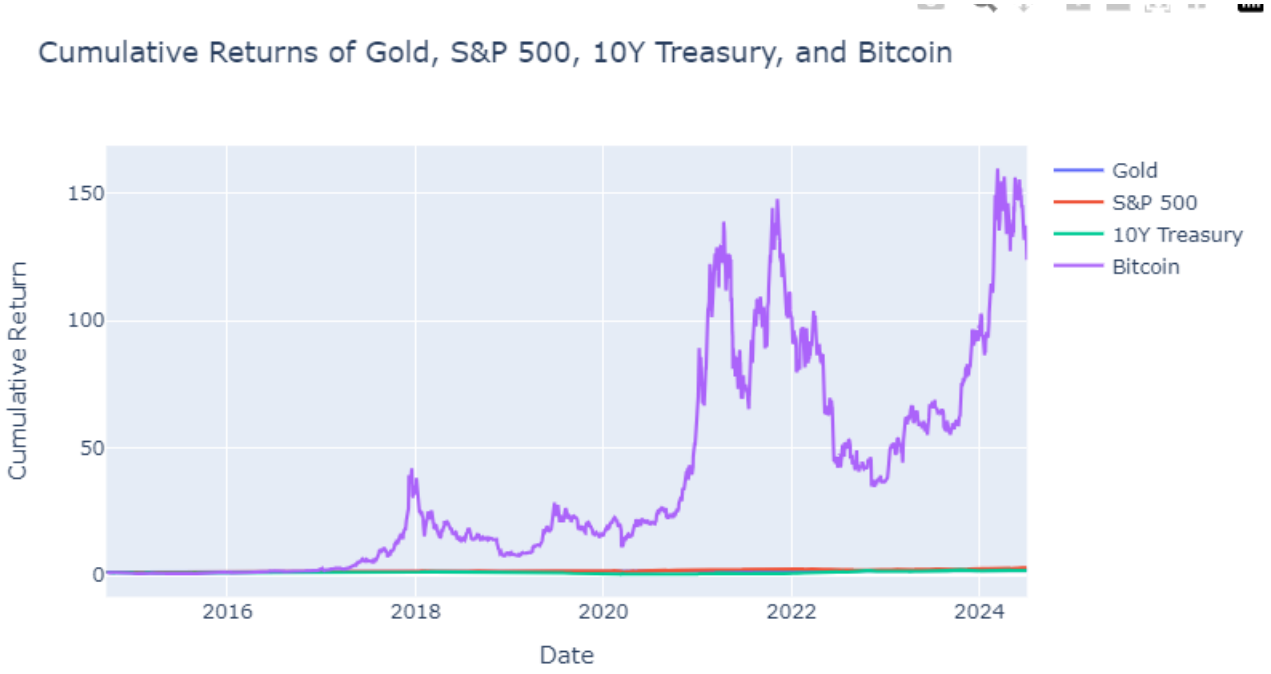
The S&P500 has demonstrated impressive performance in one year. The average return is 23%, significantly exceeding the historical average annual return of the stock market. The volatility of the S&P500 is 11%. It's considered moderate because it indicates a more stable return. The Sharpe ratio is 2.05. This means that the investment has generated a high return for the level of risk taken.

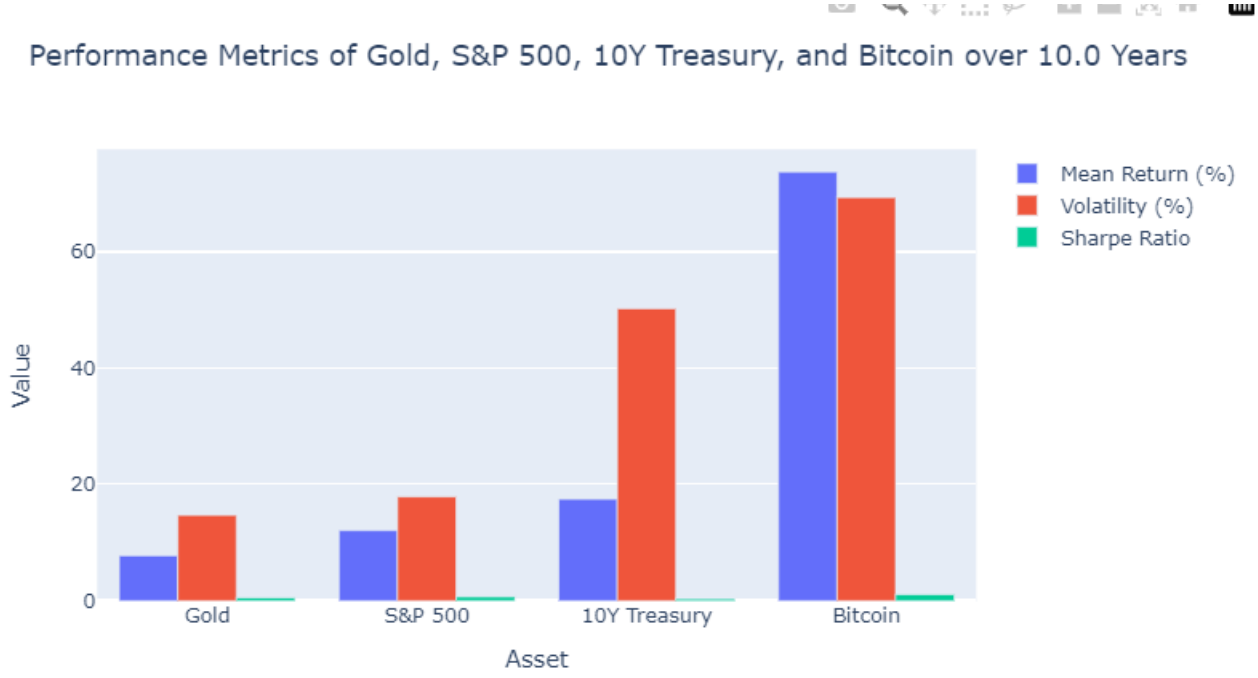
Gold has delivered a solid average return of 21%. Historically, this asset class has never produced such a high annual return. The long-term average annual return is lower than 10%. The volatility is 13%. It shows that gold price fluctuates moderately. The Sharpe ratio is 1.62. It indicates the investment has provided a strong return relative to its risk level. Gold makes it an appealing choice for investors seeking both stability and diversification.

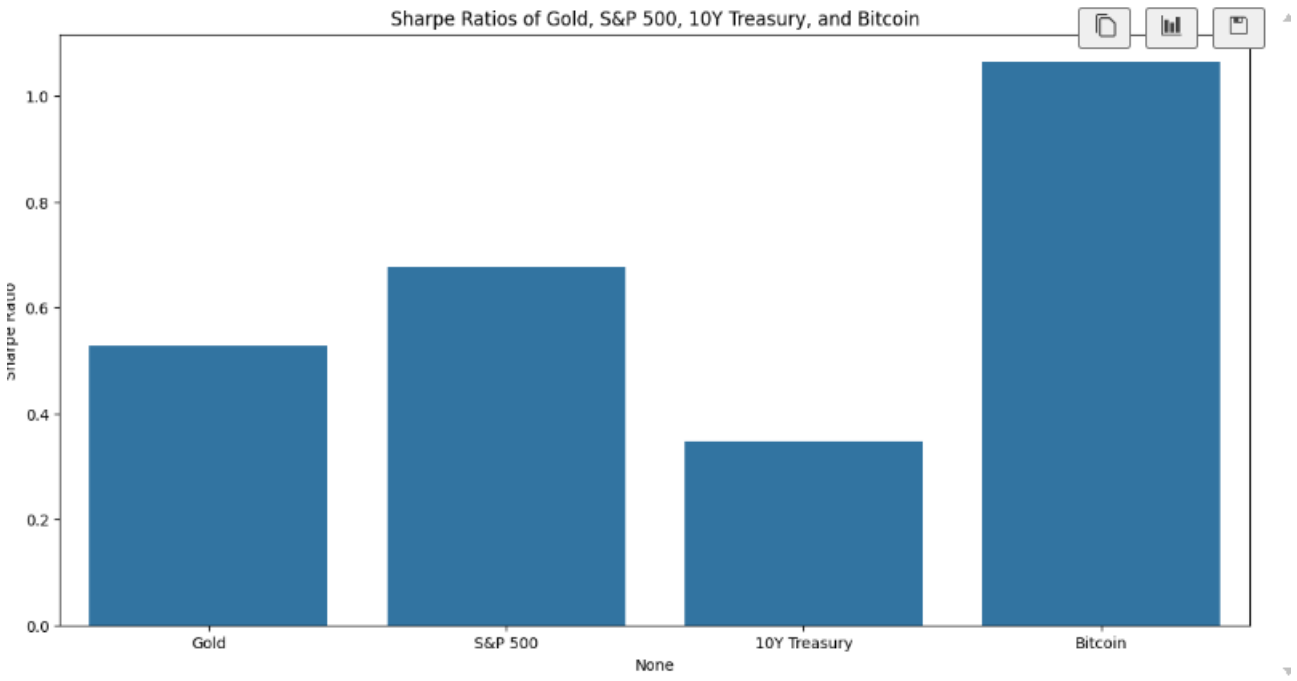
Bitcoin has shown remarkable growth over a year. The average return of 72.8%. This is significantly higher than the average return for most asset classes. The volatility is 49%. This suggests that Bitcoin has experienced a huge amount of price fluctuation. High volatility highlights the risk associated with investing in bitcoin. The Sharpe ratio is 1.49. This indicates that Bitcoin offers an excellent risk-adjusted return. Bitcoin is a high-risk and high-reward investment. It is only suitable for investors who can tolerate high risk.

The performance of the treasury is acceptable this year. The average return is 13%, which is unusually high. Historically, treasury bonds have lower average returns. A 13% return suggests an exceptional performance likely driven by changes in interest or market conditions that have dramatically increased bond prices. The volatility is 25%. It is quite high for treasury bonds; they are typically less volatile than stocks and cryptocurrency. The Sharpe Ratio is 0.55, indicating a moderate return relative return. Reflecting that the high return was achieved with considerable risk

Performance Analysis (10 years)







Bitcoin

- Average return 73.5%
- Volatility 69%
- Sharpe ration 1.06

Stock

- Average return 12%
- Volatility 17%
- Sharpe ratio 0.67

Gold

- Average return 7.8%
- Volatility 14%
- Sharpe ratio 0.53

10Y Treasury

- Average return 17%
- Volatility 14%
- Sharpe ratio 0.34

	Mean Return (%)	Volatility (%)	Sharpe Ratio
Gold	7.760523	14.716563	0.527333
S&P 500	12.087311	17.880184	0.676017
10Y Treasury	17.484506	50.236584	0.348043
Bitcoin	73.743003	69.347865	1.063378

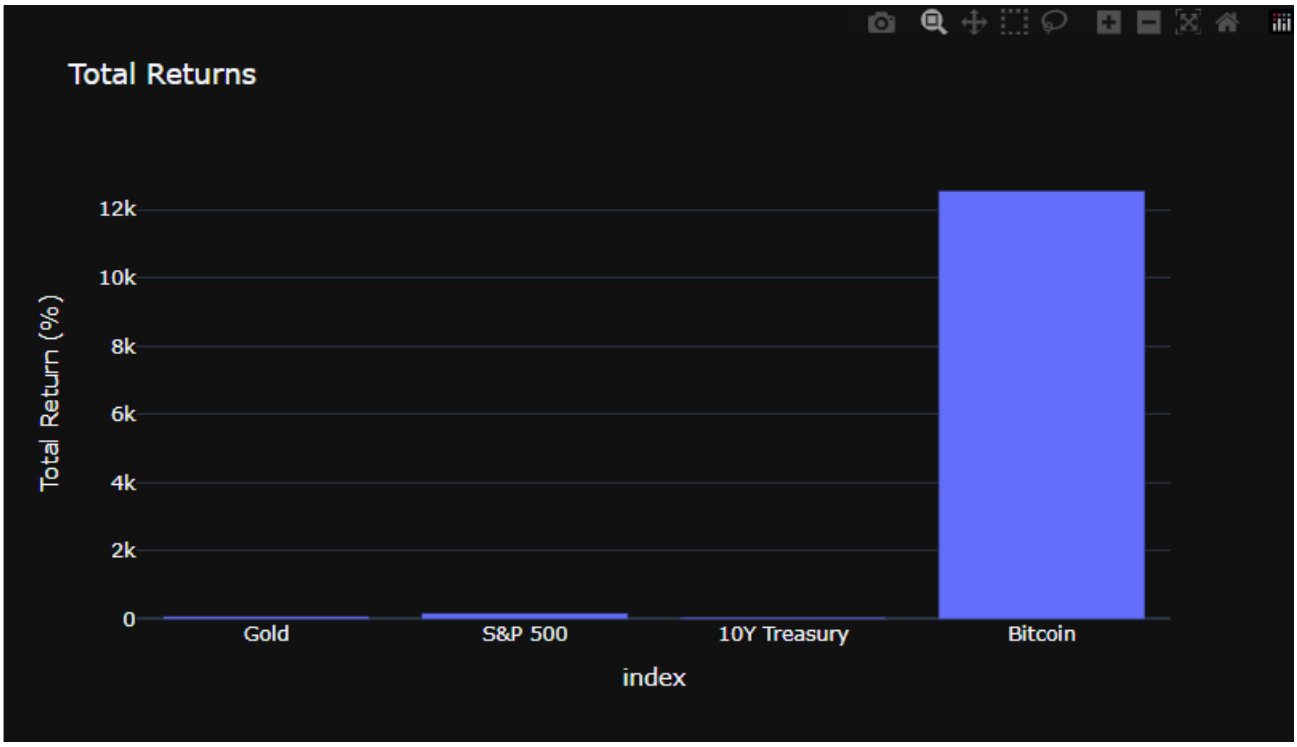
The S&P500 has seen solid growth over a year. With an average annual return of 12%, CNBC states that a 12% return is described as an optimistic benchmark according to Blanchett. The volatility of the S&P500 is 17%, which shows that the stock experiences average price fluctuation. The Sharpe ratio of 67% indicates the stock market provides a good risk-adjusted return. S&P500 is well-suited for long-term investors looking for steady growth

Gold performance suggests that this type of asset class is reliable for store value and source or moderate growth. The average annual return of 7.8% on gold is seen as a barrier against inflation rather than high return investment. The volatility of gold is 14% which means gold experiences less price fluctuation. The Sharpe ratio of 53% indicates that gold provides a reasonable risk and adjusted return.

Bitcoin has shown tremendous growth over the past ten years. Bitcoin's average annual return of 73% this level of return outpaces other traditional asset classes. With a volatility of 69% Bitcoin experiences a huge amount of price fluctuation. The high volatility highlights the risk associated with investing in bitcoin. A Sharpe ratio of 106% indicates that Bitcoin offers an excellent risk-adjusted return. Bitcoin is a high risk and high rewards investment. It is only suitable for investors who can tolerate high risk.

The 10-year Treasury provides an average annual return of 17%. This return is attractive for fixed-income investment. This suggests that a 10-year Treasury can offer a steady income and potential for capital appreciation. The volatility of the treasury is 14%, and the treasury shows moderate price fluctuation. The Sharpe ratio of 34% indicates there is a moderate risk-adjusted return. The returns are favourable, with a lower Sharpe ratio contrasted other assets.

Total return 10 Years



Total Returns:

	Total Return (%)
Gold	93.494811
S&P 500	178.141164
10Y Treasury	64.307692
Bitcoin	12289.713679

The S&P 500 shows strong performance over the decade. With the total return of 93.4% it's a solid choice for balanced growth with moderate risk, offering diversification across major US companies.

Gold has total of 93.4% over ten years. It's a stable choice for capital preservation and inflation hedging. Gold remains a haven for risk-averse investors.

Bitcoin shows an extraordinary returns over the past decade highlight its potential for high growth. However, its extreme volatility suits only high-risk-tolerant investors with a long-term horizon.

10-Year Treasury shows positive but lowest return among asset classes. Reflects its role as a low-risk, income-generating investment.

Overall Performance

S&P 500:

- **One Year:** Average return of 23%, low volatility of 11%, high Sharpe ratio. Offers good risk-adjusted returns and stability.
- **Ten Years:** Average return of 12%, moderate volatility of 17%, good Sharpe ratio. A solid choice for long-term balanced growth.
- **Summary:** Reliable for balanced and consistent growth.

Gold:

- **One Year:** Average return of 23%, volatility of 13%, high Sharpe ratio. A stable hedge against inflation, ideal for risk-averse investors.
- **Ten Years:** Average return of 7.8%, volatility of 15%, reasonable Sharpe ratio. Popular during economic uncertainty.
- **Summary:** Provides stability and inflation protection.

Bitcoin:

- **One Year:** Average return of 71.5%, high volatility of 49%, high Sharpe ratio. Suitable for high-risk, high-reward investors.
- **Ten Years:** Average return of 73.7%, high volatility of 69%, high Sharpe ratio. Shows significant long-term growth potential.
- **Summary:** High-risk, high reward with substantial growth and volatility.

10-Year Treasury:

- **One Year:** Average return of 13%, moderate volatility of 25%, decent Sharpe ratio. Ideal for stable income and capital preservation.
- **Ten Years:** Average return of 17%, moderate volatility of 14%, moderate Sharpe ratio. Good for steady income and lower risk.
- **Summary:** Offers steady income and lower risk.

DISCUSSION

The performance analysis over one and ten years has revealed significant insight into various asset classes. Bitcoin shows remarkable growth, showcasing an average return of 72% over one year and 73.5% over ten years. Its extremely high volatility highlights the significant risk associated with these assets. Bitcoin Sharpe ratio offers excellent risk-adjusted return but only for investors with a high-risk tolerance.

The S&P500 has demonstrated consistent performance with moderate volatility.

Gold has proven to be a stable investment, especially during economic uncertainty. Gold can provide a reasonable return relative to its risk.

The treasury shows relatively low returns but maintains moderate volatility. Its Sharpe ratios show that while it offers low return, and it provides capital preservation and steady income.

Understanding this performance metric is crucial for investors as it guides their investment strategies based on their investment goals and risk tolerance.
The result does not show external economic factors, market conditions, or geopolitical events that can significantly impact asset performance. Past performance does guarantee future performance. These metrics are not considered investor-specific. For instance, tax implication, liquidity, or personal financial goals are what investors look for.

For future studies, the analysis could focus on:

- Monthly or quarterly performance
- Sentiment analysis from news and social media could offer a more comprehensive understanding of market dynamics.
- Analysing the impact of interest rates, inflation, and GDP growth on this asset.
- Scenario analysis and stress testing under various economic conditions can help investors better prepare for possible market downturns.

CONCLUSION

The performance analysis of Bitcoin, S&P500, Gold, and 10-year Treasury over one and ten-year periods offer valuable insight into the return and risk profile of these asset classes.

Bitcoin offers high growth but with significant risk. Bitcoin is suitable for high-tolerance investors.ThS&P500 offers balanced growth and stability. It is ideal for long-term investors seeking stable returns. Gold serves as a reliable asset for capital preservation, especially during economic certainty, and the ten-year treasury ensures steady income and lower risk.

By leveraging this insight and continuously exploring market dynamics, investors can better navigate the evolving financial landscape and enhance their investment outcome