FINAL PROJECT: STOK MARKET ANALYSIS S&P 500

By: Ahmed Hany

Alaa Alhalaby

Mohamed Sayed

About Dataset

CONTEXT

Stock market data can be interesting to analyze and as a further incentive, strong predictive models can have large financial payoff. The amount of financial data on the web is seemingly endless. A large and well structured dataset on a wide array of companies can be hard to come by. Here I provide a dataset with historical stock prices (last 5 years) for all companies currently found on the S&P 500 index.

Sure! Let's break down each of these financial metrics and understand how they are calculated and their potential impact on stock prices and company value:

1. Price

- **Definition**: The current trading price of a company's stock.

- **Calculation**: Determined by the market based on supply and demand.

- **Impact**: Reflects the market's perception of the company's value. High demand can drive prices up, while low demand can drive them down.

2. Price/Earnings (P/E) Ratio

- **Definition**: A valuation ratio of a company's current share price compared to its per-share earnings.

- **Calculation**:

$$P/E \text{ Ratio} = \frac{\text{Price per Share}}{\text{Earnings per Share (EPS)}}$$

- **Impact**: Indicates how much investors are willing to pay per dollar of earnings. A high P/E may suggest that the stock is overvalued, or investors expect high growth rates in the future.

3. Dividend Yield

- **Definition**: A financial ratio that shows how much a company pays out in dividends each year relative to its stock price.

- **Calculation**:

$$\text{Dividend Yield} = \frac{\text{Annual Dividends per Share}}{\text{Price per Share}} \times 100$$

- **Impact**: Attracts income-focused investors. A high dividend yield can indicate a stable income stream, but it might also suggest that the stock price is low.

4. Earnings per Share (EPS)

- **Definition**: The portion of a company's profit allocated to each outstanding share of common stock.

- **Calculation**:

$$EPS = \frac{\text{Net Income} - \text{Dividends on Preferred Stock}}{\text{Average Outstanding Shares}}$$

- **Impact**: A key indicator of a company's profitability. Higher EPS generally leads to higher stock prices.

5. 52 Week Low

- **Definition**: The lowest price at which a stock has traded during the previous 52 weeks.

- **Impact**: Indicates the stock's lowest point in the past year, which can be a signal for potential buying opportunities if the stock is expected to rebound.

6. 52 Week High

- **Definition**: The highest price at which a stock has traded during the previous 52 weeks.

- **Impact**: Indicates the stock's highest point in the past year, which can be a signal for potential selling opportunities if the stock is expected to decline.

7. Market Cap

- **Definition**: The total market value of a company's outstanding shares.

- **Calculation**:

$\text{Market Cap} = \text{Price per Share} \times \text{Total Number of Outstanding Shares}$

- **Impact**: Reflects the company's size and market value. Larger market cap companies are generally more stable, while smaller ones might offer higher growth potential but with more risk.

8. EBITDA (Earnings Before Interest, Taxes, Depreciation, and Amortization)

- **Definition**: A measure of a company's overall financial performance.

- **Calculation**:

$$EBITDA = \text{Net Income} + \text{Interest} + \text{Taxes} + \text{Depreciation} + \text{Amortization}$$

- **Impact**: Provides a clearer view of a company's operational profitability by excluding non-operational expenses. Higher EBITDA indicates better operational efficiency.

9. Price/Sales (P/S) Ratio

- **Definition**: A valuation ratio that compares a company's stock price to its revenues.

- **Calculation**:

$$\text{P/S Ratio} = \frac{\text{Price per Share}}{\text{Revenue per Share}}$$

- **Impact**: Indicates how much investors are willing to pay per dollar of sales. A lower P/S ratio might suggest undervaluation, while a higher ratio could indicate overvaluation.

10. Price/Book (P/B) Ratio

- **Definition**: A ratio used to compare a stock's market value to its book value.

- **Calculation**:

$$\text{P/B Ratio} = \frac{\text{Price per Share}}{\text{Book Value per Share}}$$

- **Impact**: Indicates how much investors are willing to pay for each dollar of net assets. A lower P/B ratio might suggest that the stock is undervalued, while a higher ratio could indicate overvaluation.

How These Metrics Impact Stock Price and Company Value

- **Investor Sentiment**: Positive metrics (e.g., high EPS, low P/E ratio) can boost investor confidence, driving up stock prices.

- **Market Conditions**: Economic factors and market trends can influence these metrics and, consequently, stock prices.

- **Company Performance**: Strong financial performance reflected in these metrics can enhance a company's value and attract more investors.

Understanding these variables helps investors make informed decisions about buying, holding, or selling stocks. If you have any more questions or need further details, feel free to ask!

CONTENT

The data is presented in a couple of formats to suit different individual's needs or computational limitations. I have included files containing 5 years of stock data (in the all_stocks_5yr.csv and corresponding folder).

The folder individual_stocks_5yr contains files of data for individual stocks, labelled by their stock ticker name. The all_stocks_5yr.csv contains the same data, presented in a merged .csv file. Depending on the intended use (graphing, modelling etc.) the user may prefer one of these given formats.

All the files have the following columns:
Date - in format: yy-mm-dd

Open - price of the stock at market open (this is NYSE data so all in USD)

High - Highest price reached in the day

Low Close - Lowest price reached in the day

Volume - Number of shares traded

Name - the stock's ticker name

ACKNOWLEDGEMENTS

Due to volatility in google finance, for the newest version I have switched over to acquiring the data from The Investor's Exchange api, the simple script I use to do this is found here. Special thanks to Kaggle, Github, pandas_datareader and The Market.

INSPIRATION

This dataset lends itself to some very interesting visualizations. One can look at simple things like how prices change over time, graph and compare multiple stocks at once, or generate and graph new metrics from the data provided.
From these data informative stock stats such as volatility and moving averages can be easily calculated.
The million-dollar question is: can you develop a model that can beat the market and allow you to make statistically informed trades?

DATA FROM DATAHUB

ABOUT DATA

Information on S&P 500 index used to be available on the official webpage on the Standard and Poor's website but until they publish it back, Wikipedia is the best up-to-date and open data source.

- Index listing - see **data/constituents.csv** extracted from Wikipedia's SP500 list of companies

- Constituent financials - see **data/constituents-financials.csv** (source via Yahoo Finance)

Detailed information on the S&P 500 (primarily in XLS format) used to be obtained from its official webpage on the Standard and Poor's website - it was free but registration was required.

1. Index listing - see **data/constituents.csv** used to be extracted from source Excel file on S&P website (Note this Excel is actually S&P 500 EPS estimates but on sheet 4 it has list of members - [previous file][sp-lsting] was just members but that 404s as of Dec 2014)

2. Historical performance ([source XLS on S&P website](#))

Notes:

- Market Capitalization and EBIDTA are in Billions.

Note: For aggregate information on the S&P (dividends, earnings, etc), see [Standard and Poor's 500 Dataset](#).

Preparation

You can run the script yourself to update the data and publish them to GitHub : see [scripts README](#).

General Financial Notes

Publicly listed US companies are obliged various reports on a regular basis with the SEC. Of these 2 types are of especial interest to investors and others interested in their finances and business. These are:

- 10-K = Annual Report

- 10-Q = Quarterly report

DATA PREPARATION

DATA CLEANSING

➢ In table "CompaniesFinancials" the column names for **"52 Week High" and "52 Week Low"** are swapped so we have to rename them to match the values in each of them.

➢ In table "CompaniesFinancials" the column **"Sec Filings"** contains reference to the company documentation and won't be of any analytical use so it will be removed from the model.

➢ Check for Duplicates:
   o Column CIK revealed 3 duplicate values with a total 6 rows

```
SELECT *

FROM [dbo].[CompaniesMetadata]

WHERE CIK IN (   SELECT CIK

   FROM [dbo].[CompaniesMetadata]   GROUP BY CIK

   HAVING COUNT(CIK) > 1

);
```

	Symbol	Security	GICS Sector	GICS Sub-Industry	Headquarters Location	Date added	CIK	Founded
1	GOOGL	Alphabet Inc. (Class A)	Communication Services	Interactive Media & Services	Mountain View, California	2014-04-03 00:00:00.000	1652044	1998
2	GOOG	Alphabet Inc. (Class C)	Communication Services	Interactive Media & Services	Mountain View, California	2006-04-03 00:00:00.000	1652044	1998
3	FOXA	Fox Corporation (Class A)	Communication Services	Broadcasting	New York City, New York	2019-03-04 00:00:00.000	1754301	2019
4	FOX	Fox Corporation (Class B)	Communication Services	Broadcasting	New York City, New York	2019-03-04 00:00:00.000	1754301	2019
5	NWSA	News Corp (Class A)	Communication Services	Publishing	New York City, New York	2013-08-01 00:00:00.000	1564708	2013 (News Corpora
6	NWS	News Corp (Class B)	Communication Services	Publishing	New York City, New York	2015-09-18 00:00:00.000	1564708	2013 (News Corpora

➢ In the table "CompaniesFinancials" the column name Founded contains multiple entries this will be split into two columns " YearFounded" and "FoundedRemarks" and then drop the original column.

```
-- Step 1: Add the new columns
ALTER TABLE CompaniesFinancials
ADD YearFounded INT,
    FoundedRemarks NVARCHAR(50);

-- Step 2: Update the new columns with extracted data
UPDATE CompaniesFinancials
SET YearFounded = CAST(SUBSTRING(Founded, 1, 4) AS INT),
    FoundedRemarks = SUBSTRING(Founded, 5, LEN(Founded) -
4);

-- Step 3: Drop the original column
ALTER TABLE CompaniesFinancials
DROP COLUMN Founded;
```

➢ In the table "CompaniesFinancials" the column name "HeadquartersLocation" contains the city and the state we will split them into two columns "HQCity" and "HQState"

```
-- Step 1: Add the new columns
ALTER TABLE CompaniesMetadata
ADD HQCity NVARCHAR(50),
    HQState NVARCHAR(50);


-- Step 2: Update the new columns with extracted data
UPDATE CompaniesMetadata
SET HQCity = LEFT(HeadquartersLocation, CHARINDEX(',',
HeadquartersLocation) - 1),
    HQState = LTRIM(RIGHT(HeadquartersLocation,
LEN(HeadquartersLocation) - CHARINDEX(',',
HeadquartersLocation)));


-- Step 3: Drop the original column
ALTER TABLE CompaniesMetadata
DROP COLUMN HeadquartersLocation;
```

➢ Create a column to represent the quarter of the year.

```
Alter Table
[StockDataAnalysis].[dbo].[all_stocks_5yr]
Add Qurter As
     Case
     When Month(date) in (1,2,3) then 'Q1'
     When Month(date) in (4,5,6) then 'Q2'
     When Month(date) in (7,8,9) then 'Q3'
     Else 'Q4'

     END
```

THE STORY

Analyzing the S&P 500 data from 2013 to 2018 involves a comprehensive process to identify the best sectors and companies for investment. Initially, we cleanse and prepare the data by checking for null values, removing duplicates, and ensuring data integrity. We then calculate key financial metrics such as growth rates, dividend yields, and earnings per share for each sector and company. By examining historical trends, we identify sectors with consistent growth, such as technology and healthcare, and assess their performance against economic indicators like gold and oil prices. Using SQL queries, we analyze the correlation between these indicators and stock prices to understand market dynamics. Power BI dashboards visualize these insights, highlighting top-performing sectors and companies. Predictive models, leveraging historical data and machine learning algorithms, forecast future growth, and guide investment decisions for the next five years. This data-driven approach ensures informed, strategic investments, optimizing returns while managing risks.

BUSINESS QUESTIONS

1. WHICH STOCKS HAVE SHOWN THE HIGHEST GROWTH OVER THE PAST 5 YEARS?

```sql
SELECT [Name],
     Round( (MAX(CAST([close] AS DECIMAL(18,
2))) - MIN(CAST([close] AS DECIMAL(18, 2)))) /
MIN(CAST([close] AS DECIMAL(18, 2))),3) AS
GrowthRate
FROM all_stocks_5yr
GROUP BY [Name]
ORDER BY GrowthRate DESC;
```

	Name	GrowthRate
106	TMO	2.1300000000000000000
107	CMA	2.1280000000000000000
108	XYL	2.1280000000000000000
109	CRM	2.1000000000000000000
110	GOO...	2.0980000000000000000
111	VMC	2.0950000000000000000
112	ROST	2.0940000000000000000
113	GT	2.0860000000000000000
114	KR	2.0810000000000000000
115	PRGO	2.0800000000000000000
116	CTL	2.0700000000000000000
117	PCLN	2.0510000000000000000
118	ARNC	2.0450000000000000000
119	LNC	2.0320000000000000000
120	GILD	2.0250000000000000000
121	KORS	2.0210000000000000000
122	NI	2.0130000000000000000
123	EBAY	2.0120000000000000000

2. WHAT IS THE AVERAGE DIVIDEND YIELD BY SECTOR?

```sql
SELECT Sector,
       round(AVG([Dividend
Yield]),3) AS AvgDividendYield
FROM [dbo].[CompaniesFinancials]
GROUP BY Sector
ORDER BY AvgDividendYield DESC;
```

	Sector	AvgDividendYield
1	Telecommunication Services	7.568
2	Real Estate	3.895
3	Utilities	3.759
4	Consumer Staples	2.433
5	Financials	2.017
6	Energy	2.014
7	Materials	1.738
8	Consumer Discretionary	1.572
9	Industrials	1.479
10	Information Technology	1.228
11	Health Care	0.917

```sql
WITH PriceChanges AS (
    SELECT
        a.Name,
        a.[date],
        CAST(a.[close] AS DECIMAL(18, 2)) AS StockClose,
        LAG(CAST(a.[close] AS DECIMAL(18, 2))) OVER (PARTITION BY
a.Name ORDER BY a.[date]) AS PrevStockClose,
        CAST(g.Gold_Price AS DECIMAL(18, 2)) AS Gold_Price,
        LAG(CAST(g.Gold_Price AS DECIMAL(18, 2))) OVER (ORDER BY
g.GIO_Date) AS PrevGoldPrice,
        CAST(g.Oil_Price AS DECIMAL(18, 2)) AS Oil_Price,
        LAG(CAST(g.Oil_Price AS DECIMAL(18, 2))) OVER (ORDER BY
g.GIO_Date) AS PrevOilPrice
    FROM all_stocks_5yr a
    JOIN GIO g ON CONVERT(VARCHAR(10), g.GIO_Date, 101) = a.[date]
),
CategorizedChanges AS (
    SELECT
        Name,
        [date],
        StockClose,
        Gold_Price,
        Oil_Price,
        CASE
            WHEN StockClose > PrevStockClose AND Gold_Price >
PrevGoldPrice AND Oil_Price > PrevOilPrice THEN 'Increase Increase'
            WHEN StockClose > PrevStockClose AND Gold_Price >
PrevGoldPrice AND Oil_Price < PrevOilPrice THEN 'Increase Decrease'
            WHEN StockClose > PrevStockClose AND Gold_Price <
PrevGoldPrice AND Oil_Price > PrevOilPrice THEN 'Decrease Increase'
            WHEN StockClose < PrevStockClose AND Gold_Price >
PrevGoldPrice AND Oil_Price > PrevOilPrice THEN 'Decrease Decrease'
            ELSE 'No Change'
        END AS ChangeCategory,
        (StockClose - PrevStockClose) / PrevStockClose * 100 AS
StockChangePercent
    FROM PriceChanges
    WHERE PrevStockClose IS NOT NULL AND PrevGoldPrice IS NOT NULL AND
PrevOilPrice IS NOT NULL
)
SELECT
    Name,
    ChangeCategory,
    COUNT(*) AS Occurrences,
    AVG(StockChangePercent) AS AvgStockChangePercent
FROM CategorizedChanges
GROUP BY Name, ChangeCategory

ORDER BY AvgStockChangePercent DESC;
```

⊞ Results 🗗 Messages

	Name	ChangeCategory	Occurrences	AvgStockChangePercent
1	PYPL	Increase Decrease	35	1.564540191290866
2	PYPL	Increase Increase	48	1.257883575047492
3	PYPL	Decrease Increase	45	1.189046229482421
4	AAPL	Decrease Increase	91	1.181723047345855
5	XLNX	Increase Decrease	30	1.086905326356492
6	XLNX	Decrease Increase	41	1.015045025519279
7	AAPL	Increase Increase	70	0.984435111127699
8	AAPL	Increase Decrease	70	0.945153247472628
9	XLNX	Increase Increase	44	0.927478883612768
10	NVDA	No Change	1253	0.255756688246250
11	NFLX	No Change	1253	0.222803500444042
12	AMD	No Change	1253	0.188891148899323
13	ALGN	No Change	1253	0.178212466144629
14	EA	No Change	1253	0.176130405064550
15	MU	No Change	1253	0.172607983010162
16	AVGO	No Change	1253	0.172348516731813
17	DXC	No Change	213	0.170217362236028
18	INCY	No Change	1253	0.167445318670056
19	FB	No Change	1253	0.166746826378766
20	STZ	No Change	1253	0.165084661587041
21	BBY	No Change	1253	0.153981020099622
22	AMZN	No Change	1253	0.151356407916967

4. WHICH COMPANIES HAVE THE HIGHEST PRICE/EARNINGS RATIO IN EACH SECTOR?

```sql
SELECT Sector,
       [Name],
       [Price/Earnings]
FROM [dbo].[CompaniesFinancials]
WHERE [Price/Earnings] = (SELECT
MAX([Price/Earnings])
FROM [dbo].[CompaniesFinancials] cf
WHERE cf.Sector =
[dbo].[CompaniesFinancials].Sector);
```

	Sector	Name	Price/Earnings
1	Utilities	American Water Works Company Inc	26.23
2	Telecommunication Services	Verizon Communications	13.08
3	Real Estate	SBA Communications	199.81
4	Materials	DowDuPont	49.43
5	Information Technology	Salesforce.com	520.15
6	Industrials	Cintas Corporation	32.75
7	Health Care	Vertex Pharmaceuticals Inc	252.67
8	Financials	CBOE Holdings	35.06
9	Energy	Baker Hughes. a GE Company	305.56
10	Consumer Staples	Monster Beverage	42.17
11	Consumer Discretionary	Amazon.com Inc	296.16

5. WHAT IS THE MARKET CAPITALIZATION DISTRIBUTION ACROSS DIFFERENT SECTORS?

```sql
SELECT Sector,
       SUM([Market Cap]) AS
TotalMarketCap
FROM
[dbo].[CompaniesFinancials]
GROUP BY Sector

ORDER BY TotalMarketCap DESC;
```

	Sector	TotalMarketCap
1	Information Technology	6727122230126.00
2	Financials	3442649526475.00
3	Health Care	3244359579040.00
4	Consumer Discretionary	3213562731546.00
5	Industrials	2411539684860.00
6	Consumer Staples	2087076133307.00
7	Energy	1357314232590.00
8	Materials	692299946724.00
9	Real Estate	625315677562.00
10	Utilities	611632638471.00
11	Telecommunication Services	453042196861.00

6. WHAT IS THE GROWTH RATE PER SECTOR OVER THE PAST 5 YEARS?

```sql
SELECT cf.Sector,
  round( (MAX(CAST(as5.[close] AS
DECIMAL)) - MIN(CAST(as5.[close] AS
DECIMAL))) / MIN(CAST(as5.[close] AS
DECIMAL)),3) AS SectorGrowthRate
FROM all_stocks_5yr as5
JOIN [dbo].[CompaniesFinancials] cf
ON as5.Name = cf.Symbol
GROUP BY cf.Sector

ORDER BY SectorGrowthRate DESC;
```

	Sector	SectorGrowthRate
1	Information Technology	593.0000000000000000000
2	Consumer Discretionary	203.9000000000000000000
3	Energy	115.5000000000000000000
4	Materials	107.2500000000000000000
5	Health Care	97.8570000000000000000
6	Financials	83.7140000000000000000
7	Real Estate	36.9230000000000000000
8	Industrials	31.4550000000000000000
9	Utilities	16.6670000000000000000
10	Consumer Staples	16.6150000000000000000
11	Telecommunication Services	3.0710000000000000000

7. WHICH SECTORS HAVE THE HIGHEST AVERAGE EARNINGS PER SHARE (EPS)?

```sql
SELECT Sector,
       AVG([Earnings/Share]) AS
AvgEPS
FROM [dbo].[CompaniesFinancials]
GROUP BY Sector

ORDER BY AvgEPS DESC;
```

	Sector	AvgEPS
1	Industrials	5.34402985074627
2	Materials	4.932
3	Consumer Discretionary	4.87904761904762
4	Financials	4.43691176470588
5	Telecommunication Services	4.42666666666667
6	Health Care	4.34049180327869
7	Consumer Staples	3.65941176470588
8	Information Technology	3.11
9	Real Estate	2.39121212121212
10	Utilities	2.01464285714286
11	Energy	-1.6484375

8. HOW HAVE INTEREST RATES IMPACTED STOCK PRICES HISTORICALLY?

```sql
WITH PriceChanges AS (
  SELECT
    a.Name,
    a.[date],
    CAST(a.[close] AS DECIMAL(18, 2)) AS StockClose,
    LAG(CAST(a.[close] AS DECIMAL(18, 2))) OVER (PARTITION BY a.Name
ORDER BY a.[date]) AS PrevStockClose,
    CAST(g.Interest_Rate AS DECIMAL(18, 2)) AS Interest_Rate,
    LAG(CAST(g.Interest_Rate AS DECIMAL(18, 2))) OVER (ORDER BY
g.GIO_Date) AS PrevInterestRate
  FROM all_stocks_5yr a
  LEFT JOIN GIO g ON CONVERT(VARCHAR(10), g.GIO_Date, 101) =
a.[date]
),
CategorizedChanges AS (
  SELECT
    pc.Name,
    pc.[date],
    pc.StockClose,
    pc.Interest_Rate,
    CASE
      WHEN pc.StockClose > pc.PrevStockClose AND pc.Interest_Rate >
pc.PrevInterestRate THEN 'Increase Increase'
      WHEN pc.StockClose > pc.PrevStockClose AND pc.Interest_Rate <
pc.PrevInterestRate THEN 'Increase Decrease'
      WHEN pc.StockClose < pc.PrevStockClose AND pc.Interest_Rate >
pc.PrevInterestRate THEN 'Decrease Increase'
      WHEN pc.StockClose < pc.PrevStockClose AND pc.Interest_Rate <
pc.PrevInterestRate THEN 'Decrease Decrease'
      ELSE 'No Change'
    END AS ChangeCategory,
    (pc.StockClose - COALESCE(pc.PrevStockClose, 0)) /
COALESCE(pc.PrevStockClose, 1) * 100 AS StockChangePercent
  FROM PriceChanges pc
)
SELECT
  Name,
  ChangeCategory,
  COUNT(*) AS Occurrences,
  AVG(StockChangePercent) AS AvgStockChangePercent
FROM CategorizedChanges --where ChangeCategory != 'No Change'
GROUP BY Name, ChangeCategory
ORDER BY AvgStockChangePercent DESC;
```

Results | **Messages**

	Name	ChangeCategory	Occurrences	AvgStockChangePercent
1	ABBV	Increase Increase	15	1.539099988125744
2	AAPL	Increase Increase	18	1.379706176894909
3	XLNX	Increase Increase	39	1.281253991182741
4	XLNX	Increase Decrease	34	1.141672641871870
5	WBA	Increase Increase	5	1.119114999218664
6	WBA	Increase Decrease	4	1.079091189075807
7	AAPL	Increase Decrease	19	0.994259878607803
8	ABBV	Increase Decrease	21	0.894962411475111
9	WBA	Decrease Decrease	3	-0.727474617788326
10	WBA	Decrease Increase	6	-0.735501921929959
11	AAPL	Decrease Decrease	20	-0.824552604952556
12	AAPL	Decrease Increase	19	-0.869688243302472
13	XLNX	Decrease Increase	35	-1.145403866295845
14	XLNX	Decrease Decrease	30	-1.164526414323772
15	ABBV	Decrease Increase	18	-1.393865998694736
16	ABBV	Decrease Decrease	18	-1.619264934736441

Results | **Messages**

	Name	ChangeCategory	Occurrences	AvgStockChangePercent
1	APTV	No Change	44	201.882720446182676
2	DWDP	No Change	109	61.687187998296684
3	GOOG	No Change	977	57.234926070590879
4	PCLN	No Change	1261	55.668976304071983
5	BHF	No Change	143	48.846510051825844
6	BHGE	No Change	152	37.566025851495878
7	DXC	No Change	215	31.773285699477050
8	GOOGL	No Change	1261	31.259882560429527
9	AZO	No Change	1261	30.660257462165606
10	CMG	No Change	1261	25.439593722035391
11	WLTW	No Change	528	23.882856874009218
12	EVHC	No Change	297	23.350693799699726
13	HLT	No Change	276	21.145429071539111
14	AMZN	No Change	1261	20.923590737352932
15	BLK	No Change	1261	18.959666032259437
16	MTD	No Change	1261	17.631656355381453
17	EQIX	No Change	1261	17.486222483926130
18	GWW	No Change	1261	17.211001046590410
19	IBM	No Change	1261	15.979260638051808
20	ISRG	No Change	1261	15.372200041559154
21	RL	No Change	1261	14.058583477710906
22	REGN	No Change	1261	13.236100918536019
23	BIIB	No Change	1261	13.118583578047395
24	SHW	No Change	1261	13.067471416000880

9. WHICH SECTORS HAVE THE MOST STABLE STOCK PRICES?

```sql
SELECT cf.Sector,
       CAST(STDEV(CAST(as5.[close] AS
DECIMAL(18, 2))) AS DECIMAL(10, 2)) AS
PriceStability
FROM
[StockDataAnalysis].[dbo].[all_stocks_5yr]
as5
JOIN dbo.CompaniesFinancials cf ON as5.Name =
cf.Symbol
GROUP BY cf.Sector
ORDER BY PriceStability ASC;
```

Results | **Messages**

	Sector	PriceStability
1	Telecommunication Services	8.99
2	Utilities	24.70
3	Consumer Staples	33.40
4	Energy	34.29
5	Industrials	54.78
6	Financials	55.10
7	Materials	55.72
8	Real Estate	65.47
9	Health Care	78.00
10	Information Technology	115.02
11	Consumer Discretionary	178.56

10. WHAT IS THE TREND OF STOCK PRICE CHANGE MONTH OVER MONTH?

```sql
WITH StockChanges AS (
SELECT
Name,
DATEADD(MONTH, DATEDIFF(MONTH, 0, [date]), 0) AS Month,
CAST([close] AS DECIMAL(18, 2)) AS StockClose,
LAG(CAST([close] AS DECIMAL(18, 2))) OVER (PARTITION BY
Name ORDER BY [date]) AS PrevStockClose
FROM all_stocks_5yr
),
TrendAnalysis AS (
SELECT
Name,
Month,
StockClose,
CASE
WHEN StockClose > PrevStockClose THEN 'Increase'
WHEN StockClose < PrevStockClose THEN 'Decrease'
ELSE 'No Change'
END AS Trend
FROM StockChanges
WHERE PrevStockClose IS NOT NULL
)
SELECT
Month,
SUM(CASE WHEN Trend = 'Increase' THEN 1 ELSE 0 END) AS
IncreaseCount,
SUM(CASE WHEN Trend = 'Decrease' THEN 1 ELSE 0 END) AS
DecreaseCount,
SUM(CASE WHEN Trend = 'No Change' THEN 1 ELSE 0 END) AS
NoChangeCount
FROM TrendAnalysis
```

	Month	IncreaseCount	DecreaseCount	NoChangeCount
1	2013-02-01 00:00:00.000	3265	2860	63
2	2013-03-01 00:00:00.000	5521	3896	103
3	2013-04-01 00:00:00.000	5705	4683	80
4	2013-05-01 00:00:00.000	5451	4960	76
5	2013-06-01 00:00:00.000	4762	4754	62
6	2013-07-01 00:00:00.000	6090	4410	102
7	2013-08-01 00:00:00.000	4628	5867	109
8	2013-09-01 00:00:00.000	5360	4181	90
9	2013-10-01 00:00:00.000	6000	5007	79
10	2013-11-01 00:00:00.000	5106	4445	97
11	2013-12-01 00:00:00.000	5456	4573	114
12	2014-01-01 00:00:00.000	4700	5365	78
13	2014-02-01 00:00:00.000	5584	3515	78
14	2014-03-01 00:00:00.000	5086	4970	89
15	2014-04-01 00:00:00.000	5462	4644	66
16	2014-05-01 00:00:00.000	5559	4535	91
17	2014-06-01 00:00:00.000	5427	4642	120
18	2014-07-01 00:00:00.000	4972	5513	206
19	2014-08-01 00:00:00.000	5774	4134	319
20	2014-09-01 00:00:00.000	4623	5499	109
21	2014-10-01 00:00:00.000	6174	4966	84
22	2014-11-01 00:00:00.000	5284	3879	109
23	2014-12-01 00:00:00.000	5305	5324	107

11. COMPANIES ANALYSIS QUARTER TO QUARTER

```sql
WITH QuarterData AS (
SELECT
[Name],
[Qurter],
YEAR([date]) AS [Year],
MIN([date]) AS FirstOccurrence,
MAX([date]) AS LastOccurrence
FROM [StockDataAnalysis].[dbo].[all_stocks_5yr]
GROUP BY [Name], [Qurter], YEAR([date])
),
CompanyOccurrences AS (
SELECT [Name], COUNT(DISTINCT [Qurter] + CAST(YEAR([date]) AS VARCHAR)) AS
Occurrences
FROM [StockDataAnalysis].[dbo].[all_stocks_5yr]
GROUP BY [Name]
),
TotalQuarters AS (
SELECT COUNT(DISTINCT [Qurter] + CAST(YEAR([date]) AS VARCHAR)) AS
MaxQuarters
FROM [StockDataAnalysis].[dbo].[all_stocks_5yr]
)

SELECT
qd.[Year],
qd.[Qurter],
MIN(qd.FirstOccurrence) AS FirstOccurrence,
MAX(qd.LastOccurrence) AS LastOccurrence,
COUNT(DISTINCT qd.[Name]) AS CompanyCount,
STRING_AGG(qd.[Name], ', ') AS removedCompanies
FROM QuarterData qd
JOIN CompanyOccurrences co ON qd.[Name] = co.[Name]
JOIN TotalQuarters tq ON co.Occurrences < tq.MaxQuarters
GROUP BY qd.[Year], qd.[Qurter]

ORDER BY qd.[Year], qd.[Qurter]
```

Year	Qurter	FirstOccurrence	LastOccurrence	CompanyCount	removedCompanies
2013	Q2	09/05/13	28/06/13	6	COTY, FOX, FOXA, NWS, NWSA, IQV
2013	Q3	01/07/13	30/09/13	6	FOXA, COTY, FOX, NWSA, NWS, IQV
2013	Q4	01/10/13	31/12/13	7	NWS, NWSA, IQV, FOXA, ALLE, COTY, FOX
2014	Q1	02/01/14	31/03/14	8	FOXA, COTY, FOX, ALLE, GOOG, NWSA, NWS, IQV
2014	Q2	01/04/14	30/06/14	10	FOXA, FOX, NAVI, GOOG, COTY, ALLE, NWSA, NWS, IQV, INFO
2014	Q3	01/07/14	30/09/14	12	IQV, SYF, NWS, NWSA, ALLE, CFG, INFO, NAVI, GOOG, FOX, FOXA, COTY
2014	Q4	01/10/14	31/12/14	12	FOXA, NWSA, SYF, IQV, NWS, GOOG, ALLE, CFG, INFO, NAVI, FOX, COTY
2015	Q1	02/01/15	31/03/15	13	FOXA, FOX, COTY, GOOG, NAVI, ALLE, INFO, CFG, QRVO, SYF, NWS, NWSA, IQV
2015	Q2	01/04/15	30/06/15	14	IQV, NWS, NWSA, SYF, QRVO, CFG, INFO, ALLE, COTY, FOX, NAVI, GOOG, WRK, FOXA
2015	Q3	01/07/15	30/09/15	16	FOXA, COTY, FOX, WRK, GOOG, ALLE, PYPL, INFO, CFG, QRVO, NAVI, NWSA, SYF, NWS, IQV, KHC
2015	Q4	01/10/15	31/12/15	19	FOX, COTY, GOOG, NAVI, PYPL, ALLE, INFO, QRVO, CFG, FOXA, WRK, HPQ, HPE, IQV, SYF, CSRA, NWSA, NWS, KHC
2016	Q1	04/01/16	31/03/16	20	FOXA, WRK, HPQ, FOX, COTY, CFG, INFO, QRVO, NAVI, GOOG, ALLE, PYPL, SYF, NWS, NWSA, CSRA, WLTW, IQV, HPE, KHC
2016	Q2	01/04/16	30/06/16	21	KHC, ALLE, IQV, HPE, CSRA, SYF, NWSA, NWS, WLTW, PYPL, NAVI, INFO, QRVO, CFG, GOOG, FOX, COTY, UA, HPQ, WRK, FOXA
2016	Q3	01/07/16	30/09/16	22	KHC, CSRA, HPE, IQV, NWSA, NWS, GOOG, SYF, WLTW, PYPL, ALLE, INFO, QRVO, CFG, NAVI, UA, COTY, FTV, FOX, HPQ, FOXA, WRK
2016	Q4	03/10/16	30/12/16	23	HPQ, WRK, UA, FOXA, FTV, COTY, FOX, CFG, QRVO, NAVI, INFO, GOOG, EVHC, PYPL, ALLE, NWSA, SYF, NWS, IQV, HPE, CSRA, WLTW, KHC

| 2017	Q1	03/01/17	31/03/17	24	FOXA, UA, COTY, WRK, HPQ, EVHC, FOX, FTV, NAVI, GOOG, PYPL, ALLE, QRVO, INFO, CFG, NWS, NWSA, CSRA, WLTW, HPE, SYF, KHC, IQV, HLT
2017	Q2	03/04/17	30/06/17	25	HLT, IQV, HPE, KHC, CSRA, DXC, WLTW, NWSA, NWS, SYF, ALLE, INFO, CFG, QRVO, PYPL, GOOG, EVHC, NAVI, FTV, FOX, WRK, HPQ, COTY, UA, FOXA
2017	Q3	03/07/17	29/09/17	28	KHC, HLT, NWS, NWSA, IQV, HPE, SYF, CSRA, WLTW, DXC, PYPL, ALLE, FOX, FTV, COTY, INFO, NAVI, GOOG, EVHC, DWDP, QRVO, BHF, CFG, FOXA, BHGE, UA, WRK, HPQ
2017	Q4	02/10/17	29/12/17	29	WRK, UA, HPQ, COTY, FOXA, FOX, FTV, BHGE, DWDP, EVHC, GOOG, NAVI, PYPL, ALLE, QRVO, INFO, CSRA, DXC, WLTW, BHF, CFG, NWS, NWSA, SYF, HPE, KHC, APTV, IQV, HLT
2018	Q1	02/01/18	07/02/18	29	QRVO, BHF, IQV, HPE, HLT, KHC, APTV, DXC, CSRA, SYF, WLTW, NWSA, NWS, INFO, CFG, FTV, FOX, NAVI, PYPL, ALLE, COTY, BHGE, GOOG, EVHC, DWDP, HPQ, UA, WRK, FOXA

STORY AND MOTIVATION

Creating Power BI dashboards and reports to analyze S&P 500 historical data from 2013 to 2018 empowers investors with valuable insights into market trends and performance. By visualizing key metrics and patterns, these tools help investors identify potential investment opportunities, understand market behavior, and make informed decisions. The interactive nature of Power BI allows for dynamic exploration of data, enabling investors to drill down into specific sectors or time periods, thus enhancing their ability to strategize and optimize their portfolios based on historical performance.

DASHBOARDS AND QUESTIONS

Questions: Create visuals (Daily, Weekly, Monthly, 3 month, 6 month, Yearly, 5 Years) for

1. For Stocks :
   - Most Actives from ([all_stocks_5yr])
   - Top 10 Gainers from ([all_stocks_5yr])
   - Top 10 Losers from ([all_stocks_5yr])
   - Trending Tickers from ([all_stocks_5yr])
   - Year to year, Month to Month growth
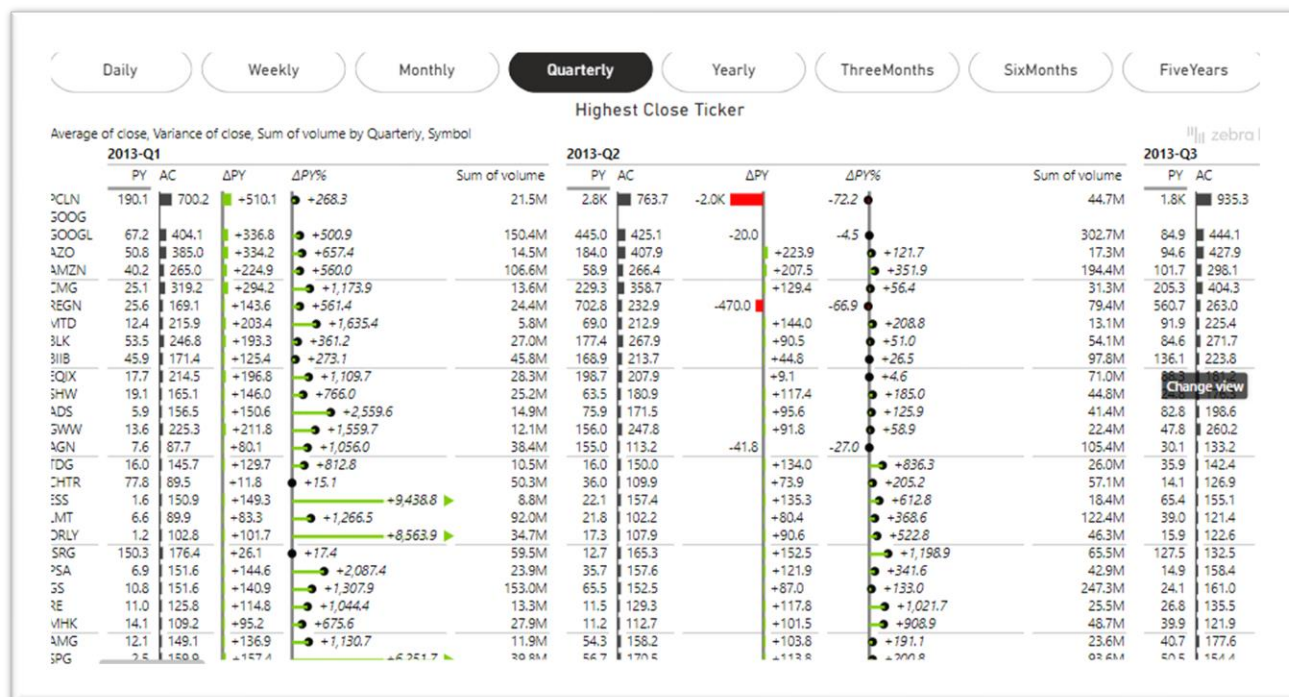
2. Futures based on

- Forcasted next year (By Synbol)
- World Indices (compare between S&P historical and DJIA between 2013 - 2018)

S & P 500

| Daily | (Blank) | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 |

Acme Corp.: 120.00 ▲ 10.00%MomCorp: 117.00 ▲ 15.00%Wayne Enterprise: -1
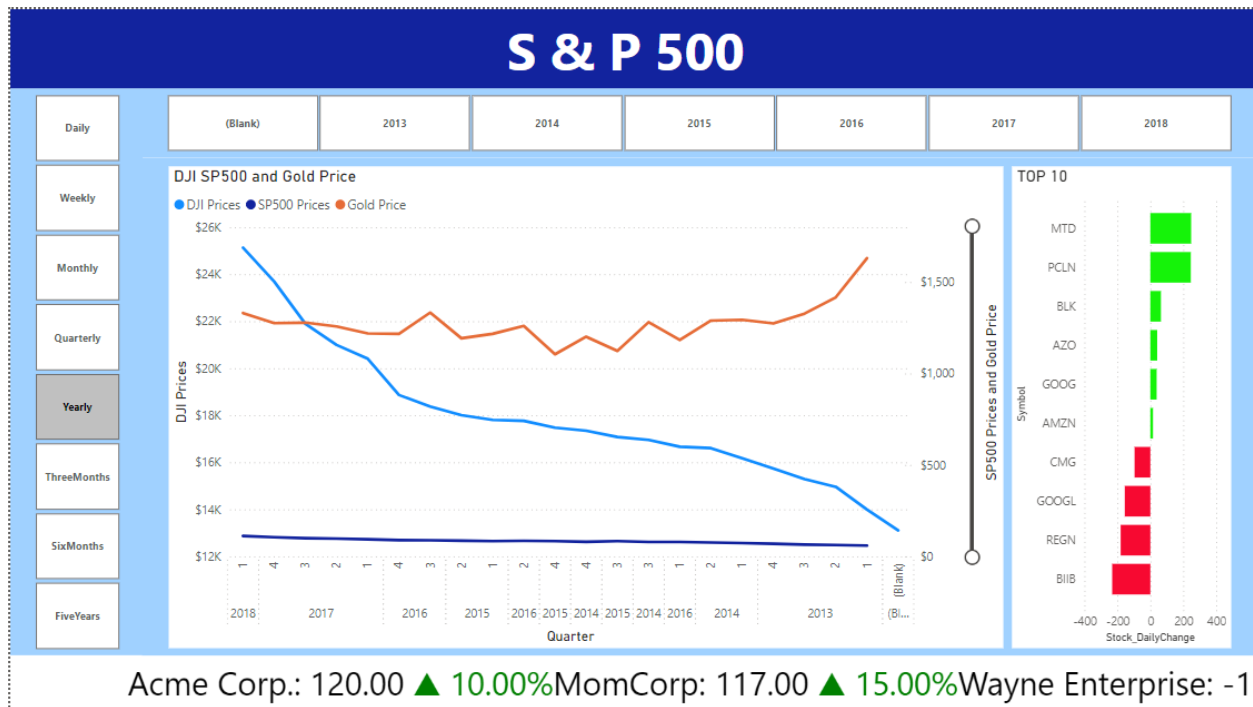
3. Top ETFs

Symbol	Sum of Price	Volume	Sum of Change	Sum of Change %	Sum of Corrected Volume	Sum of 3 Month Return	Sum of YTD Return
AFTY	16.55	17,152	0.35	0.02	17,152	-0.01	0.05
ASHR	27.33	17.612M	0.72	0.03	17,612,000	-0.03	-0.01
CALF	46.34	1.011M	0.55	0.01	1,011,000	0.00	-0.03
CHIQ	21.28	346,094	0.83	0.04	346,094	-0.08	-0.06
CNYA	28.95	261,235	0.75	0.03	261,235	-0.05	-0.03
FBZ	11.63	423	0.29	0.03	423	0.04	-0.05
FENY	23.92	676,529	0.49	0.02	676,529	-0.02	0.10
FILL	24.74	12,611	0.38	0.02	12,611	-0.03	0.09
FLHK	19.47	8,739	0.62	0.03	8,739	-0.02	-0.05
FTXN	28.84	24,103	0.57	0.02	24,103	-0.02	0.10
FUTY	51.65	119,701	0.52	0.01	119,701	0.06	0.22
GRPM	117.07	34,495	1.24	0.01	34,495	0.00	0.20
IEO	91.14	106,962	1.72	0.02	106,962	-0.04	0.06
ITB	126.77	1.947M	1.90	0.02	1,947,000	0.14	0.19
IXC	40.33	217,631	0.66	0.02	217,631	-0.01	0.10
KBA	25.19	157,900	0.62	0.03	157,900	-0.01	0.05
PSCC	37.69	4,440	0.31	0.01	4,440	0.04	0.00
PXE	29.68	28,177	0.65	0.02	28,177	-0.06	0.05
RSPG	76.21	28,154	1.52	0.02	28,154	-0.01	0.10
RWJ	45.87	111,806	0.56	0.01	111,806	0.07	0.08
UTES	63.75	81,002	0.73	0.01	81,002	0.04	0.30
VDE	121.73	487,997	2.55	0.02	487,997	-0.02	0.10
VPU	173.33	115,209	1.73	0.01	115,209	0.06	0.22
XHB	124.27	2.692M	1.83	0.01	2,692,000	0.12	0.23
XLE	87.19	15.157M	1.74	0.02	15,157,000	0.01	0.11
Total	**1,460.92**		**23.83**	**0.48**	**41,259,360**	**0.14**	**2.12**

4. Sectors (Basic Materials, Communication Services, Consumer Defensive, Consumer Cyclical, Energy, Financial Services, Healthcare, Industrials, Real Estate, Technology, Utilities)

	Deselect all	2016	2014	2015

	(Blank)
	Communication Services
	Consumer Discretionary
	Consumer Staples
	Energy
	Financials
	Health Care
	Industrials
	Information Technology
	Materials
	Real Estate
	Utilities

GICS Sub-Industry	Symbol	Security	YearFounded	Year	Sum of EBITDA	Average of Earnings/Share	Average of Dividend Yield	Market Cap	Su
Agricultural Products & Services	ADM	Archer Daniels Midland	1902	1957	$2,927,000,000	2.17	3.18	$23,594,770,663	
Brewers	TAP	Molson Coors Beverage Company	2005	1976	$4,708,400,000	9.27	2.15	$12,396,862,128	
Consumer Staples Merchandise Retail	COST	Costco	1976	1993	$5,679,000,000	6.09	1.09	$80,439,804,508	
Consumer Staples Merchandise Retail	DG	Dollar General	1939	2012	$2,457,604,000	4.43	1.06	$26,580,644,874	
Consumer Staples Merchandise Retail	DLTR	Dollar Tree	1986	2011	$2,430,300,000	3.77	0.00	$25,151,198,417	
Consumer Staples Merchandise Retail	TGT	Target Corporation	1902	1976	$7,105,000,000	4.71	3.39	$39,816,696,539	
Consumer Staples Merchandise Retail	WMT	Walmart	1962	1982	$30,721,000,000	4.39	1.98	$304,681,000,000	
Distillers & Vintners	BF.B	Brown–Forman	1870	1982	$1,139,000,000	1.70	1.12	$5,498,033,502	
Distillers & Vintners	STZ	Constellation Brands	1945	2005	$3,033,300,000	8.71	0.97	$41,697,453,163	
Drug Retail	WBA	Walgreens Boots Alliance	2014	1979	$7,083,000,000	3.78	2.24	$70,862,541,911	
Food Distributors	SYY	Sysco	1969	1986	$2,988,725,000	2.08	2.46	$30,445,320,778	
Food Retail	KR	Kroger	1883	1957	$5,342,000,000	2.05	1.73	$25,471,355,847	
Household Products	CHD	Church & Dwight	1847	2015	$868,000,000	2.92	1.84	$11,838,963,451	
Household Products	CL	Colgate-Palmolive	1806	1957	$4,064,000,000	2.28	2.28	$61,616,643,498	
Household Products	CLX	Clorox	1913	1969	$1,295,000,000	5.33	2.63	$16,540,418,002	
Household Products	KMB	Kimberly-Clark	1872	1957	$4,033,000,000	6.41	3.56	$39,449,596,000	
Packaged Foods & Meats	CAG	Conagra Brands	1919	1983	$1,281,200,000	1.46	2.37	$14,379,717,835	
Packaged Foods & Meats	CPB	Campbell Soup Company	1869	1957	$1,683,000,000	2.89	3.13	$13,467,193,376	
Packaged Foods & Meats	GIS	General Mills	1856	1957	$3,107,600,000	2.77	3.59	$31,098,243,069	
Packaged Foods &	HRL	Hormel Foods	1891	2000	$1,433,305,000	1.57	2.20	$17,338,613,096	
Total					**$178,498,035,000**	**3.78**	**2.34**		