Stock Market Analysis

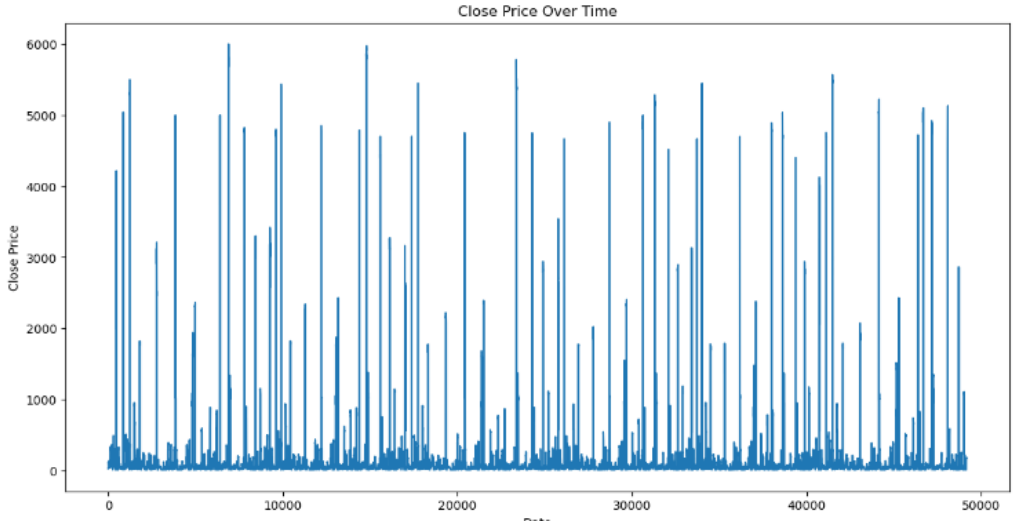
In [7]:
```
#Part-1
```

In [8]:
```
df=pd.read_csv(r"D:\Stock Market\Stock_Market_Data.csv")
df.head()
```

Out[8]:

	Date	Name	Open	High	Low	Close	Volume
0	02-01-2022	01.Bank	22.83	23.20	22.59	22.93	1842350.41
1	03-01-2022	01.Bank	23.03	23.29	22.74	22.90	1664989.63
2	04-01-2022	01.Bank	22.85	23.13	22.64	22.84	1354510.97
3	05-01-2022	01.Bank	22.91	23.20	22.70	22.98	1564334.81
4	06-01-2022	01.Bank	23.12	23.65	23.00	23.37	2586344.19

In [9]:
```
######Calculate basic summary statistics for each column (mean, median, standard deviation, etc.).
summary_stats = df.describe()

######Explore the distribution of the 'Close' prices over time.
plt.figure(figsize=(14,7))
plt.plot(df['Close'])
plt.title('Close Price Over Time')
plt.xlabel('Date')
plt.ylabel('Close Price')
plt.show()
#####Identify and analyze any outliers (if any) in the dataset.
z_scores = (df['Close'] - df['Close'].mean()) / df['Close'].std()
outliers = df[abs(z_scores) > 3]
```



In [10]:
```
df
```

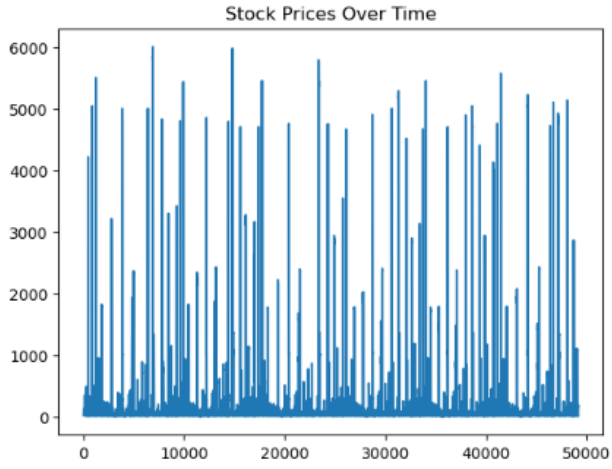
Out[10]:

	Date	Name	Open	High	Low	Close	Volume
0	02-01-2022	01.Bank	22.83	23.20	22.59	22.93	1842360.41
1	03-01-2022	01.Bank	23.03	23.29	22.74	22.90	1664989.63
2	04-01-2022	01.Bank	22.85	23.13	22.64	22.84	1354510.97
3	05-01-2022	01.Bank	22.91	23.20	22.70	22.98	1564334.81
4	06-01-2022	01.Bank	23.12	23.65	23.00	23.37	2586344.19
...	...	...	...	...	...	...	...
49153	26-06-2022	ZEALBANGLA	169.00	174.90	169.00	170.30	10480.00
49154	27-06-2022	ZEALBANGLA	174.10	176.00	166.90	167.50	13817.00
49155	28-06-2022	ZEALBANGLA	170.00	170.90	167.00	168.10	5214.00
49156	29-06-2022	ZEALBANGLA	167.10	169.00	164.90	165.10	6678.00
49157	30-06-2022	ZEALBANGLA	165.10	174.00	164.00	172.20	5883.00

49158 rows × 7 columns

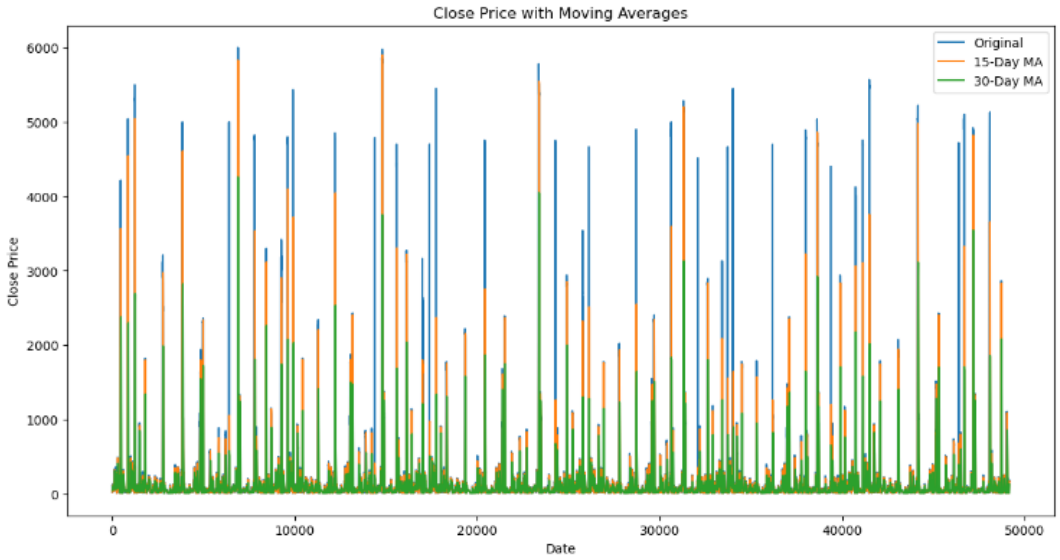
In [14]:
```
#####Part 2
####Create a line chart to visualize the 'Close' prices over time.
df['Close'].plot(title='Stock Prices Over Time')
```

Out[14]:
```
<Axes: title={'center': 'Stock Prices Over Time'}>
```



20]:

21]:
```
####Investigate the presence of any trends or seasonality in the stock prices.

####Apply moving averages to smooth the time series data in 15/30 day intervals against the original graph.
df['MA_15'] = df['Close'].rolling(window=15).mean()
df['MA_30'] = df['Close'].rolling(window=30).mean()

plt.figure(figsize=(14,7))
plt.plot(df['Close'], label='Original')
plt.plot(df['MA_15'], label='15-Day MA')
plt.plot(df['MA_30'], label='30-Day MA')
plt.title('Close Price with Moving Averages')
plt.xlabel('Date')
plt.ylabel('Close Price')
plt.legend()
plt.show()
```



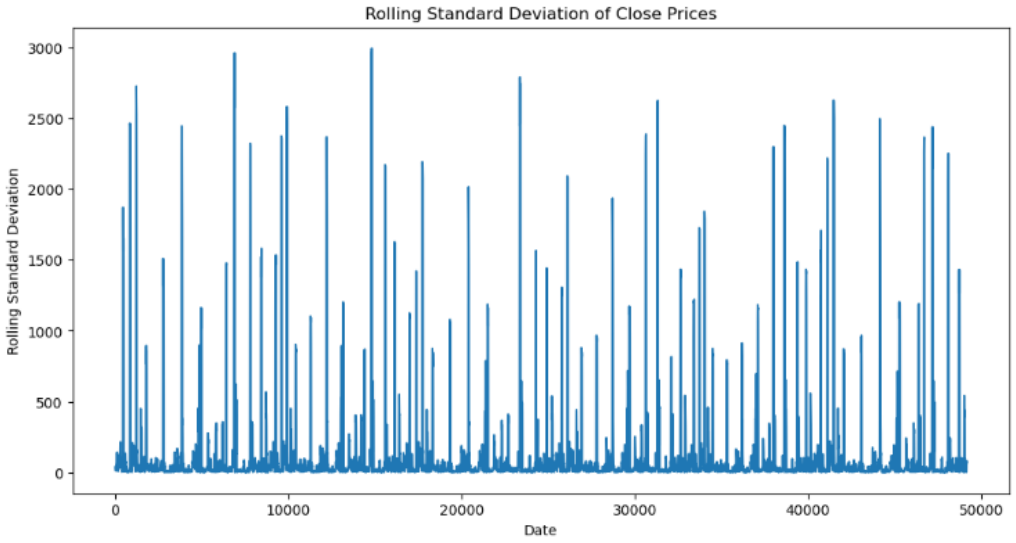
In [17]:
```
########Calculate the average closing price for each stock.
import pandas as pd


average_closing_prices = df.groupby('Name')['Close'].mean().reset_index()

top_5_stocks = average_closing_prices.nlargest(5, 'Close')
bottom_5_stocks = average_closing_prices.nsmallest(5, 'Close')


print("Top 5 stocks based on average closing price:")
print(top_5_stocks)
print("\nBottom 5 stocks based on average closing price:")
print(bottom_5_stocks)
```

```
Top 5 stocks based on average closing price:
           Name        Close
56    APSCLBOND  5413.238636
320  RECKITTBEN  5342.024793
298   PREBPBOND  4918.357143
178  IBBL2PBOND  4851.330357
283    PBLPBOND  4836.195652

Bottom 5 stocks based on average closing price:
           Name     Close
144   FAMILYTEX  4.698361
187    ICBIBANK  4.725620
149       FBFIF  5.289344
293  POPULAR1MF  5.368033
291      PHPMF1  5.417213
```

In [16]:
```
####Identify the top 5 and bottom 5 stocks based on average closing price.
import pandas as pd



average_closing_prices = df.groupby('Name')['Close'].mean()


top_5_stocks = average_closing_prices.sort_values(ascending=False).head(5)


bottom_5_stocks = average_closing_prices.sort_values(ascending=True).head(5)

top_5_stocks, bottom_5_stocks
```

Out[16]:
```
(Name
 APSCLBOND     5413.238636
 RECKITTBEN    5342.024793
 PREBPBOND     4918.357143
 IBBL2PBOND    4851.330357
 PBLPBOND      4836.195652
 Name: Close, dtype: float64,
 Name
 FAMILYTEX     4.698361
 ICBIBANK      4.725620
 FBFIF         5.289344
 POPULAR1MF    5.368033
 PHPMF1        5.417213
 Name: Close, dtype: float64)
```

[18]:
```
####Part 3
####Calculate and plot the rolling standard deviation of the 'Close' prices.

df['Rolling_Std'] = df['Close'].rolling(window=30).std()

plt.figure(figsize=(12, 6))
df['Rolling_Std'].plot(title='Rolling Standard Deviation of Close Prices')
plt.xlabel('Date')
plt.ylabel('Rolling Standard Deviation')
plt.show()
```



Date

In [21]:
```
####Create a new column for daily price change (Close - Open).
df['Daily_Price_Change'] = df['Close'] - df['Open']
df
```

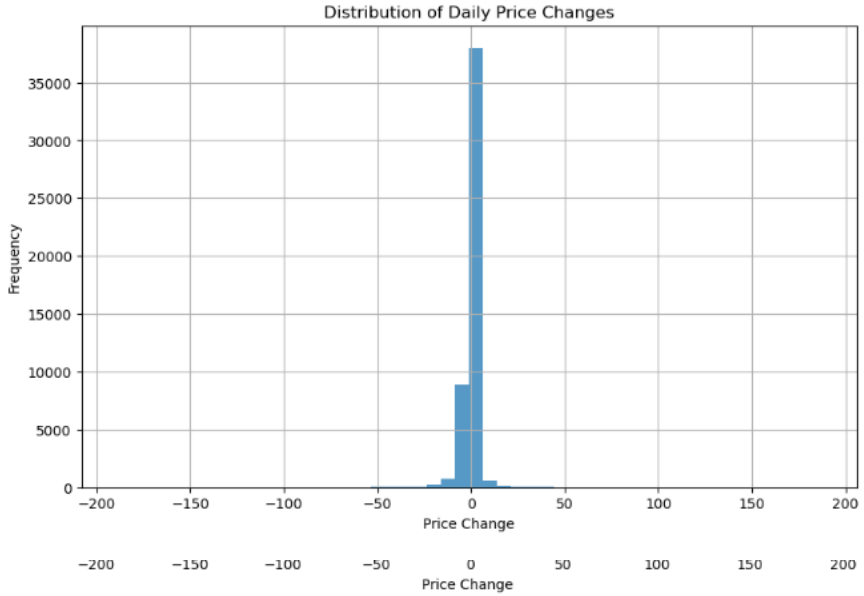
Out[21]:

	Date	Name	Open	High	Low	Close	Volume	Rolling_Std	Daily_Price_Change
0	02-01-2022	01.Bank	22.83	23.20	22.59	22.93	1842350.41	NaN	0.10
1	03-01-2022	01.Bank	23.03	23.29	22.74	22.90	1664989.63	NaN	-0.13
2	04-01-2022	01.Bank	22.85	23.13	22.64	22.84	1354510.97	NaN	-0.01
3	05-01-2022	01.Bank	22.91	23.20	22.70	22.98	1564334.81	NaN	0.07
4	06-01-2022	01.Bank	23.12	23.65	23.00	23.37	2586344.19	NaN	0.25
...	...	...	...	...	...	...	...	...	...
49153	26-06-2022	ZEALBANGLA	169.00	174.90	169.00	170.30	10480.00	79.893906	1.30
49154	27-06-2022	ZEALBANGLA	174.10	176.00	166.90	167.50	13817.00	78.581206	-6.60
49155	28-06-2022	ZEALBANGLA	170.00	170.90	167.00	168.10	5214.00	76.880561	-1.90
49156	29-06-2022	ZEALBANGLA	167.10	169.00	164.90	165.10	6678.00	74.677983	-2.00
49157	30-06-2022	ZEALBANGLA	165.10	174.00	164.00	172.20	5883.00	72.156515	7.10

49158 rows × 9 columns

49158 rows × 9 columns

In [22]:
```
####Analyze the distribution of daily price changes.
import pandas as pd
import matplotlib.pyplot as plt

plt.figure(figsize=(10, 6))
plt.hist(df['Daily_Price_Change'], bins=50, alpha=0.75)
plt.title('Distribution of Daily Price Changes')
plt.xlabel('Price Change')
plt.ylabel('Frequency')
plt.grid(True)
plt.show()
```



In [23]:
```
####dentify days with the largest price increases and decreases.

largest_increase = df.loc[df['Daily_Price_Change'].idxmax()]


largest_decrease = df.loc[df['Daily_Price_Change'].idxmin()]


print("Day with the largest price increase:")
print(largest_increase)

print("\nDay with the largest price decrease:")
print(largest_decrease)
```

```
Day with the largest price increase:
Date                   29-06-2022
Name                    SJIBLPBOND
Open                        4710.0
High                        4899.0
Low                         4710.0
Close                       4897.0
Volume                       101.0
Rolling_Std           2184.394521
Daily_Price_Change          187.0
Name: 48081, dtype: object

Day with the largest price decrease:
Date                   07-03-2022
Name                    RECKITTBEN
Open                        5753.0
High                        5753.0
Low                         5550.0
Close                       5563.8
Volume                      1876.0
Rolling_Std           2144.092378
Daily_Price_Change         -189.2
Name: 23365, dtype: object
```

In [24]:
```
####Identify stocks with unusually high trading volume on certain days.

mean_volume = df['Volume'].mean()
std_volume = df['Volume'].std()


threshold = mean_volume + 2 * std_volume


unusual_volume_days = df[df['Volume'] > threshold]


print("Days with unusually high trading volume:")
print(unusual_volume_days)
```

```
Days with unusually high trading volume:
            Date                    Name   Open   High    Low  Close  \
52     12-01-2022         03.Ceramics_Sector  76.46  79.04  75.30  77.32
54     16-01-2022         03.Ceramics_Sector  78.06  81.36  76.96  79.48
319    17-01-2022  15.Services_&_Real_Estate  60.18  61.83  59.28  61.15
320    18-01-2022  15.Services_&_Real_Estate  63.03  66.15  59.05  64.75
321    19-01-2022  15.Services_&_Real_Estate  64.30  65.85  61.98  63.30
...           ...                        ...    ...    ...    ...    ...
49075  08-06-2022                        YPL  21.70  23.00  21.70  22.70
49081  16-06-2022                        YPL  22.80  23.70  22.80  23.30
49089  28-06-2022                        YPL  22.80  23.60  21.90  23.60
49090  29-06-2022                        YPL  24.30  24.60  23.30  23.40
49091  30-06-2022                        YPL  23.50  24.20  23.00  23.30

           Volume  Rolling_Std  Daily_Price_Change
52     3148906.60    14.613524                0.86
54     3351889.00    14.840866                1.42
319    6056375.75   209.207937                0.97
320    5141492.75   211.705256                1.72
321    3928104.25   213.309606               -1.00
...           ...          ...                 ...
49075  4296959.00    50.368736                1.00
49081  3394619.00     5.072623                0.50
49089  6145142.00     5.003219                0.80
49090  4463125.00     4.916470               -0.90
49091  3844363.00     4.782853               -0.20

[1610 rows x 9 columns]
```

In [ ]:
```
####part 4
```

In [25]:
```
#####Explore the relationship between trading volume and volatility.
df['Volatility'] = df['High'] - df['Low']


correlation_volume_volatility = df['Volume'].corr(df['Volatility'])


print(f"Correlation between trading volume and volatility: {correlation_volume_volatility}")
```

```
Correlation between trading volume and volatility: -0.07613982435013261
```

In [26]:
```
#####Calculate the correlation matrix between the 'Open' & 'High', 'Low' &'Close' prices.

correlation_matrix = df[['Open', 'High', 'Low', 'Close']].corr()


print("Correlation matrix between 'Open', 'High', 'Low', and 'Close':")
print(correlation_matrix)
```

```
Correlation matrix between 'Open', 'High', 'Low', and 'Close':
            Open      High       Low     Close
Open   1.000000  0.999940  0.999939  0.999925
High   0.999940  1.000000  0.999887  0.999942
Low    0.999939  0.999887  1.000000  0.999961
Close  0.999925  0.999942  0.999961  1.000000
```

```
Low    0.999939  0.999887  1.000000  0.999961
Close  0.999925  0.999942  0.999961  1.000000
```

In [30]:
```
####Create a heatmap to visualize the correlations using the seaborn package.
sns.set(style="white")
plt.figure(figsize=(8, 6))
heatmap = sns.heatmap(correlation_matrix, annot=True, cmap='coolwarm', fmt='.2f')
plt.title('Correlation Heatmap of Stock Prices')
plt.show()
```