# This analysis covers the daily data of NIFTY-50 spanning the last 24 years, from 1999 to 2023, conducted using Python.

## Importing necessary libararies

```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
import openpyxl
```

## Loading file in Pandas

```
df=pd.read_excel("/kaggle/input/nifty-50-dataset-24-years/NIFTY 50
Data.xlsx")
df
```

```
           Date      Open      High       Low     Close
Price_to_Earnings  \
0    2023-08-31  19375.55  19388.20  19223.65  19253.80
21.97
1    2023-08-30  19433.45  19452.80  19334.75  19347.45
22.07
2    2023-08-29  19374.85  19377.90  19309.10  19342.65
22.07
3    2023-08-28  19298.35  19366.85  19249.70  19306.05
22.03
4    2023-08-25  19297.40  19339.55  19229.70  19265.80
21.98
...         ...       ...       ...       ...       ...
...
6805 1996-04-26   1133.17   1133.17   1106.29   1123.60
NaN
6806 1996-04-25   1157.94   1160.16   1110.61   1120.80
NaN
6807 1996-04-24   1136.97   1145.11   1126.77   1145.10
NaN
6808 1996-04-23   1090.04   1100.51   1090.04   1095.80
NaN
6809 1996-04-22   1136.28   1136.28   1102.83   1106.90
NaN

      Price_to_Book Div_Yield_Perc
0              4.40           1.38
```

```
1               4.42           1.38
2               4.42           1.38
3               4.43           1.38
4               4.44           1.38
...              ...            ...
6805             NaN            NaN
6806             NaN            NaN
6807             NaN            NaN
6808             NaN            NaN
6809             NaN            NaN

[6810 rows x 8 columns]
```

## Changing necessary column names

```
df.rename(columns={"Price_to_Earnings":"P/E","Price_to_Book":"P/
B","Div_Yield_Perc":"dividend_perc"},inplace=True)
```

## Concise summary of Data

```
df.info()

<class 'pandas.core.frame.DataFrame'>
RangeIndex: 6810 entries, 0 to 6809
Data columns (total 8 columns):
 #   Column          Non-Null Count  Dtype
---  ------          --------------  -----
 0   Date            6810 non-null   datetime64[ns]
 1   Open            6809 non-null   float64
 2   High            6809 non-null   float64
 3   Low             6809 non-null   float64
 4   Close           6810 non-null   float64
 5   P/E             6141 non-null   float64
 6   P/B             6141 non-null   float64
 7   dividend_perc   6141 non-null   object
dtypes: datetime64[ns](1), float64(6), object(1)
memory usage: 425.8+ KB
```

# Dropping rows containing null values

```
df.dropna(inplace=True)

df.info()

<class 'pandas.core.frame.DataFrame'>
Index: 6141 entries, 0 to 6140
Data columns (total 8 columns):
 #   Column          Non-Null Count  Dtype
```

```
---  ------         --------------  -----
 0   Date           6141 non-null   datetime64[ns]
 1   Open           6141 non-null   float64
 2   High           6141 non-null   float64
 3   Low            6141 non-null   float64
 4   Close          6141 non-null   float64
 5   P/E            6141 non-null   float64
 6   P/B            6141 non-null   float64
 7   dividend_perc  6141 non-null   object
dtypes: datetime64[ns](1), float64(6), object(1)
memory usage: 431.8+ KB
```

# Now that we have a clear file with no null values we can start analysing the index in different parameters

```
df.iloc[:, 1:].describe()
```

```
               Open          High           Low         Close
P/E  \
count   6141.000000   6141.000000   6141.000000   6141.000000
6141.000000
mean    6494.537526   6534.472366   6445.391418   6490.899756
20.782092
std     4929.404228   4945.915686   4902.180818   4924.904708
4.956375
min      853.000000    877.000000    849.950000    854.200000
10.680000
25%     1996.300000   2019.350000   1984.750000   1999.000000
17.550000
50%     5365.700000   5399.700000   5318.900000   5361.600000
20.630000
75%     9336.200000   9352.550000   9230.800000   9285.300000
23.360000
max    19850.900000  19991.850000  19758.400000  19979.150000
42.000000

               P/B
count  6141.000000
mean      3.602666
std       0.782386
min       1.920000
25%       3.070000
50%       3.520000
75%       4.060000
max       6.550000
```

## Calculate the Daily return of the index

```
df['daily_return']=((df['Close']-df['Open'])/df['Open'])*100
df
```

```
           Date      Open      High       Low     Close    P/E
P/B  \
0     2023-08-31  19375.55  19388.20  19223.65  19253.80  21.97  4.40

1     2023-08-30  19433.45  19452.80  19334.75  19347.45  22.07  4.42

2     2023-08-29  19374.85  19377.90  19309.10  19342.65  22.07  4.42

3     2023-08-28  19298.35  19366.85  19249.70  19306.05  22.03  4.43

4     2023-08-25  19297.40  19339.55  19229.70  19265.80  21.98  4.44

...          ...       ...       ...       ...       ...    ...   ...

6136 1999-01-07    932.95    961.15    932.95    954.70  12.46  2.22

6137 1999-01-06    923.30    930.55    915.65    928.25  12.11  2.16

6138 1999-01-05    901.00    907.20    893.15    907.20  11.84  2.11

6139 1999-01-04    896.40    905.45    895.75    897.80  11.72  2.08

6140 1999-01-01    886.75    892.20    882.60    890.80  11.62  2.07


     dividend_perc  daily_return
0             1.38     -0.628369
1             1.38     -0.442536
2             1.38     -0.166195
3             1.38      0.039900
4             1.38     -0.163753
...            ...           ...
6136          1.71      2.331315
6137          1.75      0.536120
6138          1.79      0.688124
6139          1.81      0.156180
6140          1.83      0.456724

[6141 rows x 9 columns]
```

## Lets find statistical summary now

```
df.iloc[:,1:].describe()
```

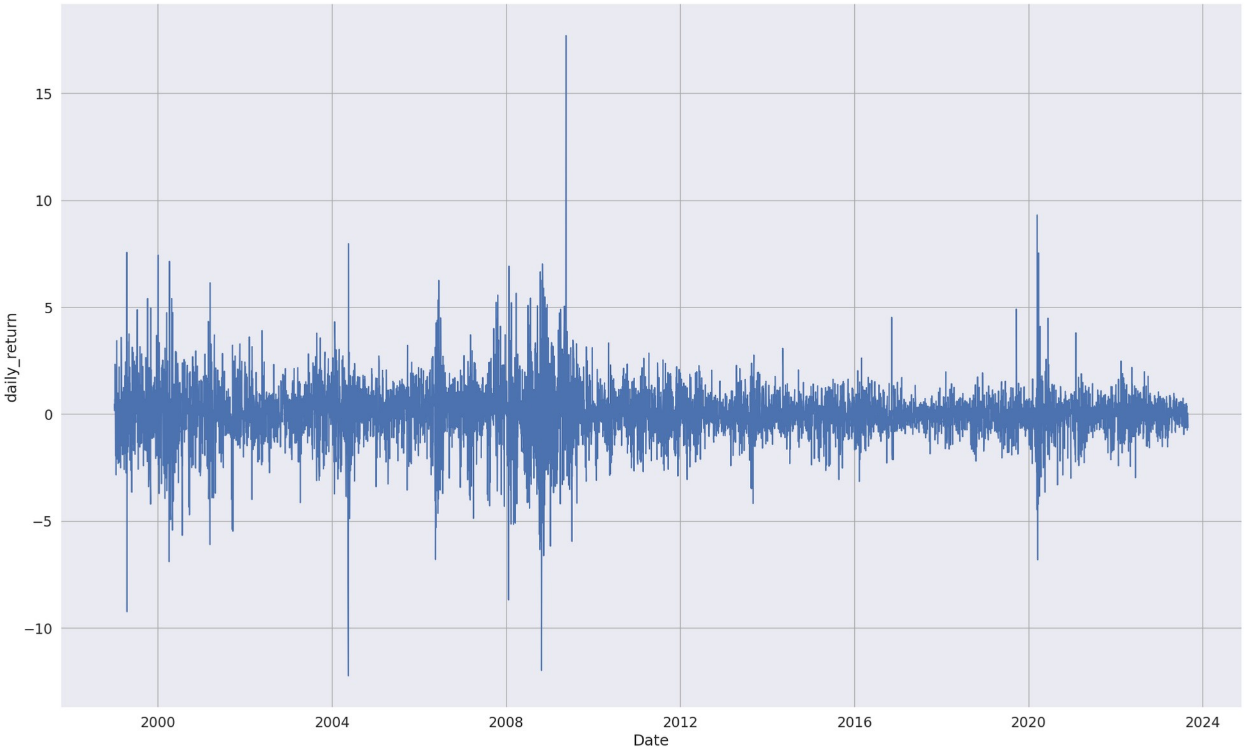
```
               Open          High           Low         Close
P/E  \
count   6141.000000   6141.000000   6141.000000   6141.000000
6141.000000
mean    6494.537526   6534.472366   6445.391418   6490.899756
20.782092
std     4929.404228   4945.915686   4902.180818   4924.904708
4.956375
min      853.000000    877.000000    849.950000    854.200000
10.680000
25%     1996.300000   2019.350000   1984.750000   1999.000000
17.550000
50%     5365.700000   5399.700000   5318.900000   5361.600000
20.630000
75%     9336.200000   9352.550000   9230.800000   9285.300000
23.360000
max    19850.900000  19991.850000  19758.400000  19979.150000
42.000000

               P/B  daily_return
count  6141.000000   6141.000000
mean      3.602666     -0.016770
std       0.782386      1.357052
min       1.920000    -12.246445
25%       3.070000     -0.623124
50%       3.520000     -0.005107
75%       4.060000      0.621230
max       6.550000     17.694622
```

## Highest nifty fall for 1 day was 12.24% and Highest 1 day gain is 17.69%, so lets find out the date for these returns

```
df[df['daily_return']==df['daily_return'].min()]

           Date    Open    High     Low   Close    P/E   P/B
dividend_perc  \
4791 2004-05-17  1582.5  1583.8  1292.2  1388.7  12.87  2.74
2.64

      daily_return
4791    -12.246445

df[df['daily_return']==df['daily_return'].max()]

           Date     Open    High      Low   Close    P/E   P/B
dividend_perc  \
3547 2009-05-18  3673.15  4384.3  3673.15  4323.1  20.41  3.57
1.29

      daily_return
3547     17.694622
```

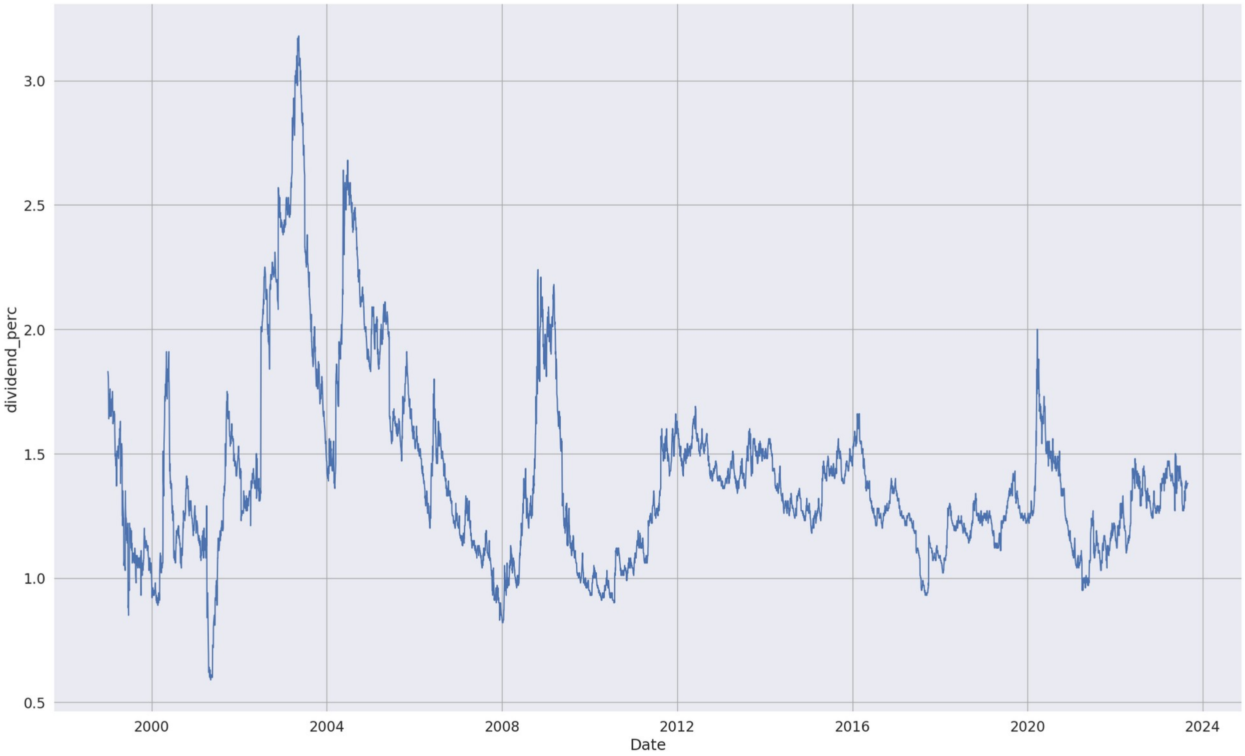
# Plotting the Graph for Index Returns over time

```python
plt.figure(figsize=(25, 15))
sns.lineplot(data=df, x='Date', y='daily_return')
plt.grid(color='darkgrey')
sns.set(font_scale=1.50)
plt.show()
```



# Plotting the Graph for Index Dividends over time

```python
plt.figure(figsize=(25, 15))
sns.lineplot(data=df, x='Date', y='dividend_perc',estimator='mean')
plt.grid(color='darkgrey')
sns.set(font_scale=1.50)
plt.show()
```



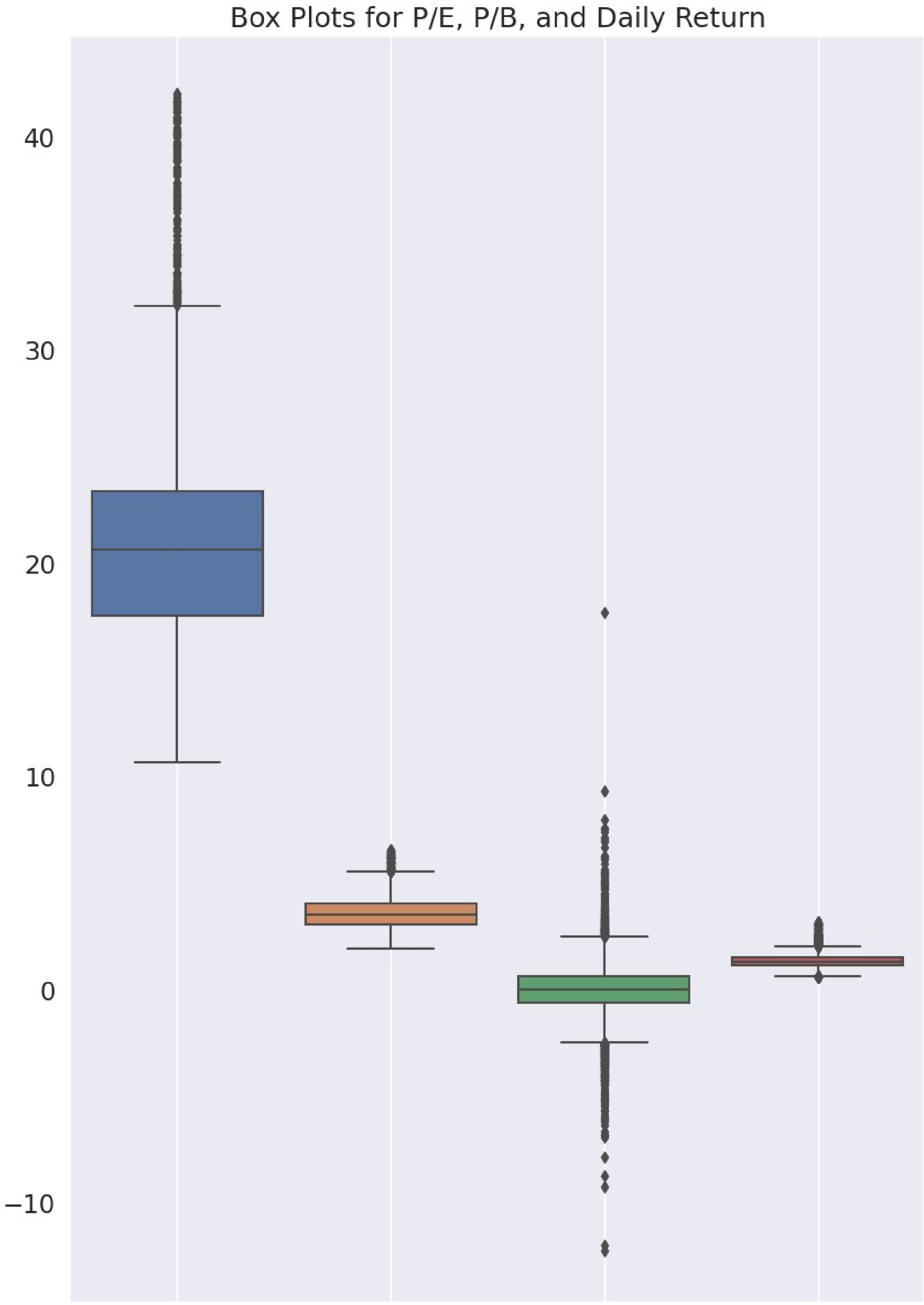
# Lets find out the Daily, Weekly, Monthly, Yearly variations in index Return

```
daily_volatility = df['daily_return'].std()
daily_standev = round(daily_volatility,4)
daily_standev

1.3571

week_df=df.set_index('Date')
week_returns = week_df['Close'].resample('W').ffill().pct_change()
weekly_standev = round(week_returns.std(),4)
weekly_standev

0.03

month_df=df.set_index('Date')
monthly_returns = month_df['Close'].resample('M').ffill().pct_change()
monthly_standev = round(monthly_returns.std(),4)
monthly_standev

0.0647

year_df=df.set_index('Date')
yearly_returns = year_df['Close'].resample('Y').ffill().pct_change()
yearly_stadndev = round(yearly_returns.std(),4)
yearly_stadndev
```

```
0.2892
```

## Box Plot to find Outliers in P/E, P/B,Daily Return and Dividends

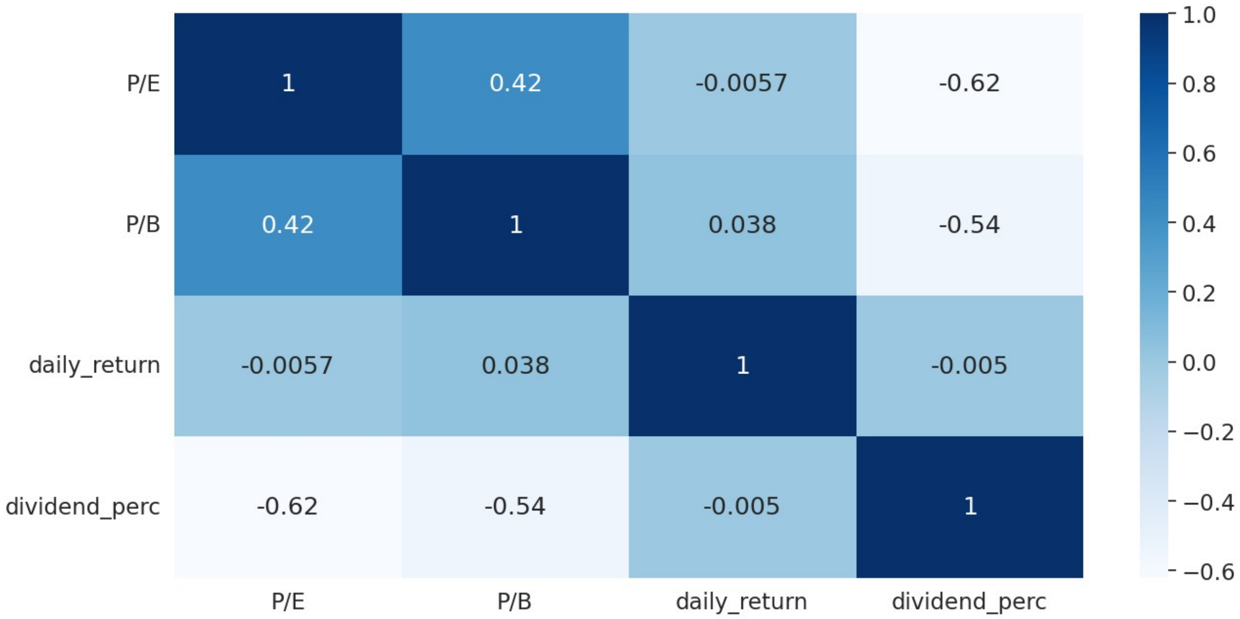
```
plt.figure(figsize=(10,15))
sns.boxplot(data=df[['P/E', 'P/B','daily_return','dividend_perc']])
plt.title('Box Plots for P/E, P/B, and Daily Return')
plt.grid()
plt.show()
```



Box Plots for P/E, P/B, and Daily Return
40
30
20
10
0
−10

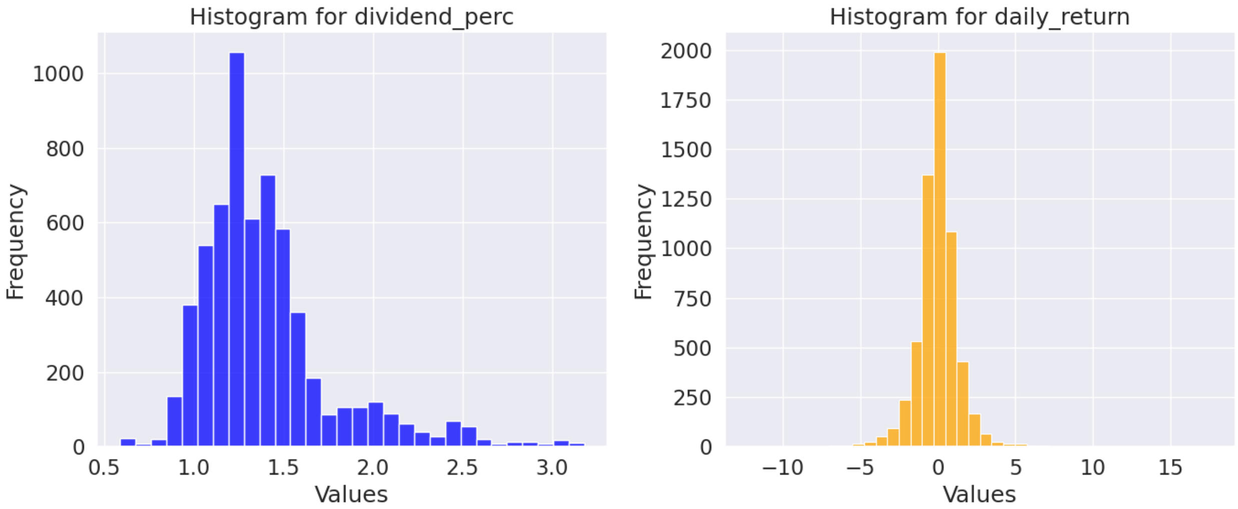
## Finding Correlation between P/E, P/B,Daily Return and Dividends

```
corr= df[['P/E', 'P/B','daily_return','dividend_perc']].corr()
plt.figure(figsize=(15,7.5))
sns.set(font_scale=1.5)
sns.heatmap(data=corr,cmap="Blues",annot=True)
plt.show()
```



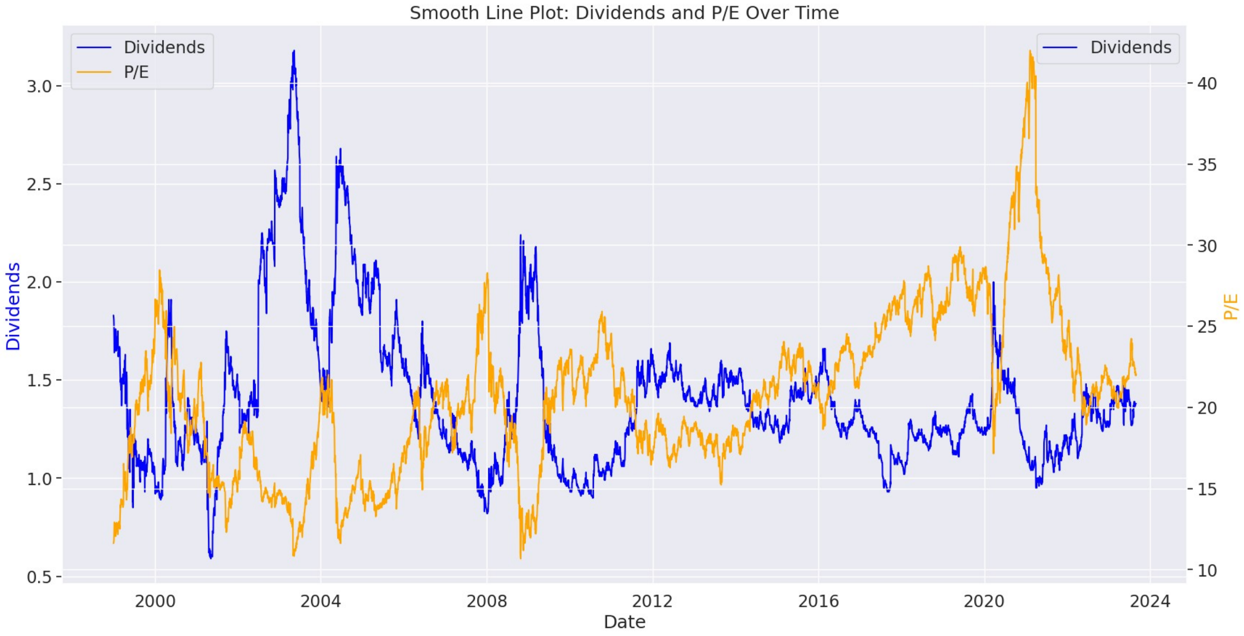
## Plotting Histogram to understand dividends and Daily return Distribution

```
fig, axes = plt.subplots(nrows=1, ncols=2, figsize=(14, 6))


sns.histplot(df['dividend_perc'], bins=30, color='blue', ax=axes[0])
axes[0].set_title('Histogram for dividend_perc')
axes[0].set_xlabel('Values')
axes[0].set_ylabel('Frequency')


sns.histplot(df['daily_return'], bins=40, color='orange', ax=axes[1])
axes[1].set_title('Histogram for daily_return')
axes[1].set_xlabel('Values')
axes[1].set_ylabel('Frequency')


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



# Relation between Dividends and P/E

```
plt.figure(figsize=(20,10))
ax1 = sns.lineplot(x='Date', y='dividend_perc', data=df,
label='Dividends', color='blue', estimator='mean')
ax2 = ax1.twinx()
sns.lineplot(x='Date', y='P/E', data=df, label='P/E', color='orange',
ax=ax2, estimator='mean')

ax1.set_title('Smooth Line Plot: Dividends and P/E Over Time')
ax1.set_xlabel('Date')
ax1.set_ylabel('Dividends', color='blue')
ax2.set_ylabel('P/E', color='orange')

lines, labels = ax1.get_legend_handles_labels()
lines2, labels2 = ax2.get_legend_handles_labels()
ax2.legend(lines + lines2, labels + labels2, loc='upper left')

plt.show()
```


Smooth Line Plot: Dividends and P/E Over Time
Dividends
P/E
Dividends
Dividends
P/E
Date
0.5
1.0
1.5
2.0
2.5
3.0
10
15
20
25
30
35
40
2000
2004
2008
2012
2016
2020
2024