

Report

Introduction

- This dataset encapsulates a comprehensive collection of financial information, spanning multiple stocks within the Nifty 50 index. It comprises a rich array of data points, including stock prices, trading volumes, and related metrics, amassed over a substantial timeframe. This dataset serves as a valuable resource for analyzing market trends, assessing stock performances, and deriving insights crucial for informed investment strategies and comprehensive market evaluations.
- The Nifty 50 index represents a collection of 50 actively traded Indian stocks listed on the National Stock Exchange (NSE). These stocks are chosen based on various factors like market capitalization, liquidity, and other financial parameters. The index serves as a benchmark for the Indian stock market, reflecting the performance of these select companies across diverse sectors, offering a snapshot of the overall market movements.
- Regarding the dataset, it encompasses a wide array of financial metrics for stocks within the Nifty 50 index. This includes historical stock prices, trading volumes, market indicators, fundamental ratios, and potentially other relevant data points.
- Constraints within this dataset might include factors such as:
 1. Timeframe: Data might be available within a specific time range due to historical limitations or data collection constraints.
 2. Availability of Metrics: Some metrics or specific data points might be missing or incomplete due to various reasons, like unreported values or data collection issues.
 3. Accuracy: The dataset's accuracy might be influenced by factors like reporting errors or discrepancies in the data sources.
 4. Granularity: Depending on the source, the dataset might have limitations in granularity, such as daily, weekly, or monthly data, which could impact detailed analysis at a more refined time scale.
- The dataset's richness and comprehensive nature make it a valuable tool for conducting in-depth analysis, identifying market trends, evaluating stock performances, and formulating informed investment strategies within the context of the Indian stock market

```
In [1]: import pandas as pd
import glob
import matplotlib.pyplot as plt
import seaborn as sns
```

Reading all the CSV files

```
In [2]: file_list = glob.glob('C:/Users/devan/Desktop/Big Data Analytics/Final Project/*.csv')
data_frames = []
for file in file_list:
    data = pd.read_csv(file)
    data_frames.append(data)
nifty_data = pd.concat(data_frames, ignore_index=True)
```

This code compiles data from multiple CSV files located in a specified directory. It first collects a list of file paths using 'glob.glob', then reads each CSV file using Pandas' 'read_csv' function and stores the data in a list of data frames. Finally, it merges these separate data frames into a single comprehensive DataFrame named 'nifty_data' using 'pd.concat', providing a consolidated dataset that aggregates information from all the CSV files for streamlined analysis within the context of Big Data Analytics.

```
In [3]: nifty_data.head()
```

Out[3]:

	Date	Symbol	Series	Prev Close	Open	High	Low	Last	Close	VWAP	Volume
0	2007-11-27	MUNDRAPORT	EQ	440.00	770.00	1050.00	770.0	959.0	962.90	984.72	27294366.0 2.68
1	2007-11-28	MUNDRAPORT	EQ	962.90	984.00	990.00	874.0	885.0	893.90	941.38	4581338.0 4.31
2	2007-11-29	MUNDRAPORT	EQ	893.90	909.00	914.75	841.0	887.0	884.20	888.09	5124121.0 4.55
3	2007-11-30	MUNDRAPORT	EQ	884.20	890.00	958.00	890.0	929.0	921.55	929.17	4609762.0 4.28
4	2007-12-03	MUNDRAPORT	EQ	921.55	939.75	995.00	922.0	980.0	969.30	965.65	2977470.0 2.87

What are the data types?

```
In [4]: nifty_data = nifty_data.astype({'Symbol': 'category'})
nifty_data.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 470434 entries, 0 to 470433
Data columns (total 18 columns):
 #   Column            Non-Null Count  Dtype  
--- 
 0   Date              470384 non-null   object  
 1   Symbol             470434 non-null   category
 2   Series             470434 non-null   object  
 3   Prev Close         470384 non-null   float64
 4   Open               470384 non-null   float64
 5   High               470384 non-null   float64
 6   Low                470384 non-null   float64
 7   Last               470384 non-null   float64
 8   Close               470384 non-null   float64
 9   VWAP               470384 non-null   float64
 10  Volume              470384 non-null   float64
 11  Turnover             470384 non-null   float64
 12  Trades              240688 non-null   float64
 13  Deliverable Volume  438230 non-null   float64
 14  %Deliverble          438230 non-null   float64
 15  Company Name         50 non-null      object  
 16  Industry             50 non-null      object  
 17  ISIN Code             50 non-null      object  
dtypes: category(1), float64(12), object(5)
memory usage: 61.5+ MB
```

```
In [5]: nifty_data.Symbol.unique()
```

```
Out[5]: ['MUNDRAPORT', 'ADANIPORTS', 'ASIANPAINT', 'UTIBANK', 'AXISBANK', ..., 'VEDL', 'WIPR
O', 'ZEETEL', 'ZEEL', 'INFRATEL']
Length: 66
Categories (66, object): ['ADANIPORTS', 'ASIANPAINT', 'AXISBANK', 'BAJAJ-AUTO', ...,
'VEDL', 'WIPRO', 'ZEEL', 'ZEETEL']
```

Finding unique values (stocks) from the dataset.

Descriptive statistics of the dataset.

```
In [6]: nifty_data.shape
```

```
Out[6]: (470434, 18)
```

```
In [7]: nifty_data.describe()
```

Out[7] :

	Prev Close	Open	High	Low	Last	Close	
count	470384.000000	470384.000000	470384.000000	470384.000000	470384.000000	470384.000000	470384.000000
mean	1266.196349	1267.759708	1286.581440	1247.488465	1266.388302	1266.554351	1266.554351
std	2581.367576	2585.256861	2619.646432	2546.618689	2581.389799	2582.138197	2582.138197
min	0.000000	8.500000	9.750000	8.500000	9.100000	9.150000	9.150000
25%	274.300000	275.000000	279.500000	269.600000	274.400000	274.350000	274.350000
50%	566.500000	567.025000	576.900000	556.500000	567.000000	566.700000	566.700000
75%	1242.200000	1243.312500	1263.000000	1221.650000	1242.900000	1242.400000	1242.400000
max	32861.950000	33399.950000	33480.000000	32468.100000	32849.000000	32861.950000	32861.950000



- The descriptive statistics presented here offer insights into various aspects of a financial dataset related to stock market trading. These statistics provide a summary overview of the numerical attributes within the dataset, shedding light on the stock market's price movements and trading volumes.
- The 'count' row indicates the total number of observations for each column, implying the quantity of available data points for analysis. The 'mean' row showcases the average values for each attribute, providing a central tendency measure for the dataset. Meanwhile, the 'std' row illustrates the standard deviation, signifying the extent of variability or dispersion around the mean.
- The 'min' and 'max' rows signify the minimum and maximum values observed in each column, outlining the range of values present in the dataset. The '25%', '50%', and '75%' rows correspond to the first quartile (25th percentile), median (50th percentile), and third quartile (75th percentile), respectively. These percentiles offer insights into the distribution and spread of the data, indicating the values below which a certain percentage of observations lie.
- These descriptive statistics aid in understanding the range, central tendency, and dispersion of stock prices, trading volumes, and related metrics. They facilitate preliminary assessments of data characteristics, aiding analysts and investors in making informed decisions and formulating strategies based on historical market behavior.

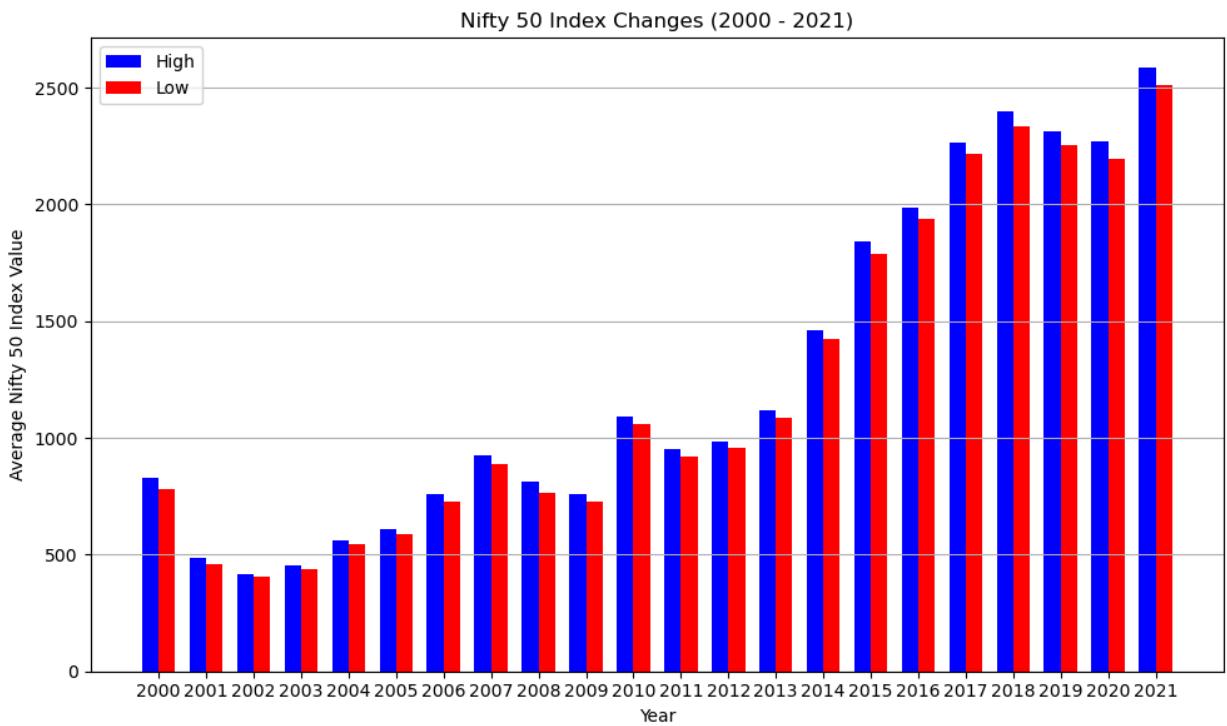
Finding null values in the dataset

In [8]: `nifty_data.isna().sum()`

```
Out[8]: Date      50
          Symbol     0
          Series     0
          Prev Close 50
          Open       50
          High       50
          Low        50
          Last       50
          Close      50
          VWAP       50
          Volume     50
          Turnover   50
          Trades     229746
          Deliverable Volume 32204
          %Deliverble 32204
          Company Name 470384
          Industry    470384
          ISIN Code   470384
          dtype: int64
```

```
In [9]: nifty_data['Date'] = pd.to_datetime(nifty_data['Date'])
```

```
In [10]: nifty_data['Year'] = nifty_data['Date'].dt.year
          nifty_data_yearly = nifty_data.groupby('Year')[['High', 'Low']].mean()
          plt.figure(figsize=(10, 6))
          bar_width = 0.35
          index = nifty_data_yearly.index
          plt.bar(index - bar_width/2, nifty_data_yearly['High'], bar_width, color='blue', label='High')
          plt.bar(index + bar_width/2, nifty_data_yearly['Low'], bar_width, color='red', label='Low')
          plt.title('Nifty 50 Index Changes (2000 - 2021)')
          plt.xlabel('Year')
          plt.ylabel('Average Nifty 50 Index Value')
          plt.legend()
          plt.xticks(index)
          plt.grid(axis='y')
          plt.tight_layout()
          plt.show()
```



- A visual representation showcasing the annual high-low ranges of the Nifty Fifty through a bar graph provides a comprehensive overview of the market's yearly price volatility.

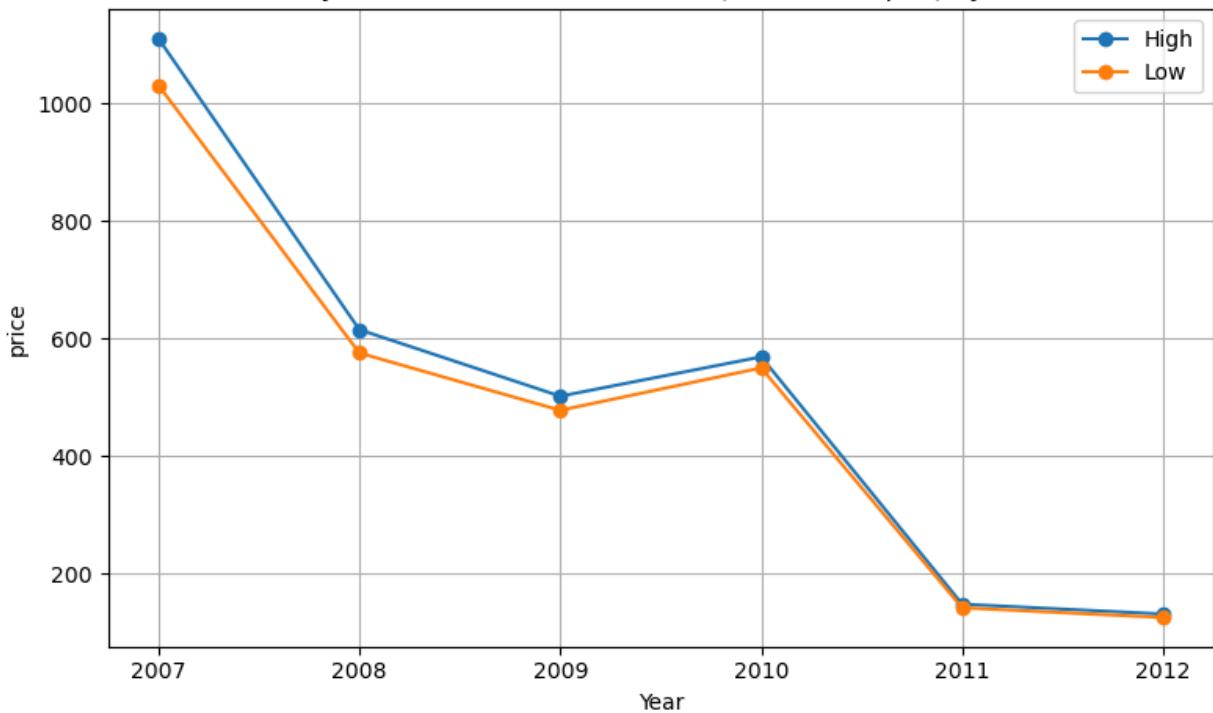
```
In [11]: for stock in nifty_data['Symbol'].unique():
    plt.figure(figsize=(8, 5)) # Each stock gets its own plot
    temp_df = nifty_data[nifty_data['Symbol'] == stock]

    # Group data by year and calculate the mean 'Close' and 'Open' values for each year
    yearly_data = temp_df.groupby(temp_df['Date'].dt.year)[['High', 'Low']].mean()

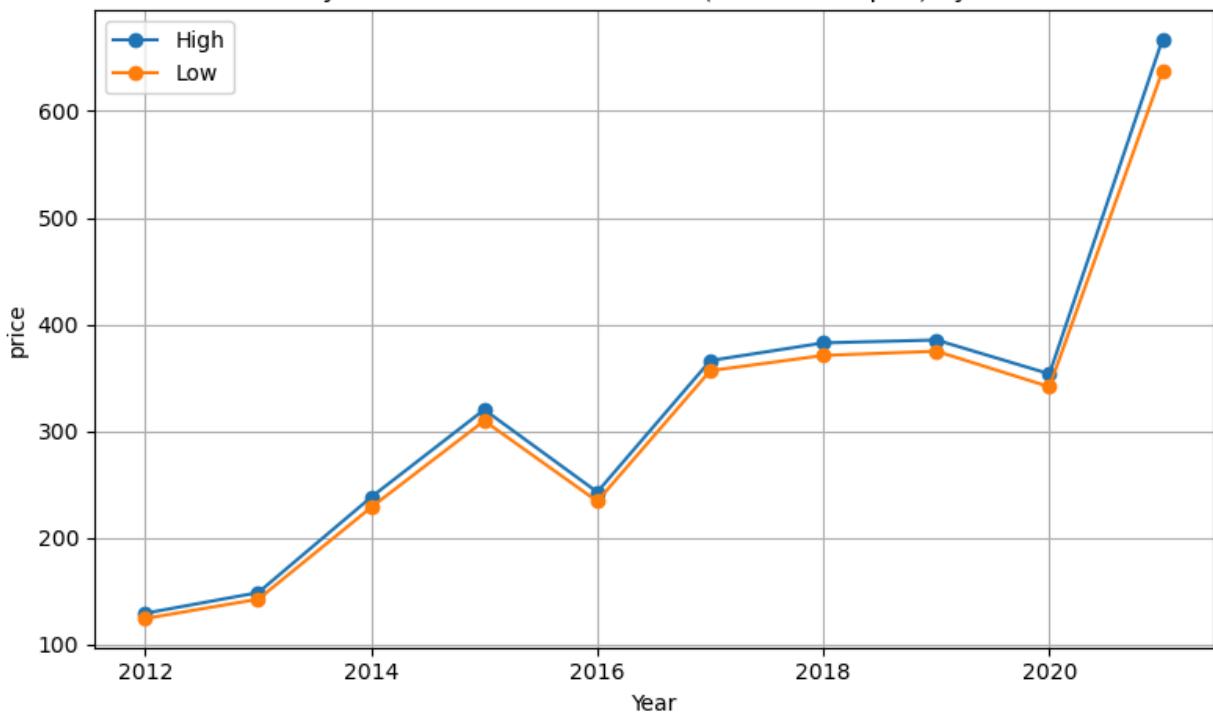
    plt.plot(yearly_data.index, yearly_data['High'], marker='o', label='High')
    plt.plot(yearly_data.index, yearly_data['Low'], marker='o', label='Low')

    plt.title(f"Nifty 50 Index for '{stock}' (Close and Open) by Year")
    plt.xlabel('Year')
    plt.ylabel('price')
    plt.legend()
    plt.grid(True)
    plt.tight_layout()
    plt.show()
```

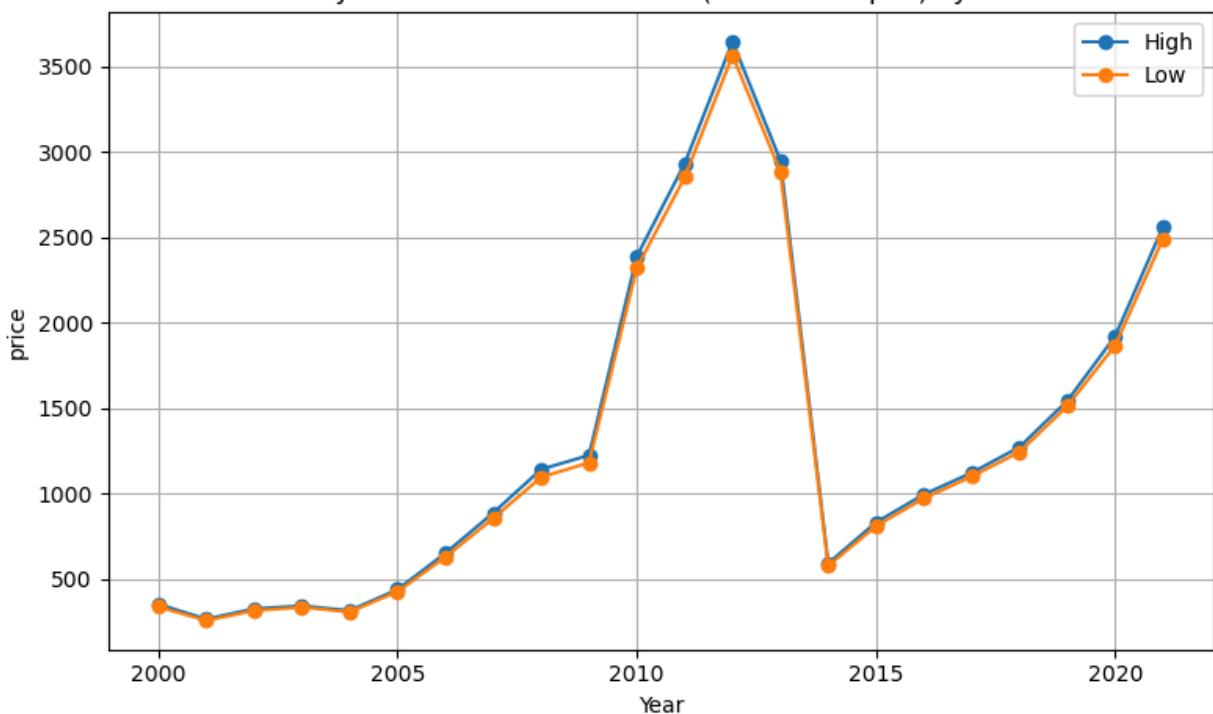
Nifty 50 Index for 'MUNDRAPORT' (Close and Open) by Year



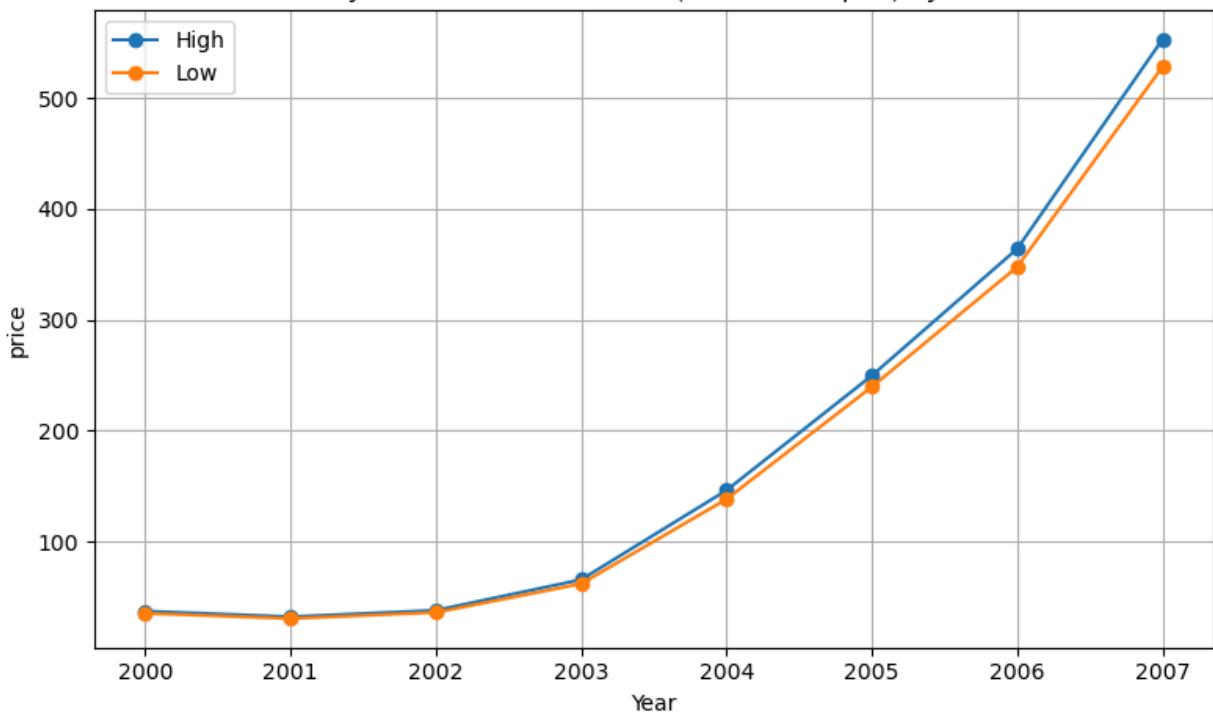
Nifty 50 Index for 'ADANIPORTS' (Close and Open) by Year



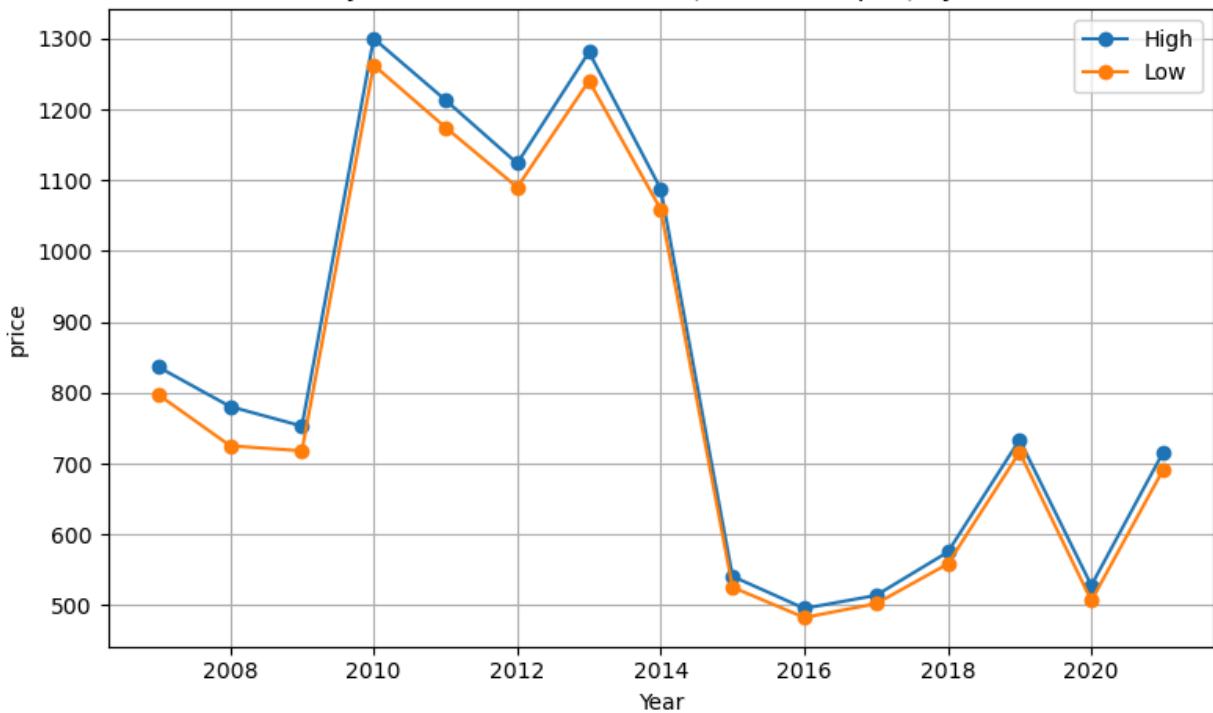
Nifty 50 Index for 'ASIANPAINT' (Close and Open) by Year



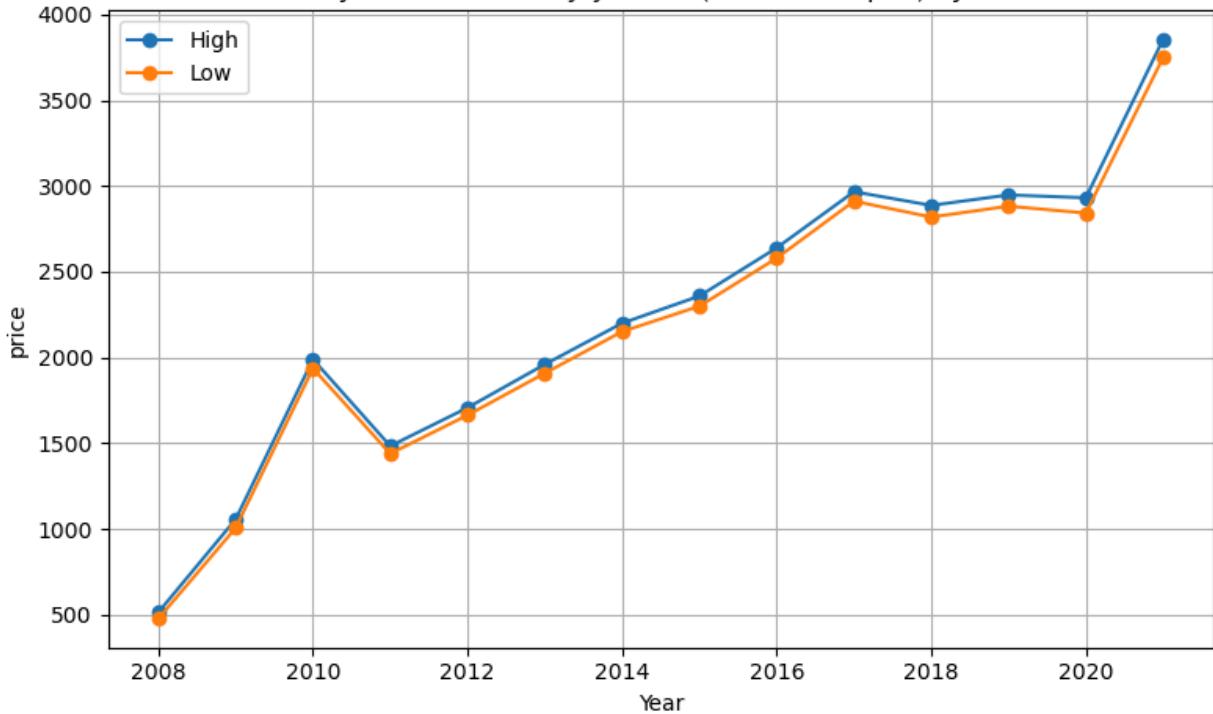
Nifty 50 Index for 'UTIBANK' (Close and Open) by Year

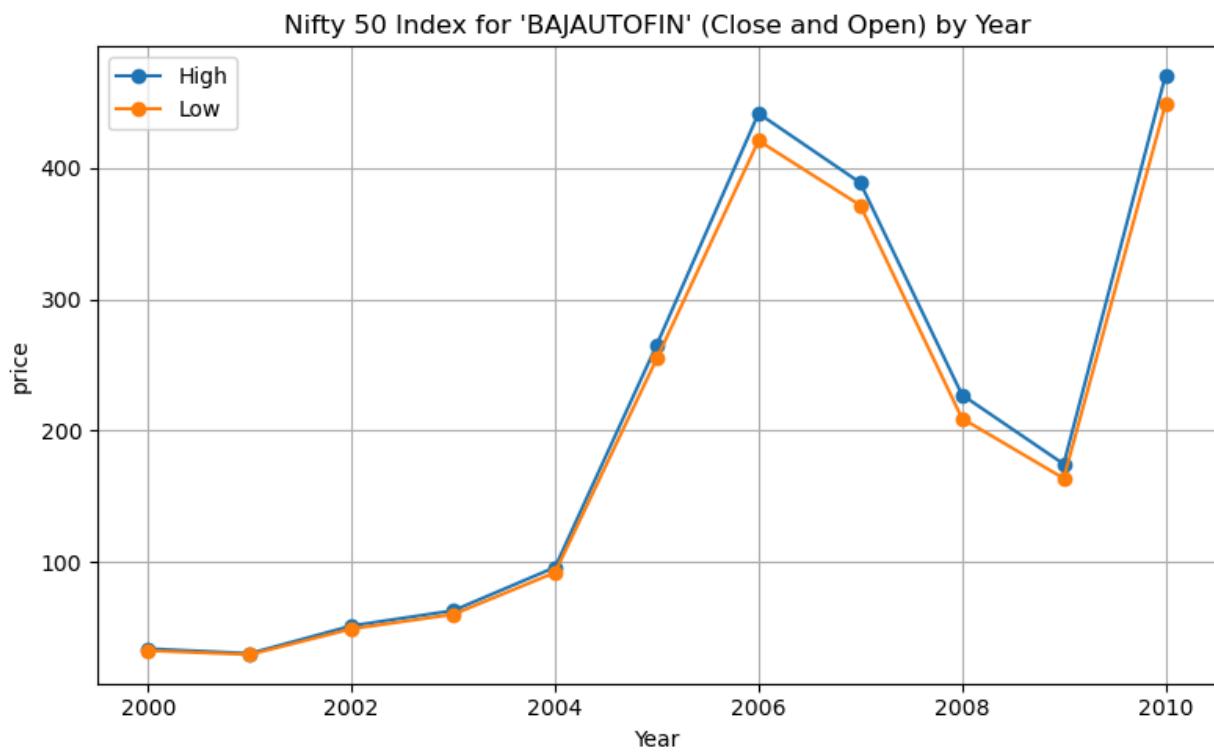
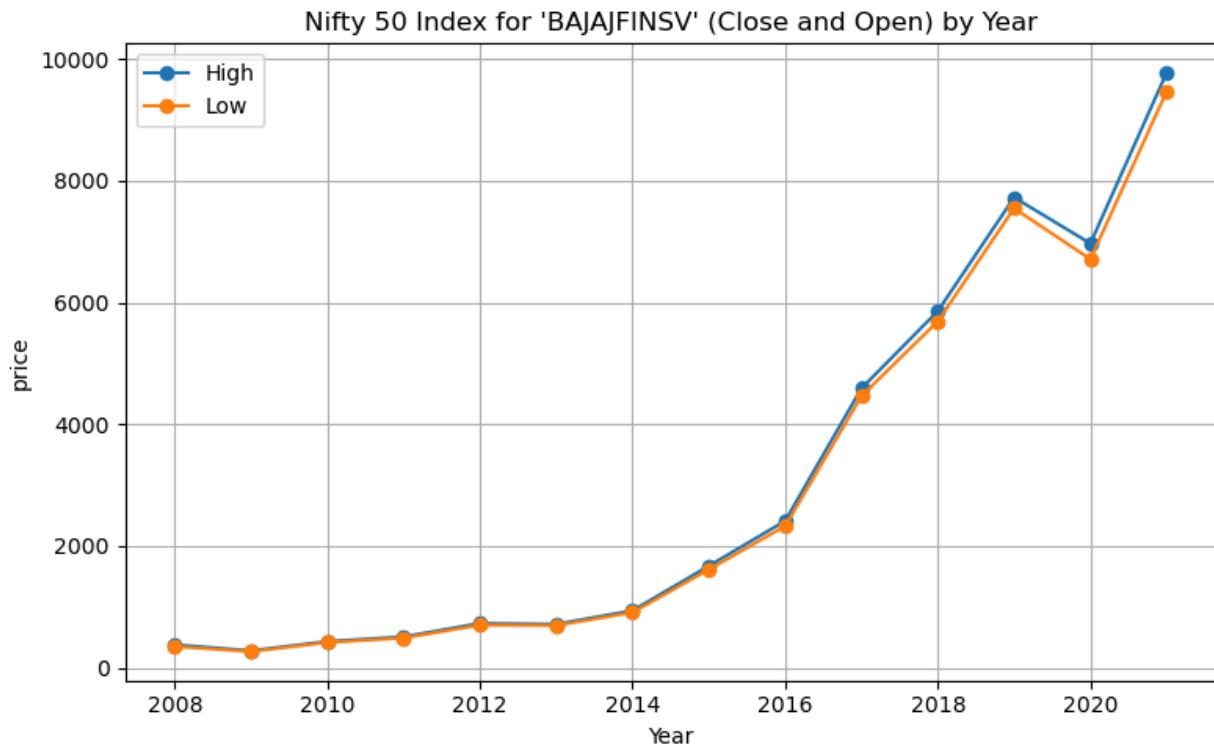


Nifty 50 Index for 'AXISBANK' (Close and Open) by Year

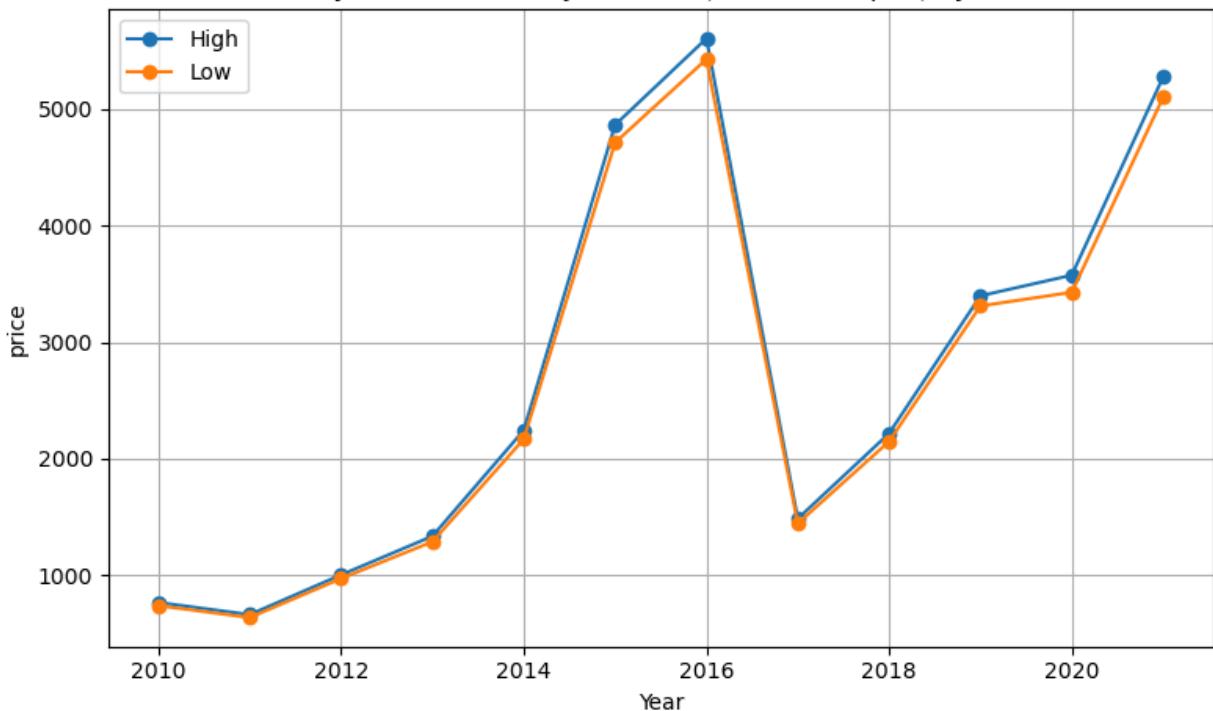


Nifty 50 Index for 'BAJAJ-AUTO' (Close and Open) by Year

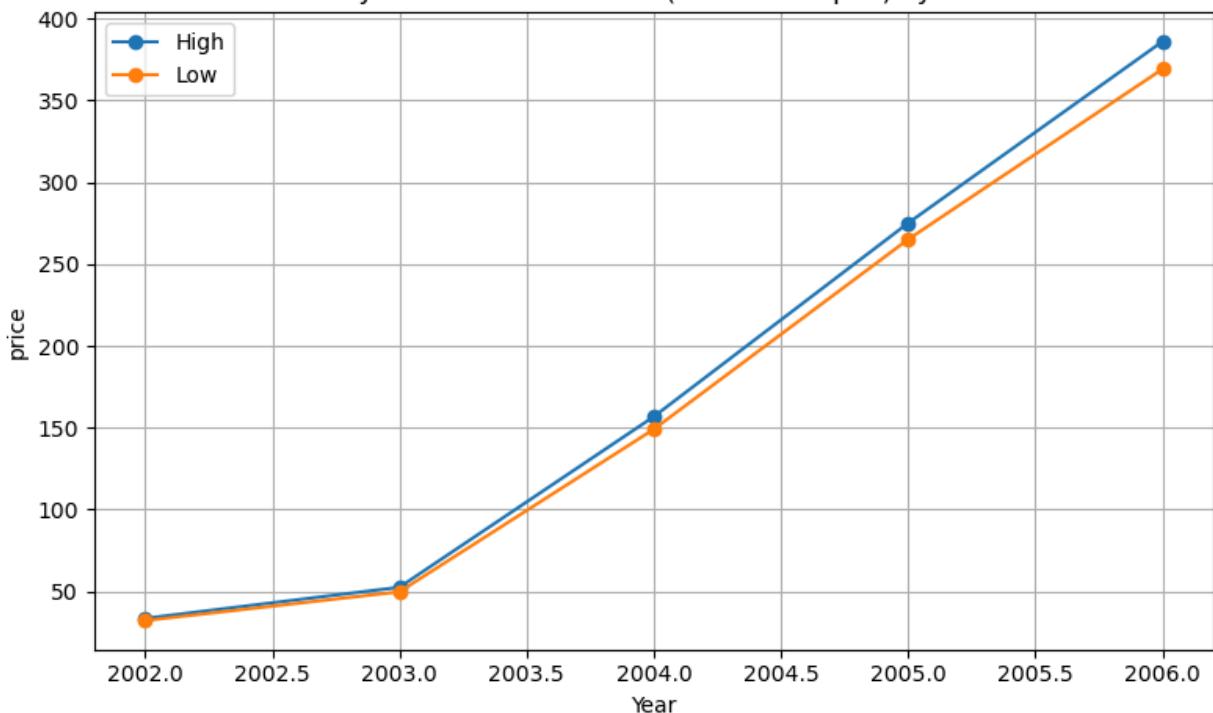




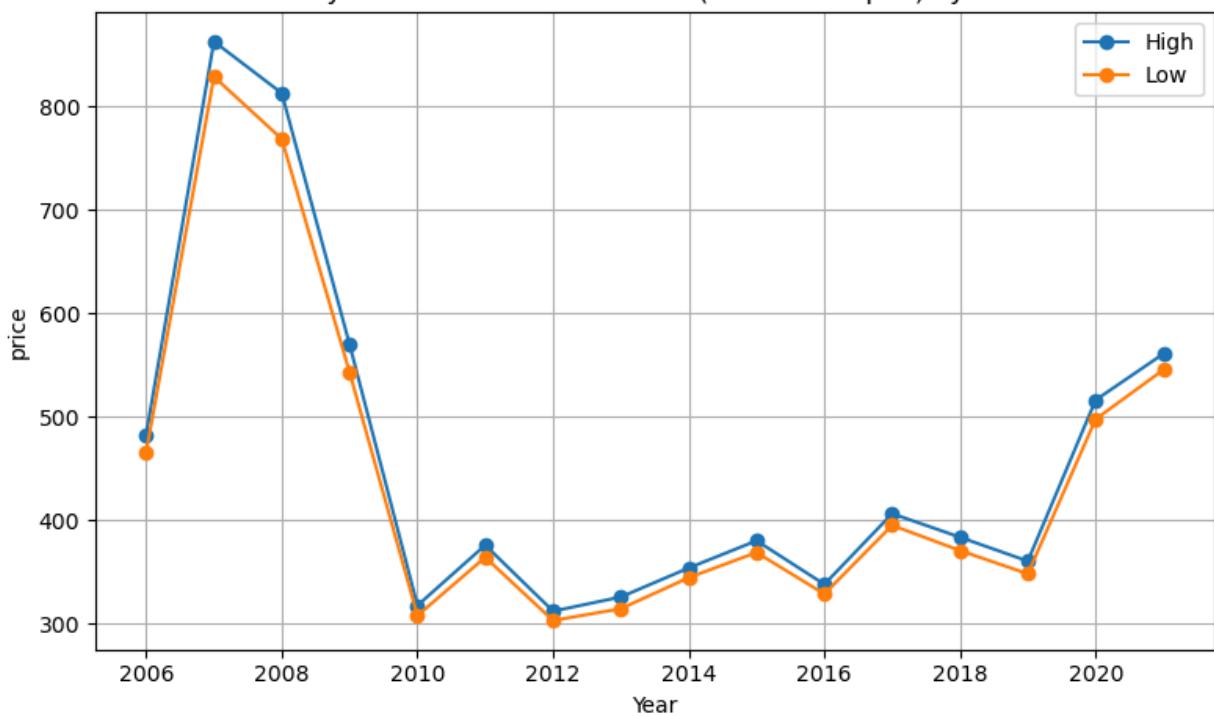
Nifty 50 Index for 'BAJFINANCE' (Close and Open) by Year



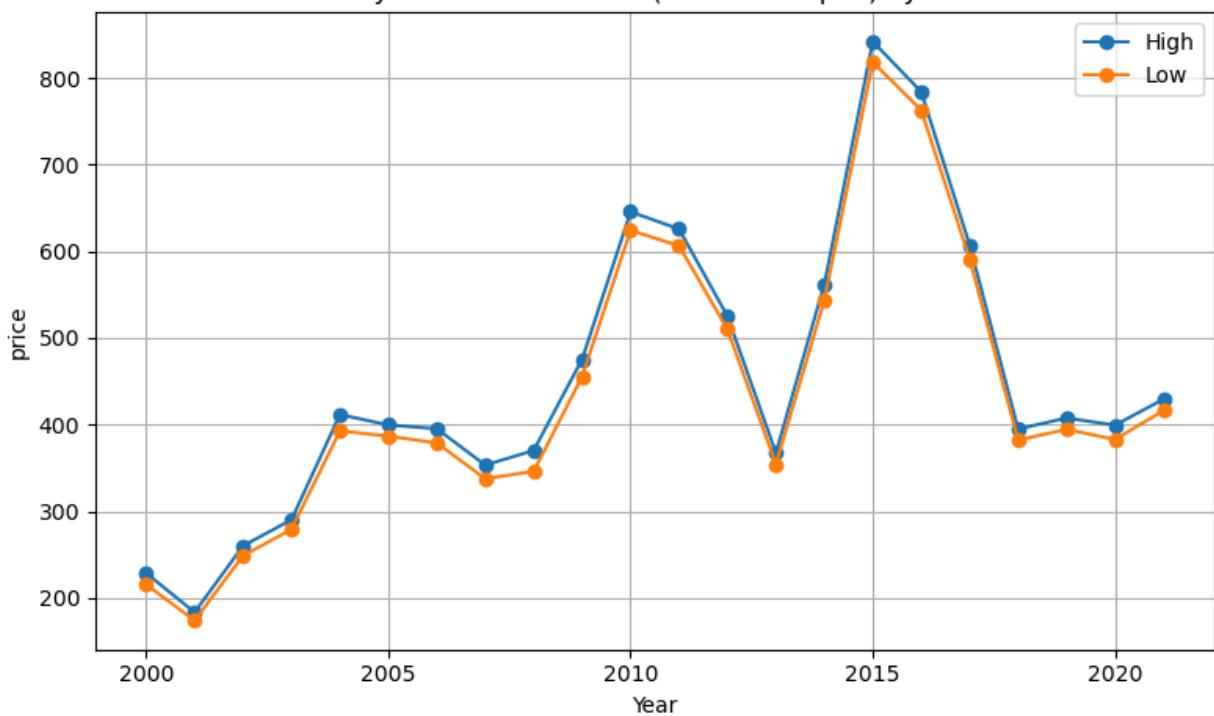
Nifty 50 Index for 'BHARTI' (Close and Open) by Year



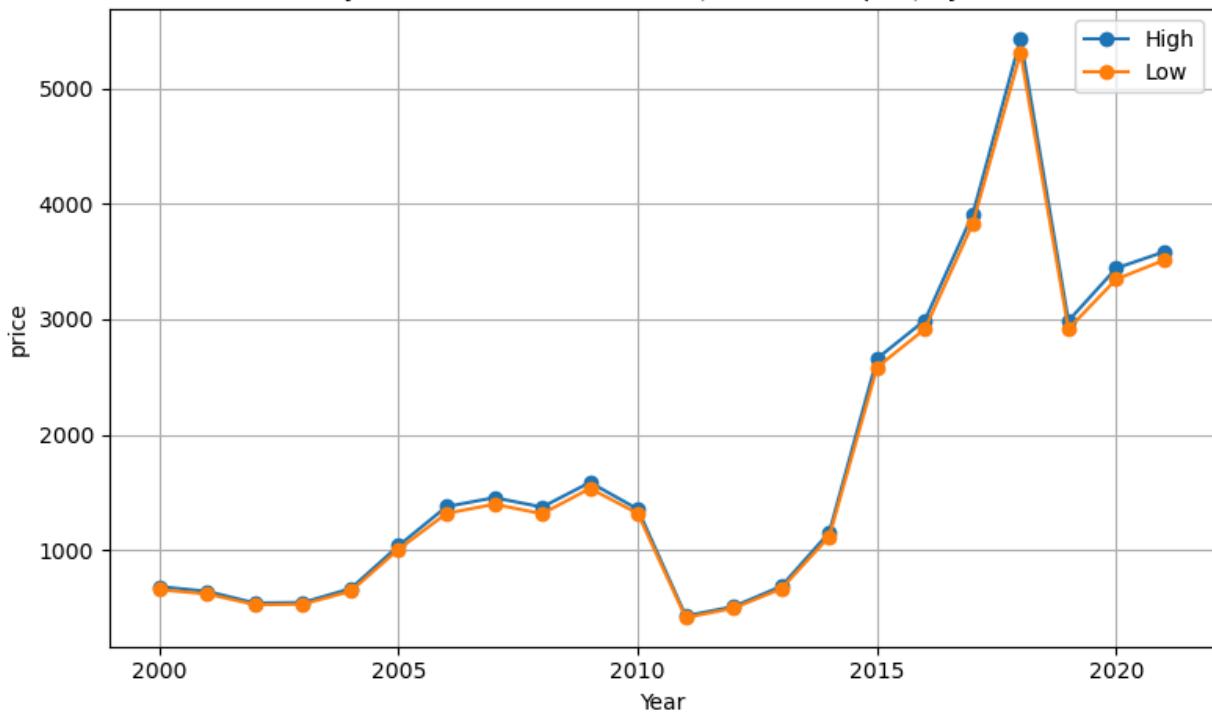
Nifty 50 Index for 'BHARTIARTL' (Close and Open) by Year



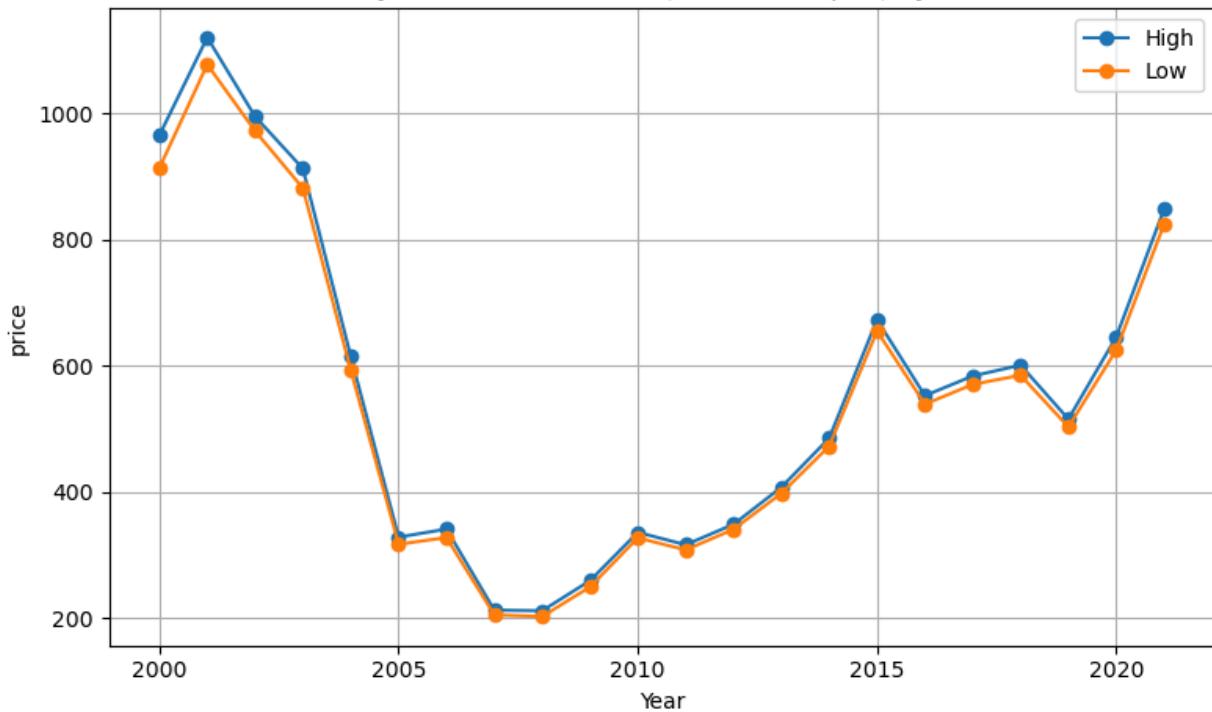
Nifty 50 Index for 'BPCL' (Close and Open) by Year



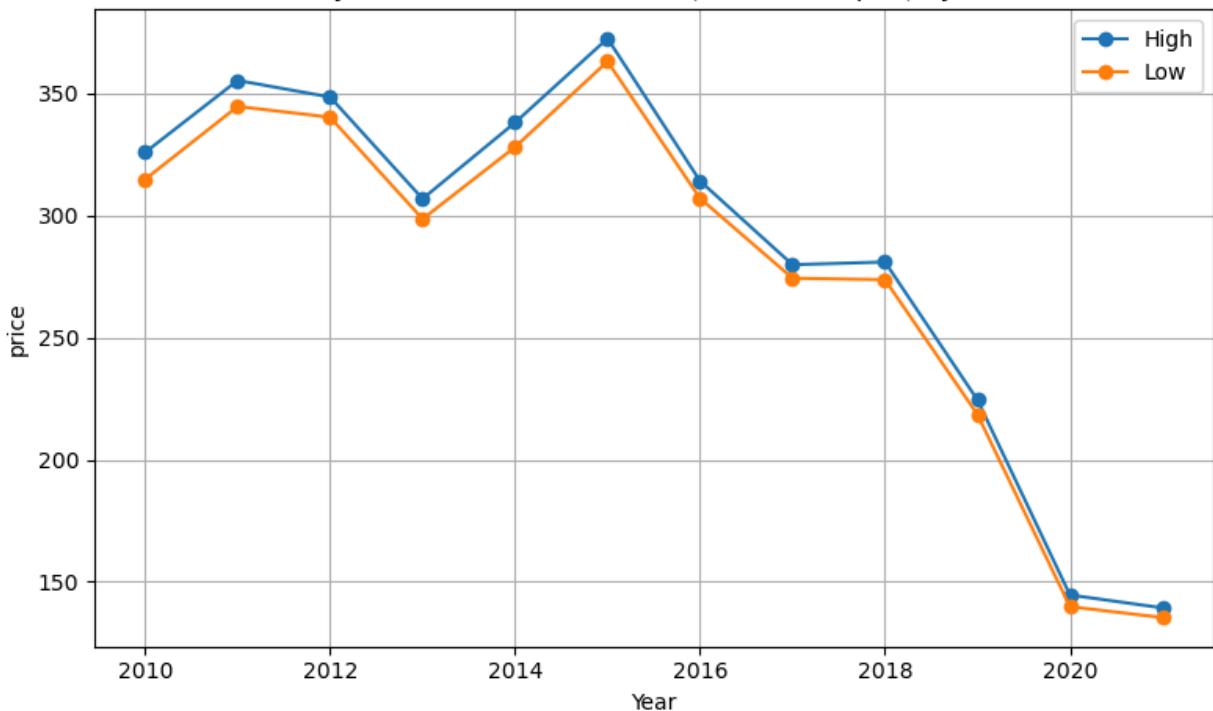
Nifty 50 Index for 'BRITANNIA' (Close and Open) by Year



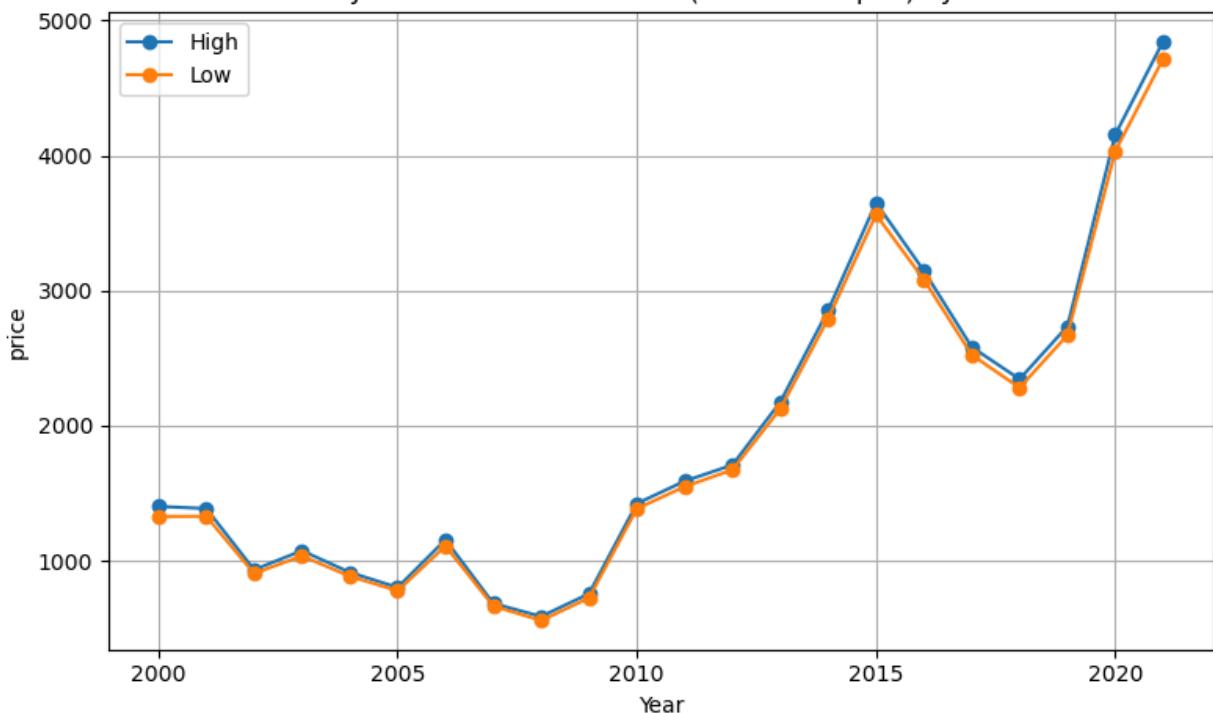
Nifty 50 Index for 'CIPLA' (Close and Open) by Year



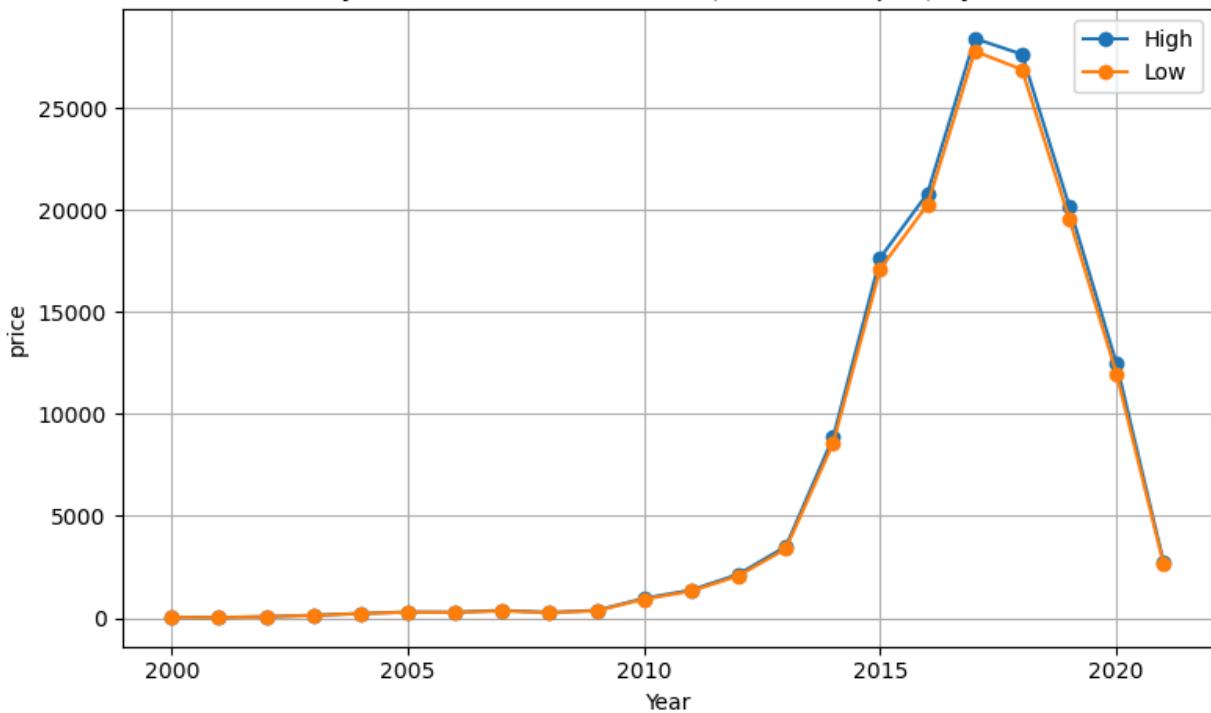
Nifty 50 Index for 'COALINDIA' (Close and Open) by Year



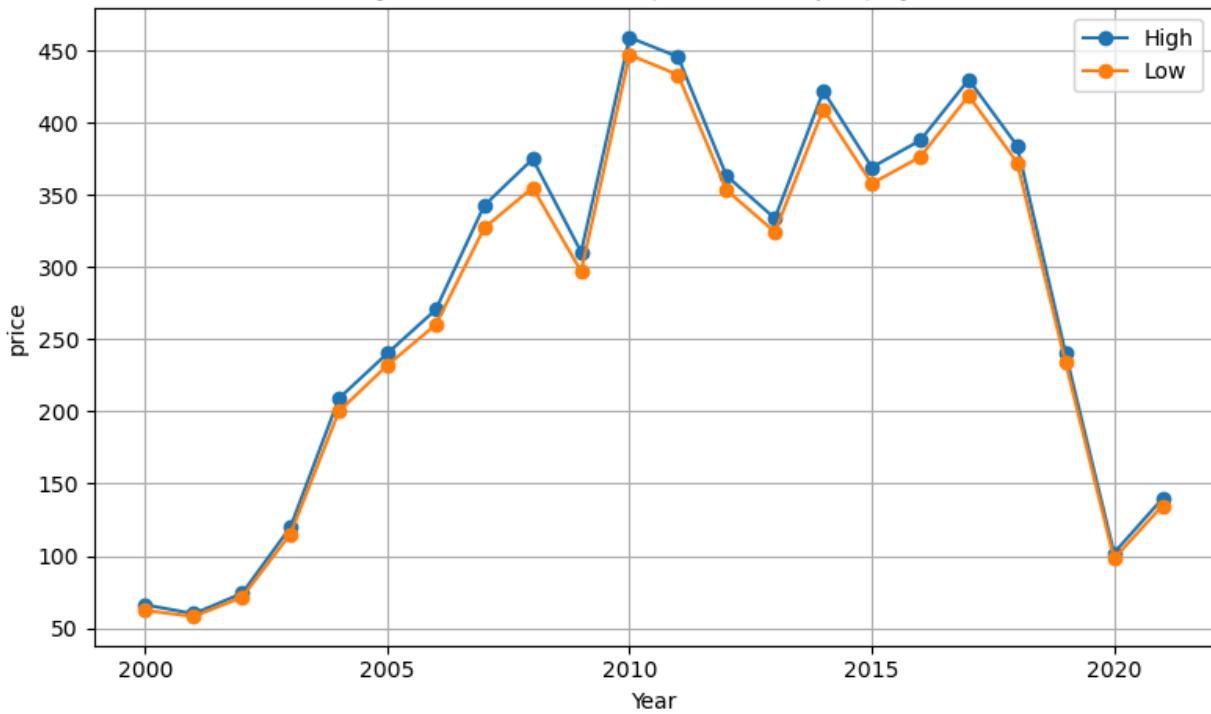
Nifty 50 Index for 'DRREDDY' (Close and Open) by Year



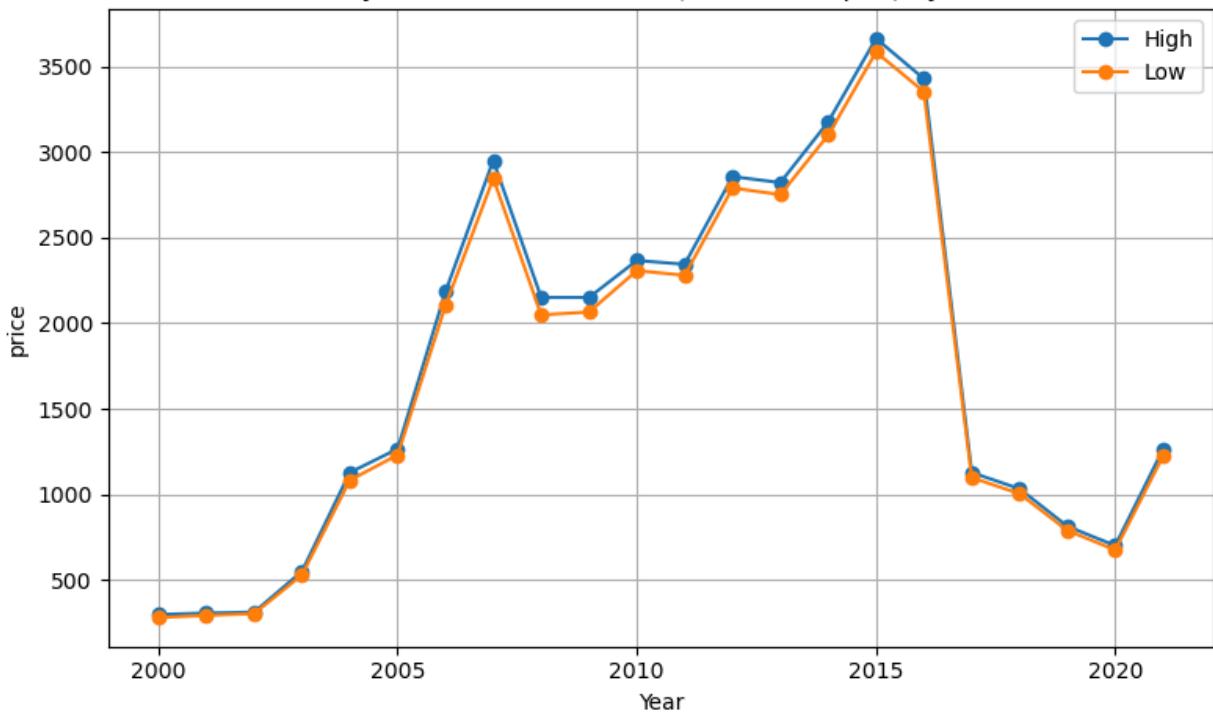
Nifty 50 Index for 'EICHERMOT' (Close and Open) by Year



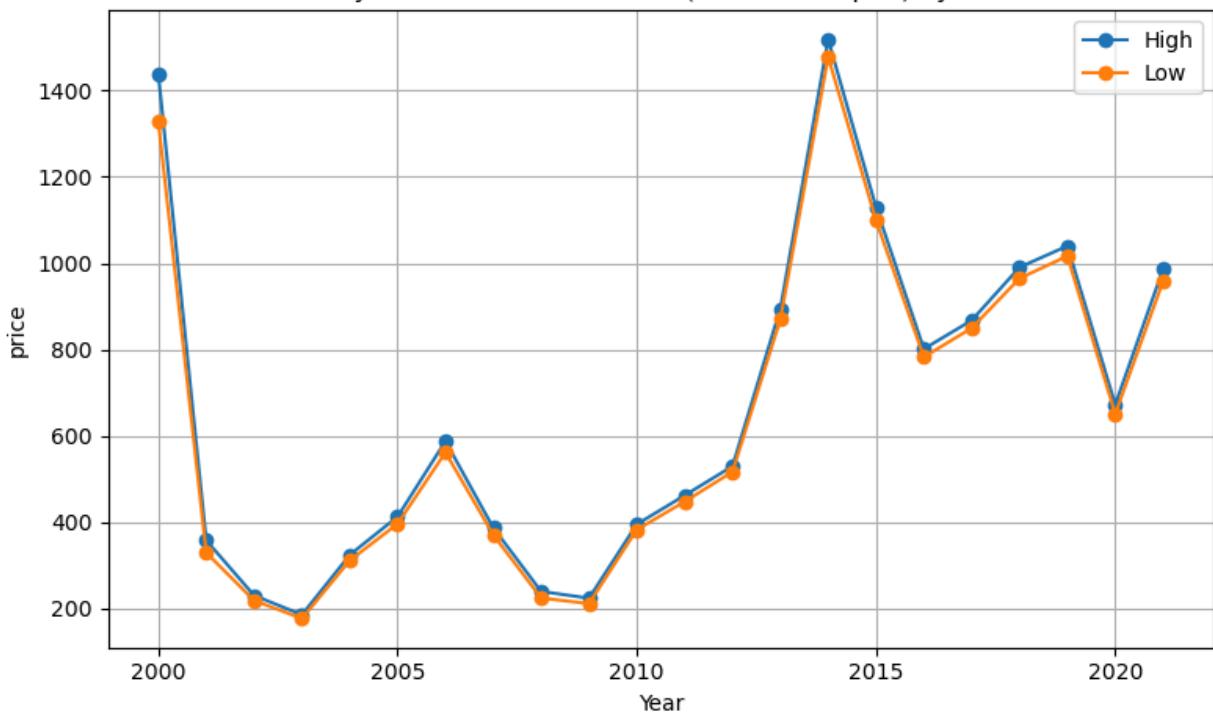
Nifty 50 Index for 'GAIL' (Close and Open) by Year



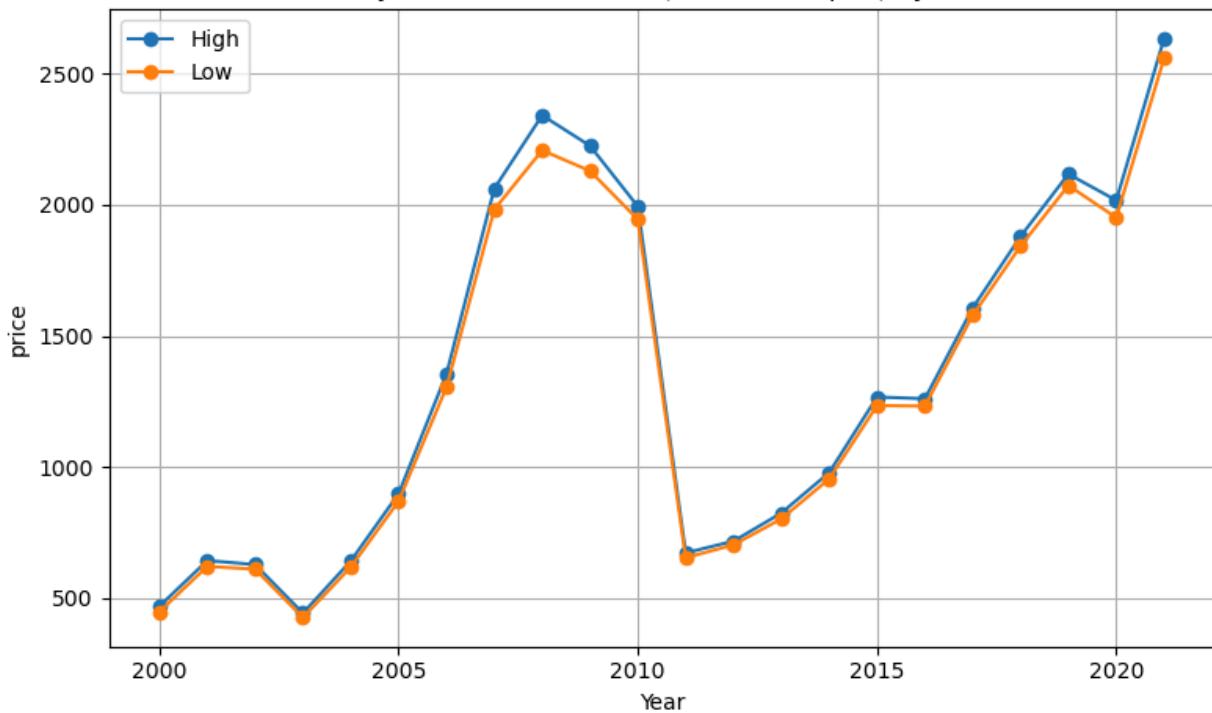
Nifty 50 Index for 'GRASIM' (Close and Open) by Year



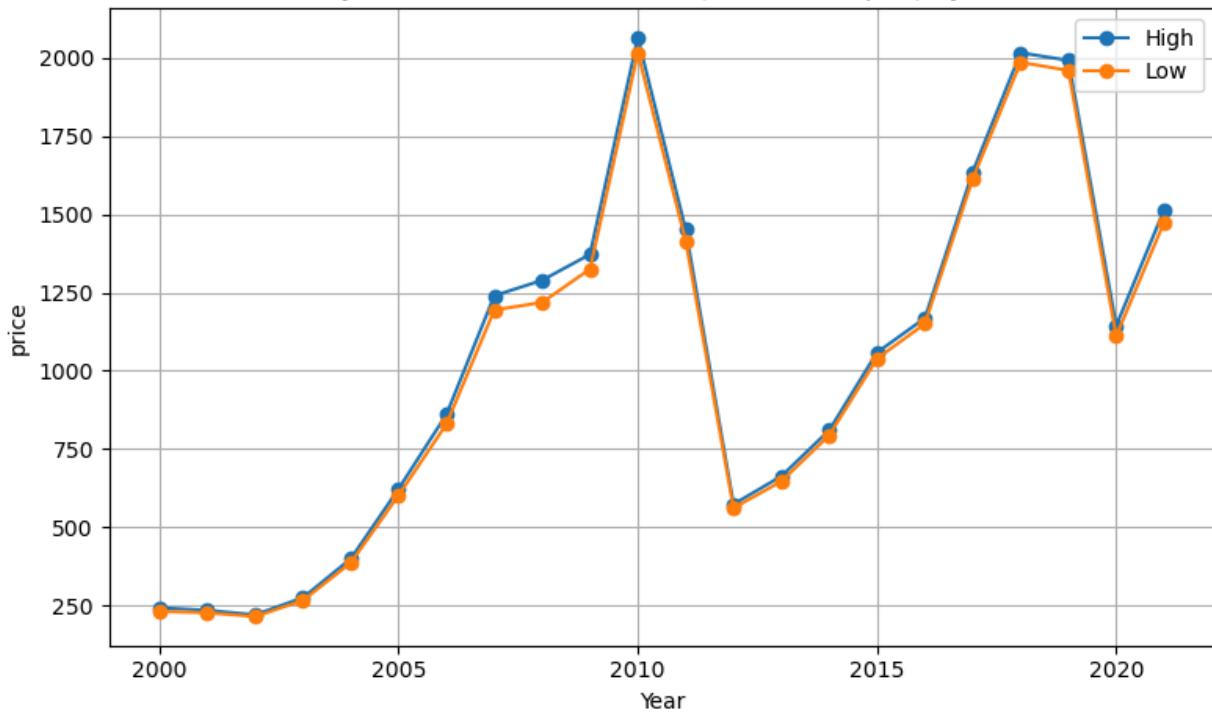
Nifty 50 Index for 'HCLTECH' (Close and Open) by Year



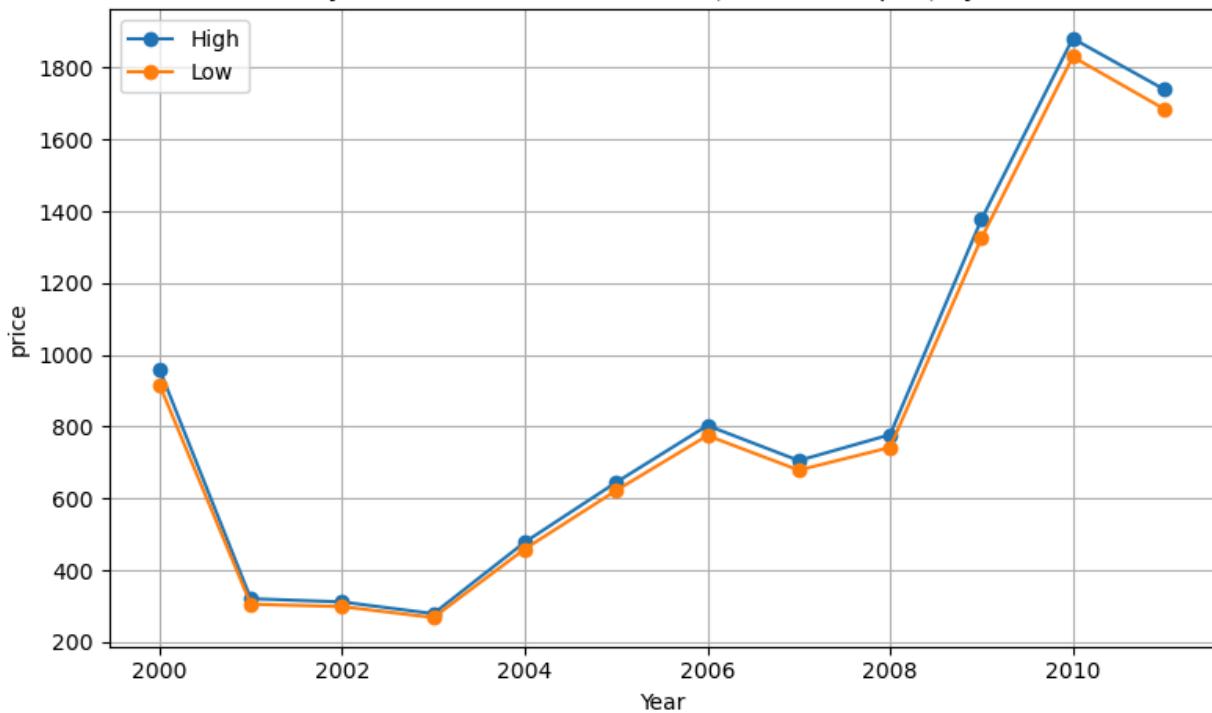
Nifty 50 Index for 'HDFC' (Close and Open) by Year



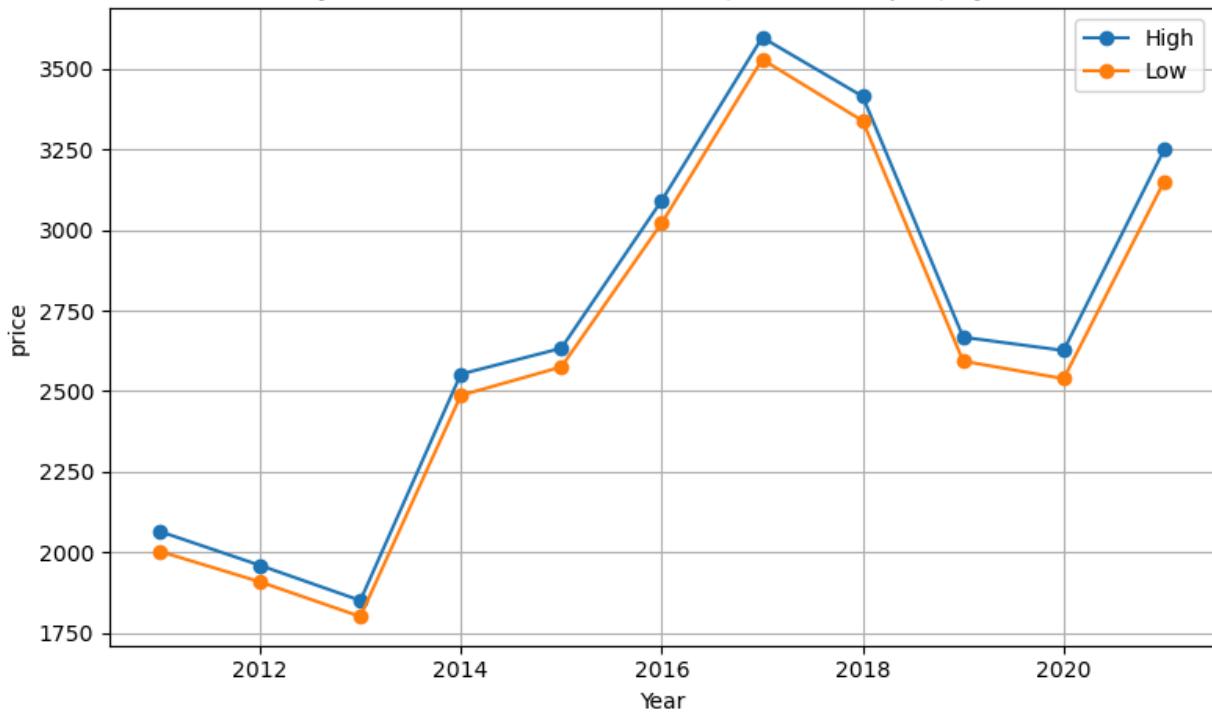
Nifty 50 Index for 'HDFCBANK' (Close and Open) by Year



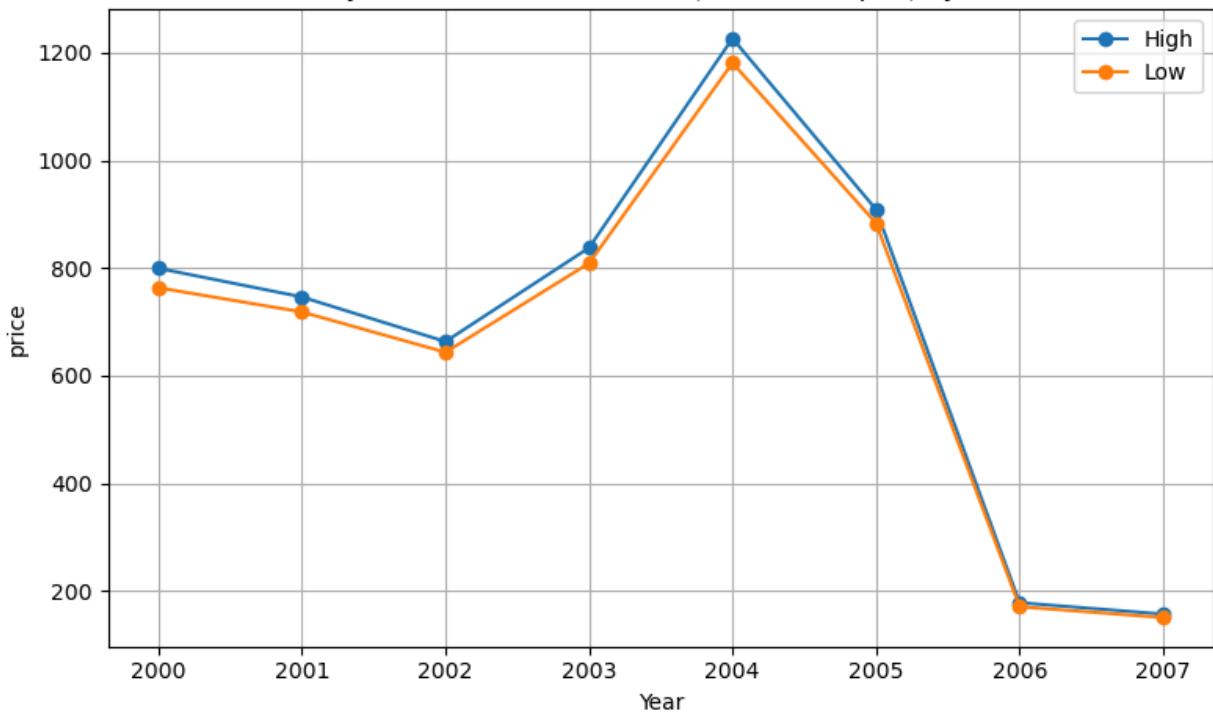
Nifty 50 Index for 'HEROHONDA' (Close and Open) by Year



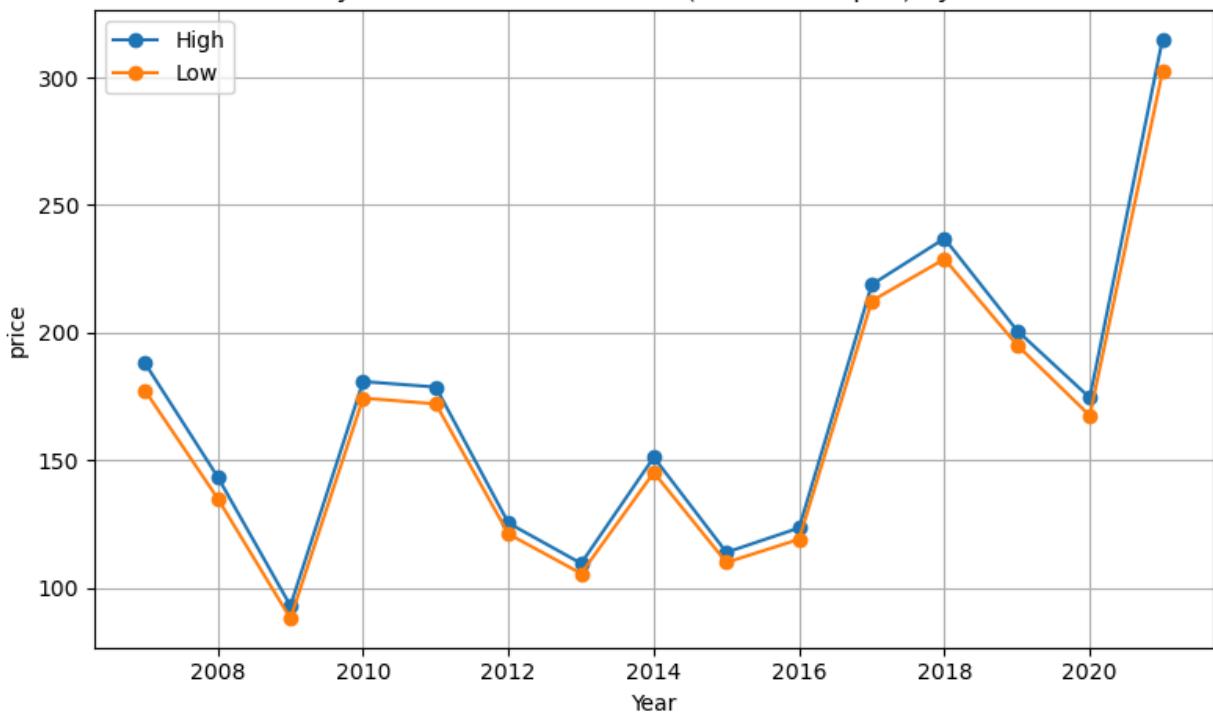
Nifty 50 Index for 'HEROMOTOCO' (Close and Open) by Year



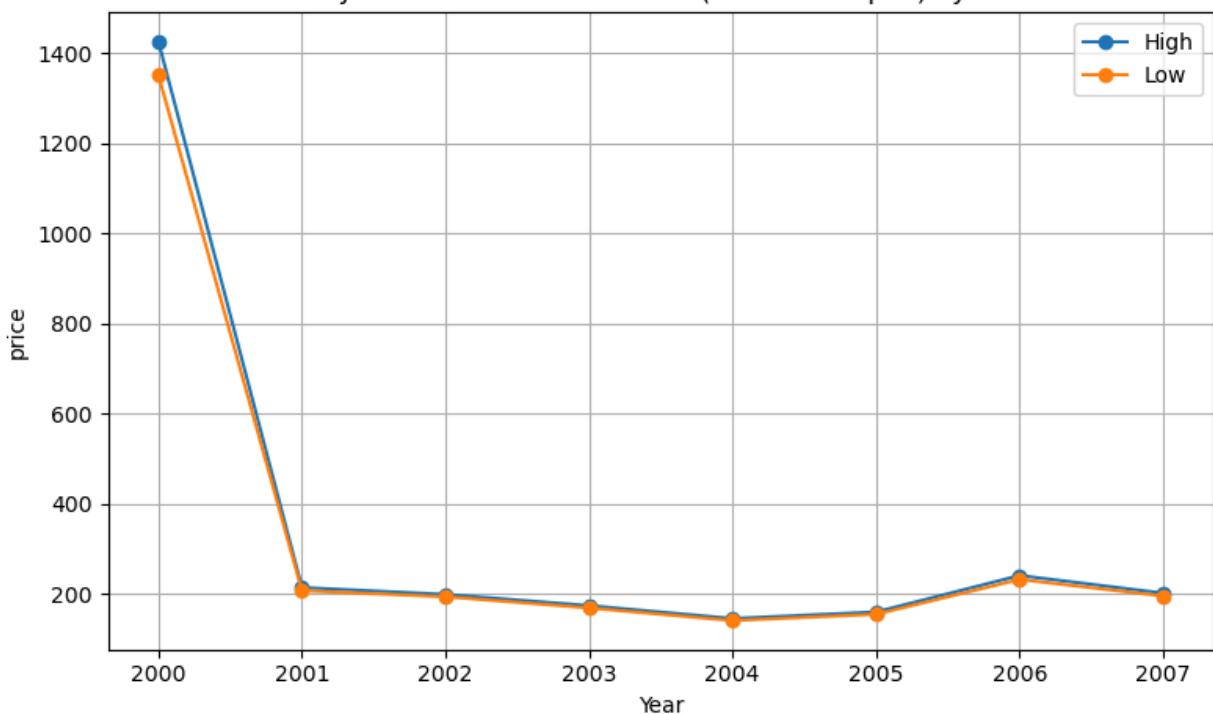
Nifty 50 Index for 'HINDALCO' (Close and Open) by Year



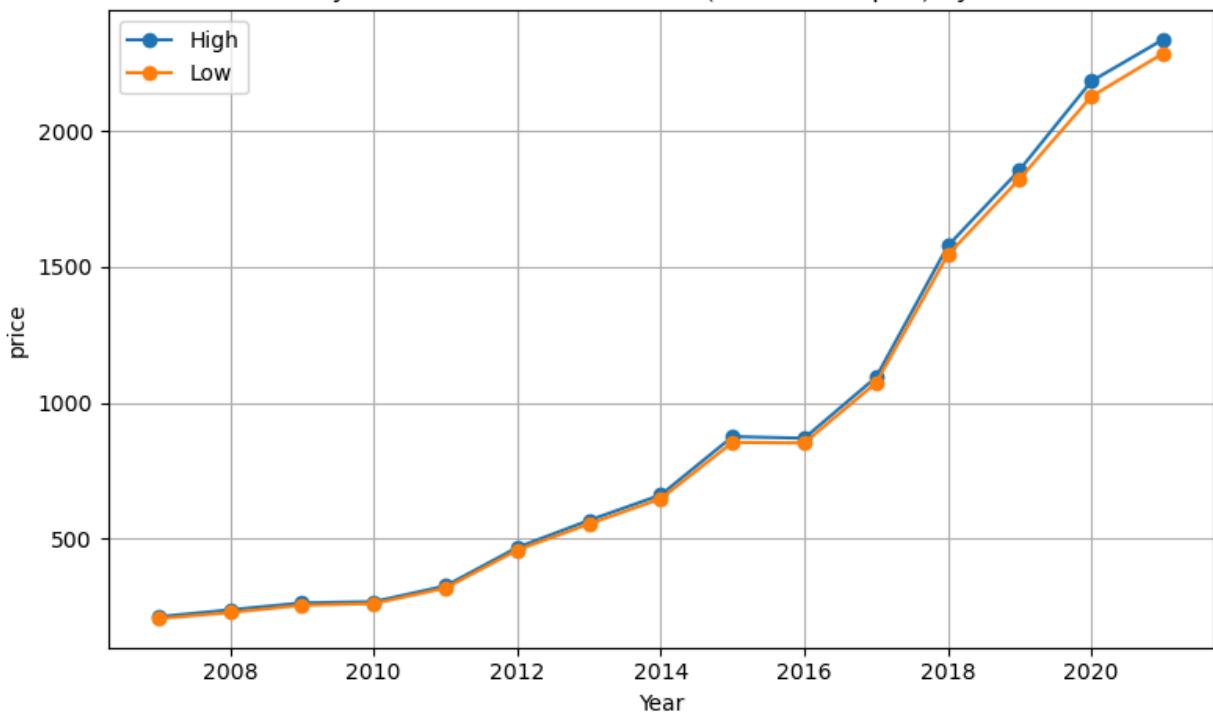
Nifty 50 Index for 'HINDALCO' (Close and Open) by Year



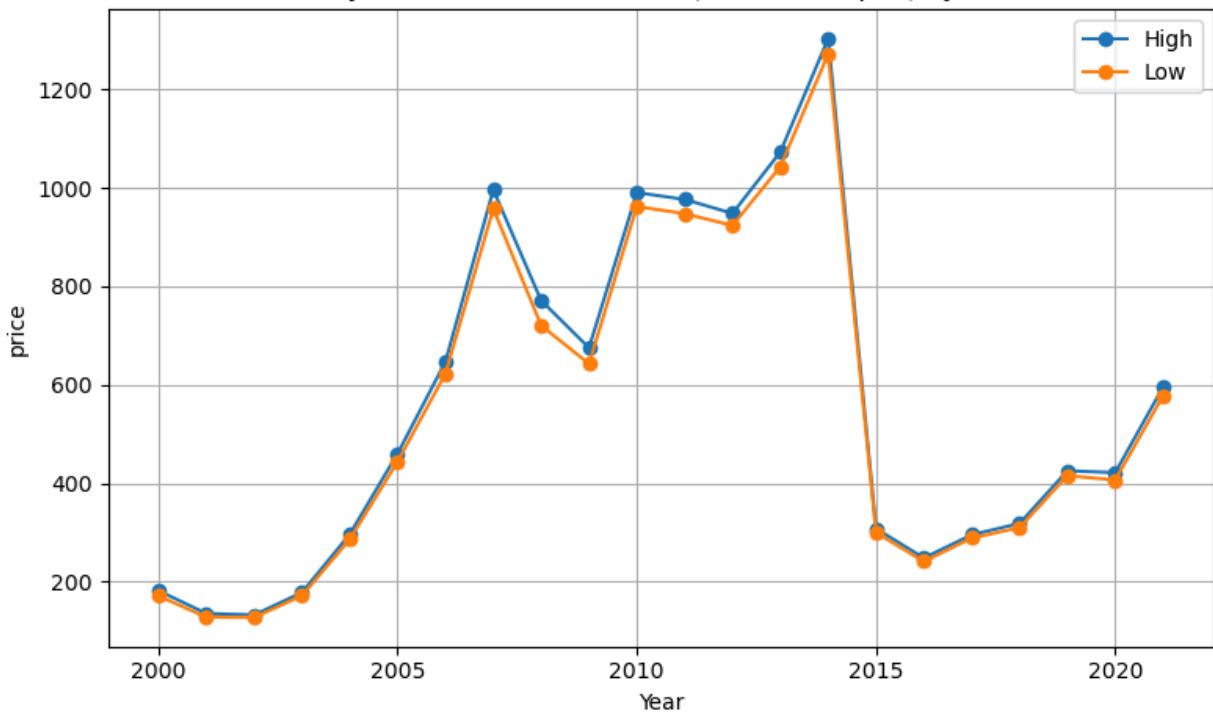
Nifty 50 Index for 'HINDLEVER' (Close and Open) by Year



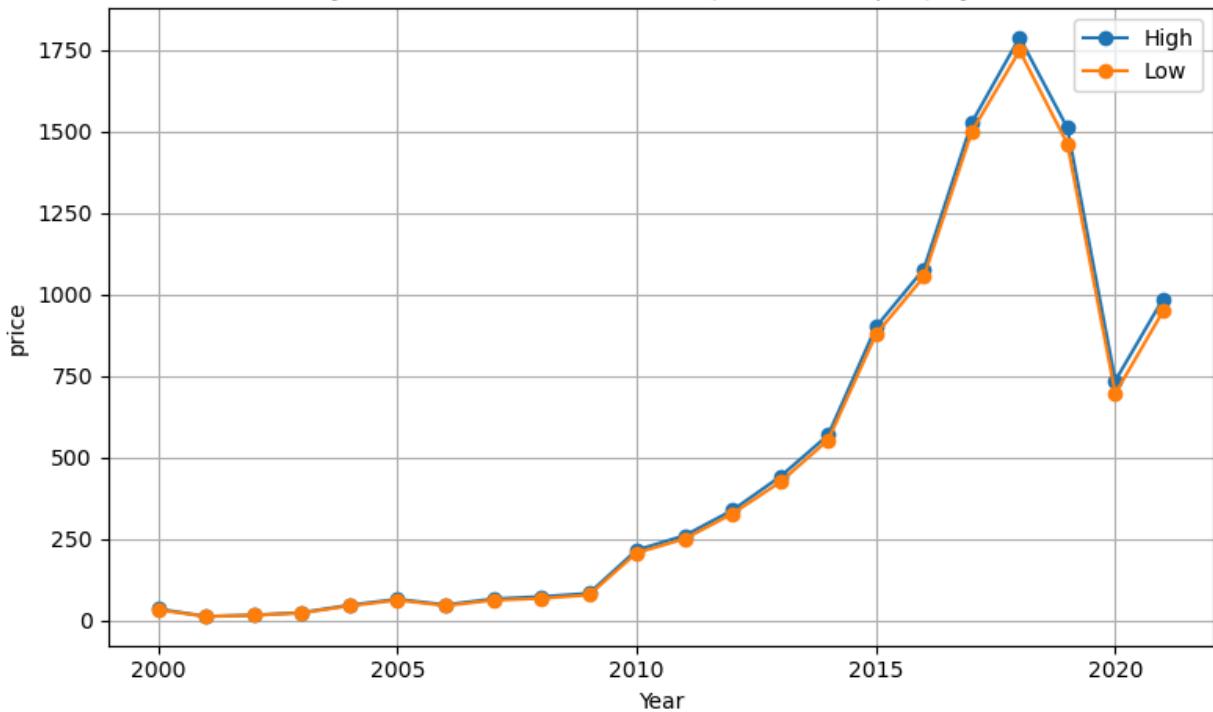
Nifty 50 Index for 'HINDUNILVR' (Close and Open) by Year



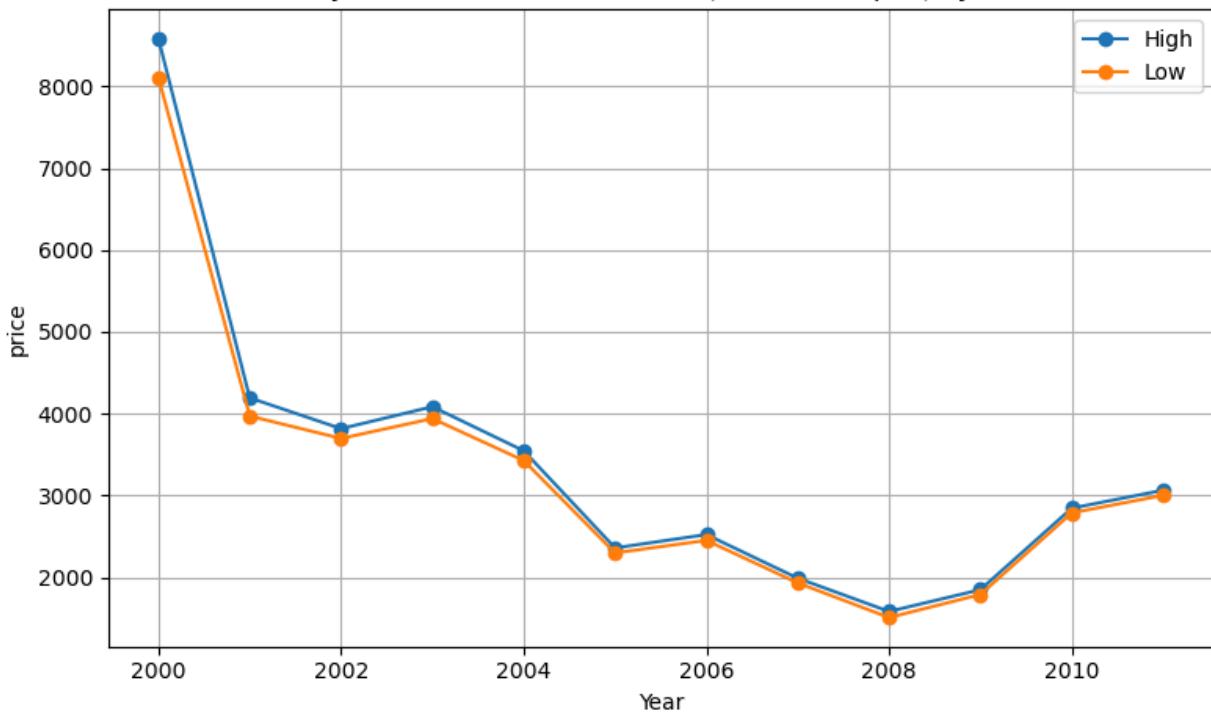
Nifty 50 Index for 'ICICIBANK' (Close and Open) by Year



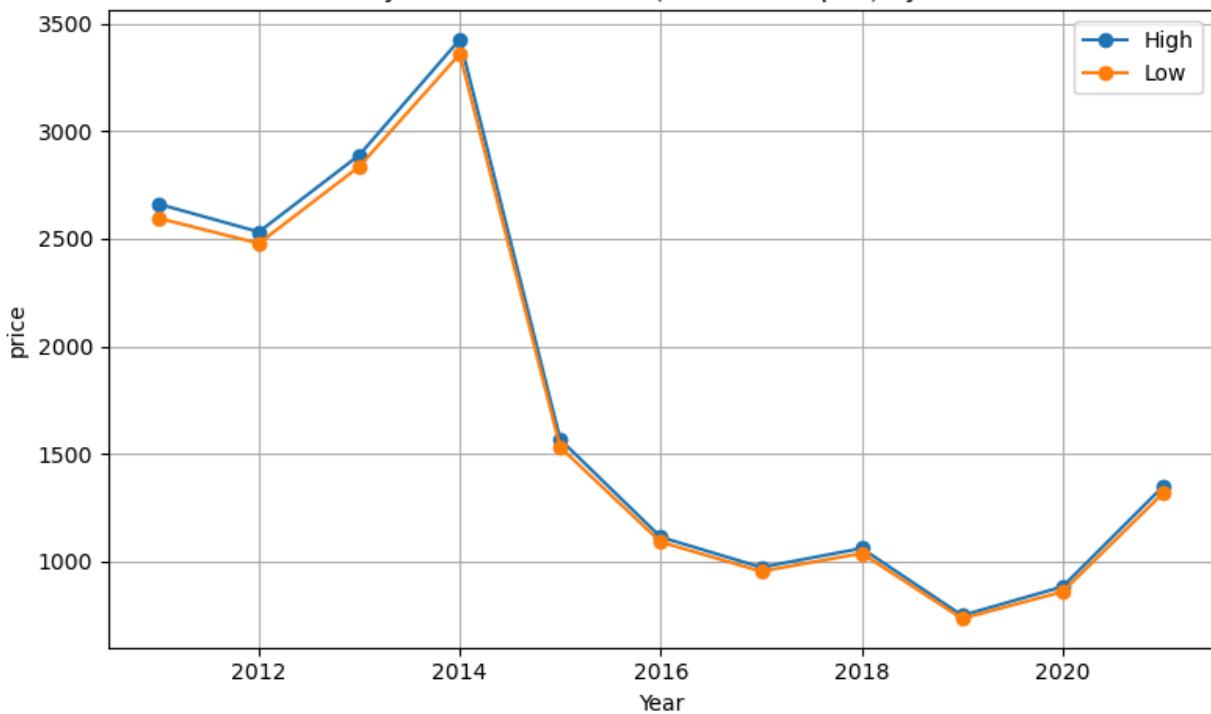
Nifty 50 Index for 'INDUSINDBK' (Close and Open) by Year



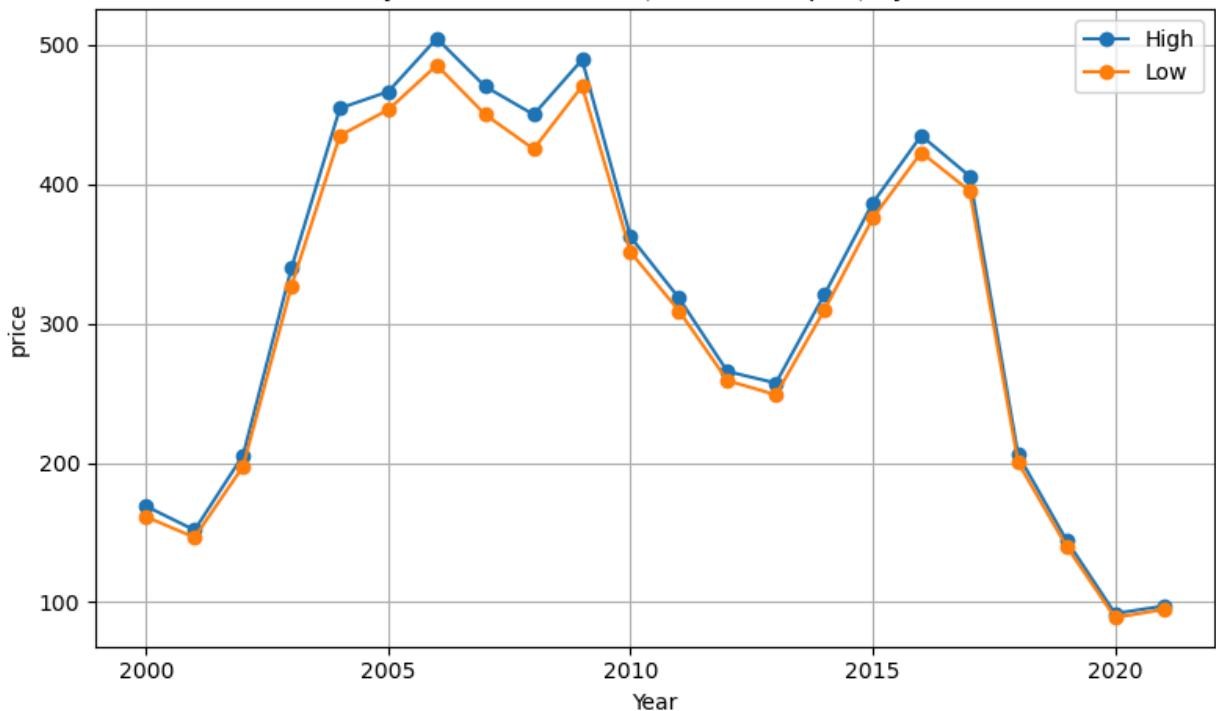
Nifty 50 Index for 'INFOSYSTCH' (Close and Open) by Year



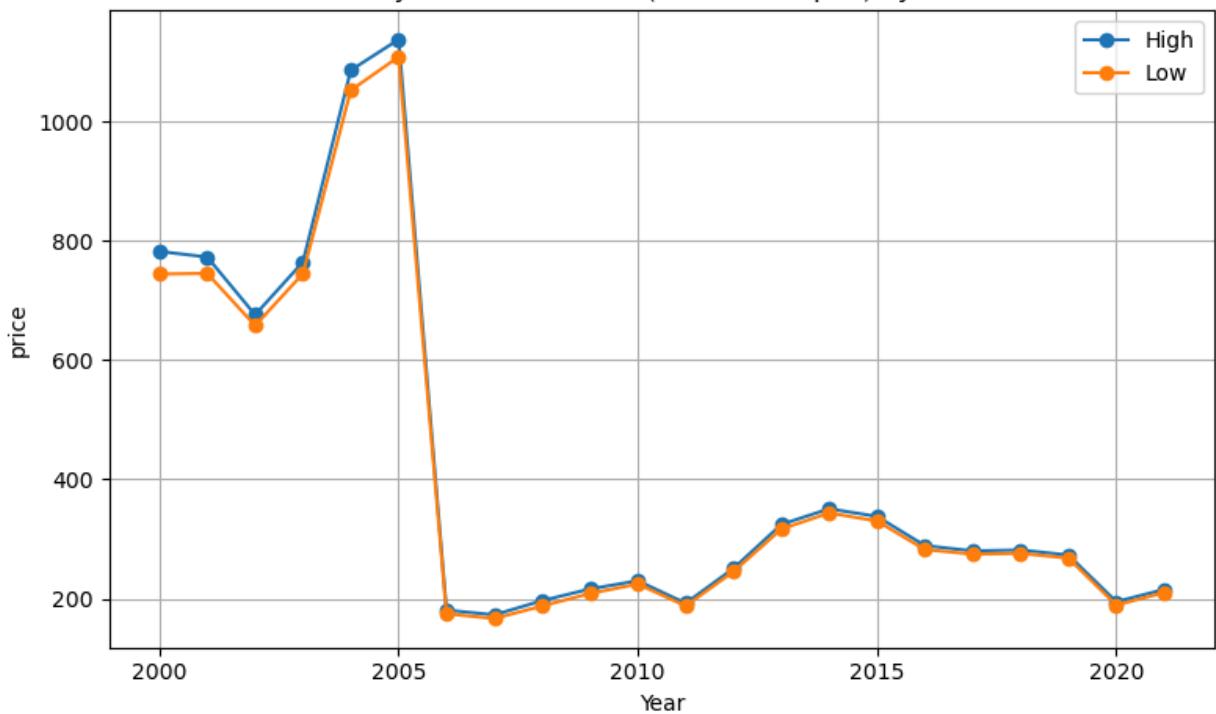
Nifty 50 Index for 'INFY' (Close and Open) by Year



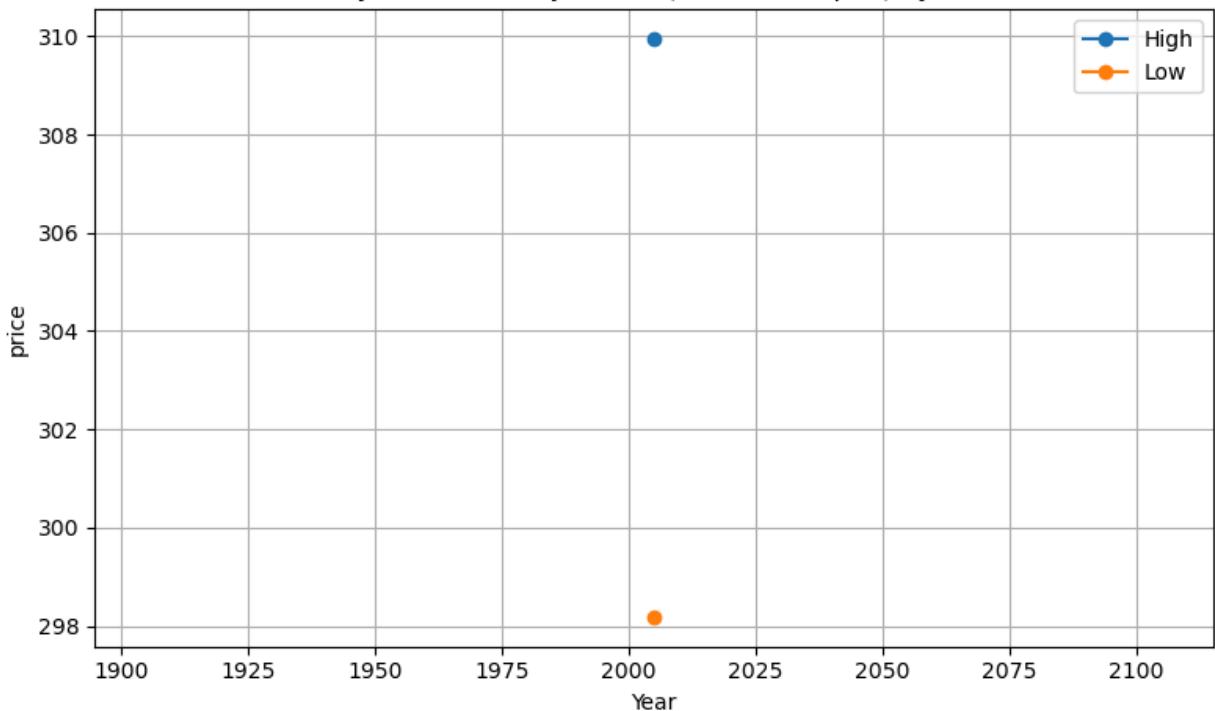
Nifty 50 Index for 'IOC' (Close and Open) by Year



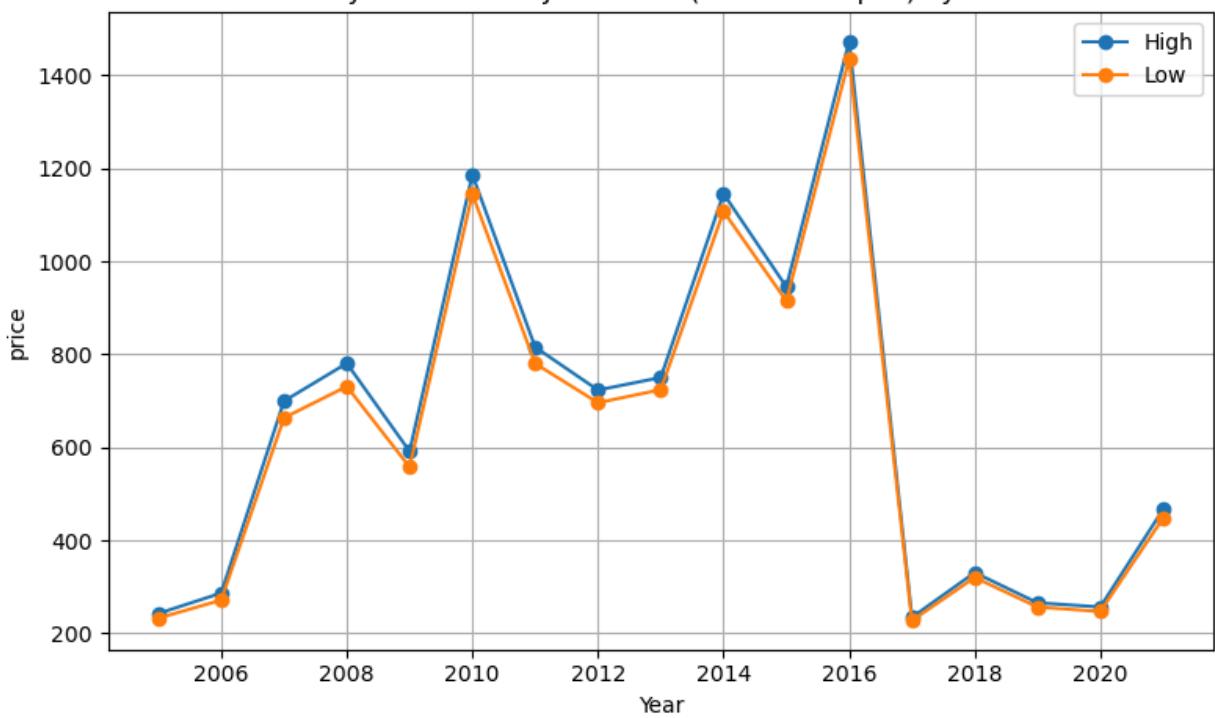
Nifty 50 Index for 'ITC' (Close and Open) by Year



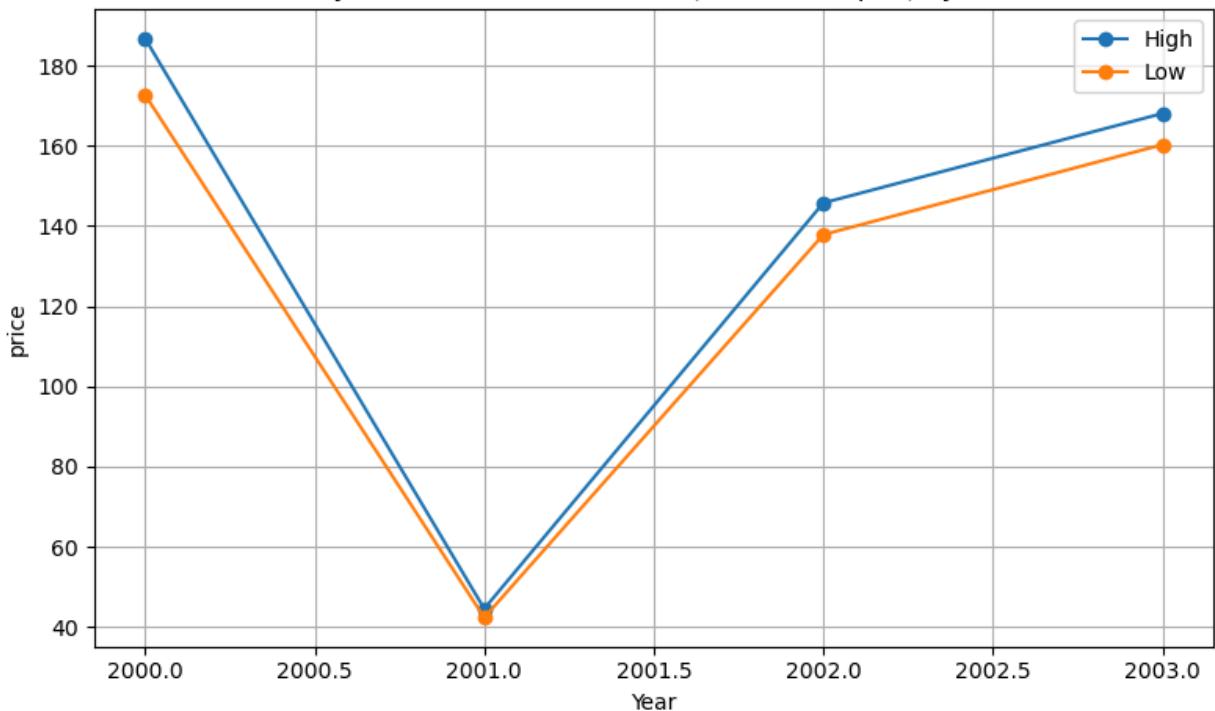
Nifty 50 Index for 'JSWSTL' (Close and Open) by Year



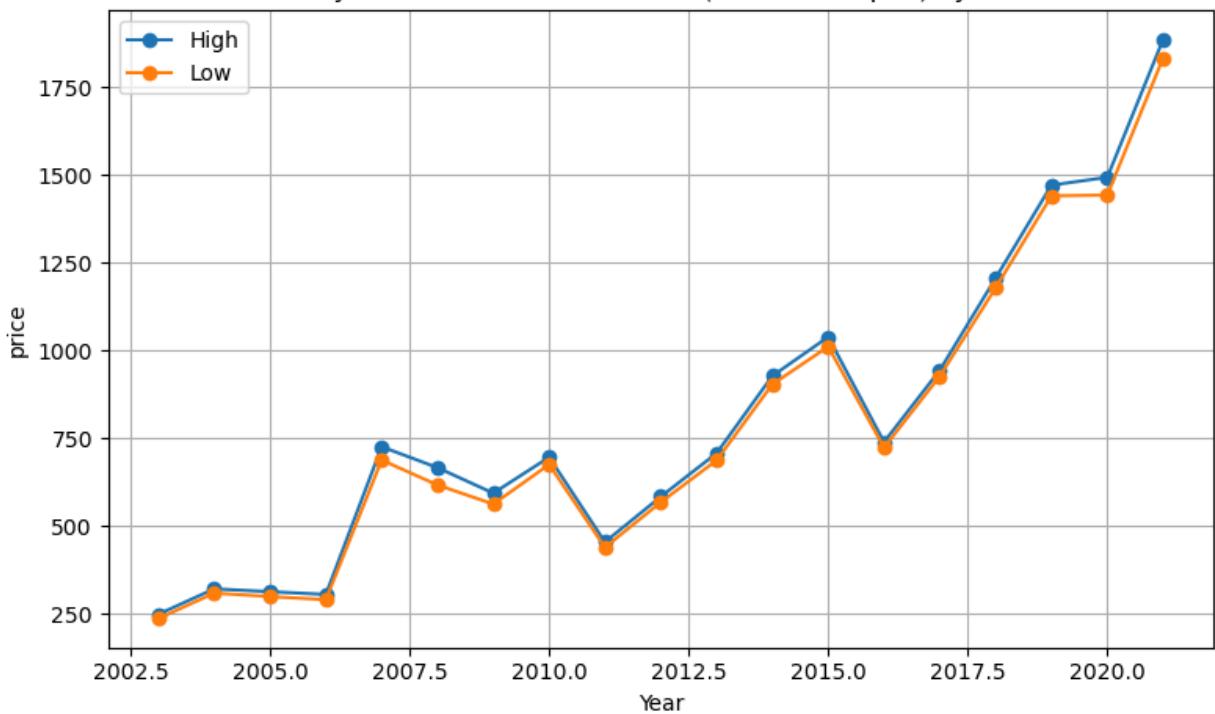
Nifty 50 Index for 'JSWSTEEL' (Close and Open) by Year



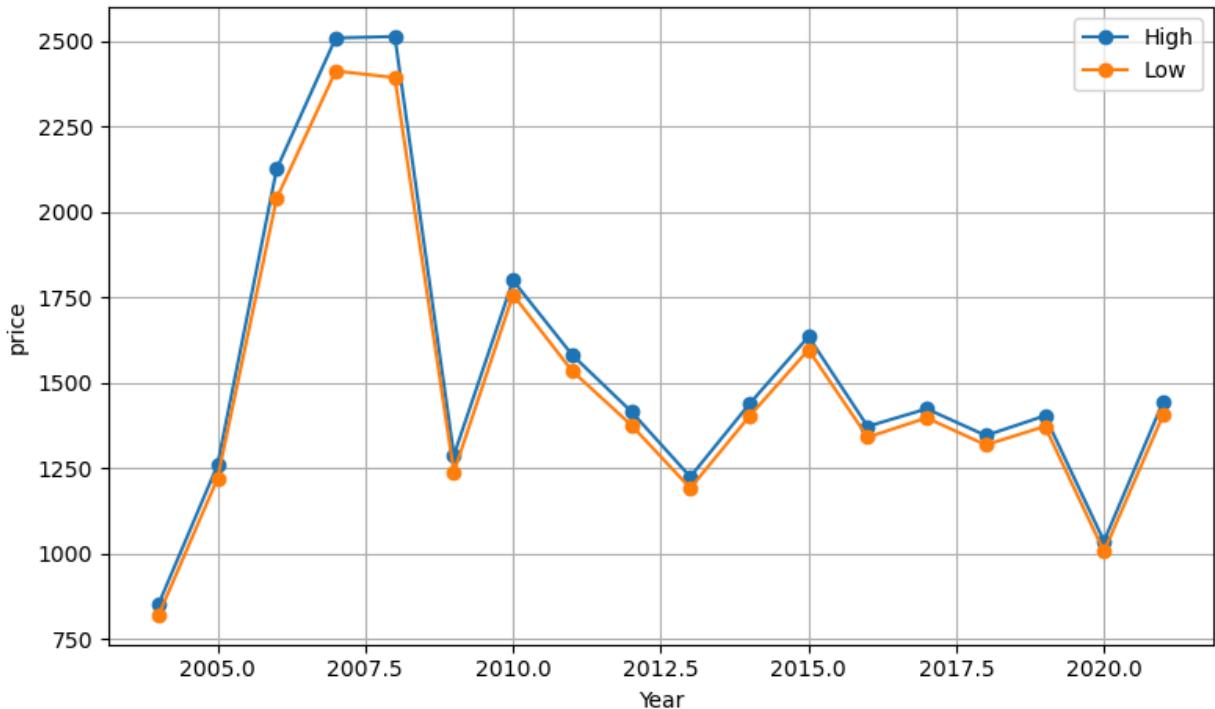
Nifty 50 Index for 'KOTAKMAH' (Close and Open) by Year



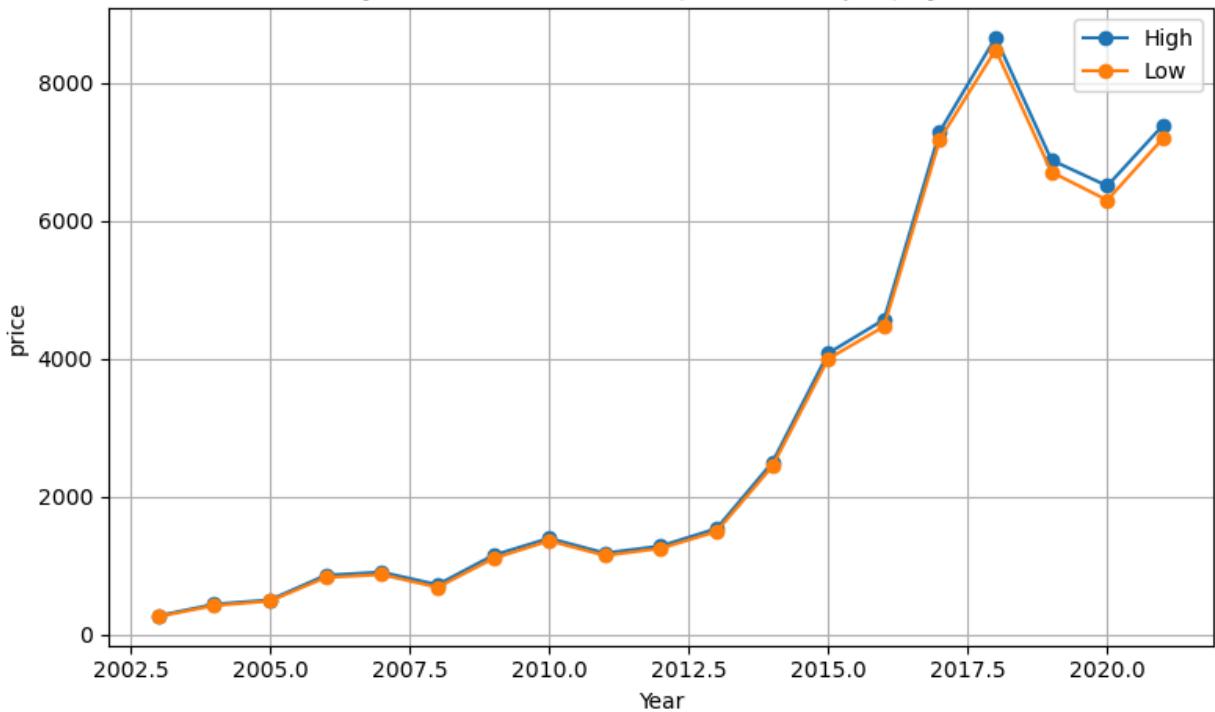
Nifty 50 Index for 'KOTAKBANK' (Close and Open) by Year



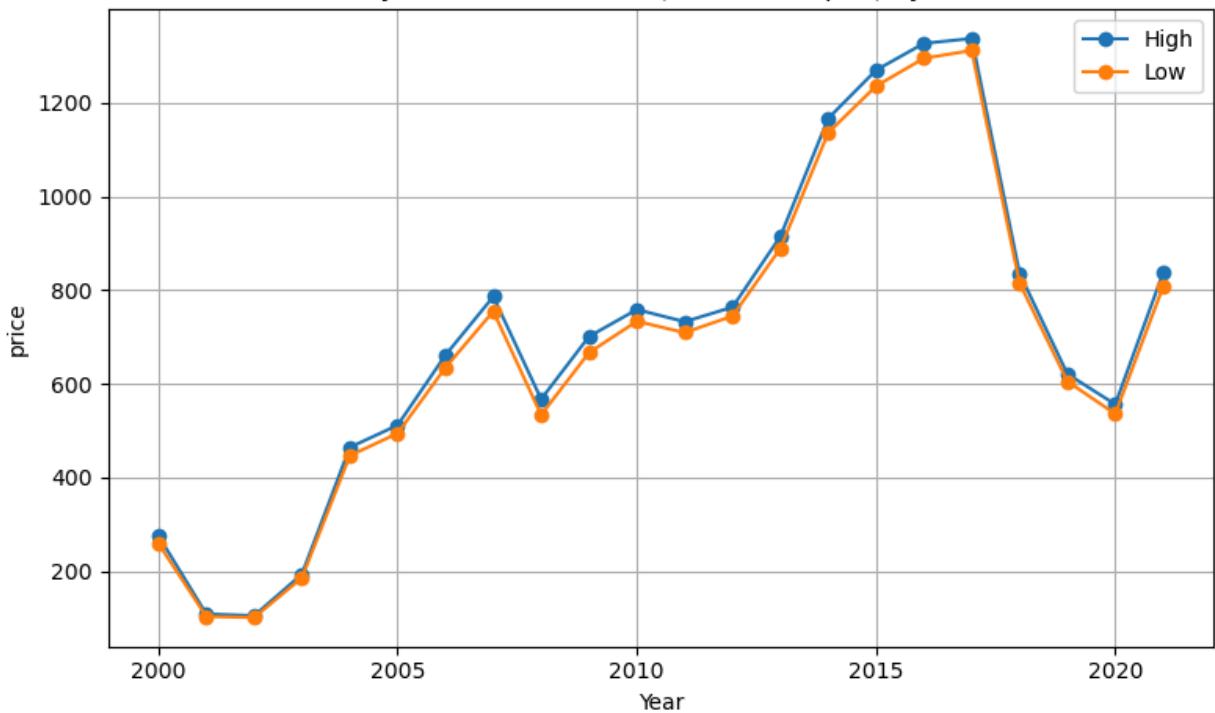
Nifty 50 Index for 'LT' (Close and Open) by Year



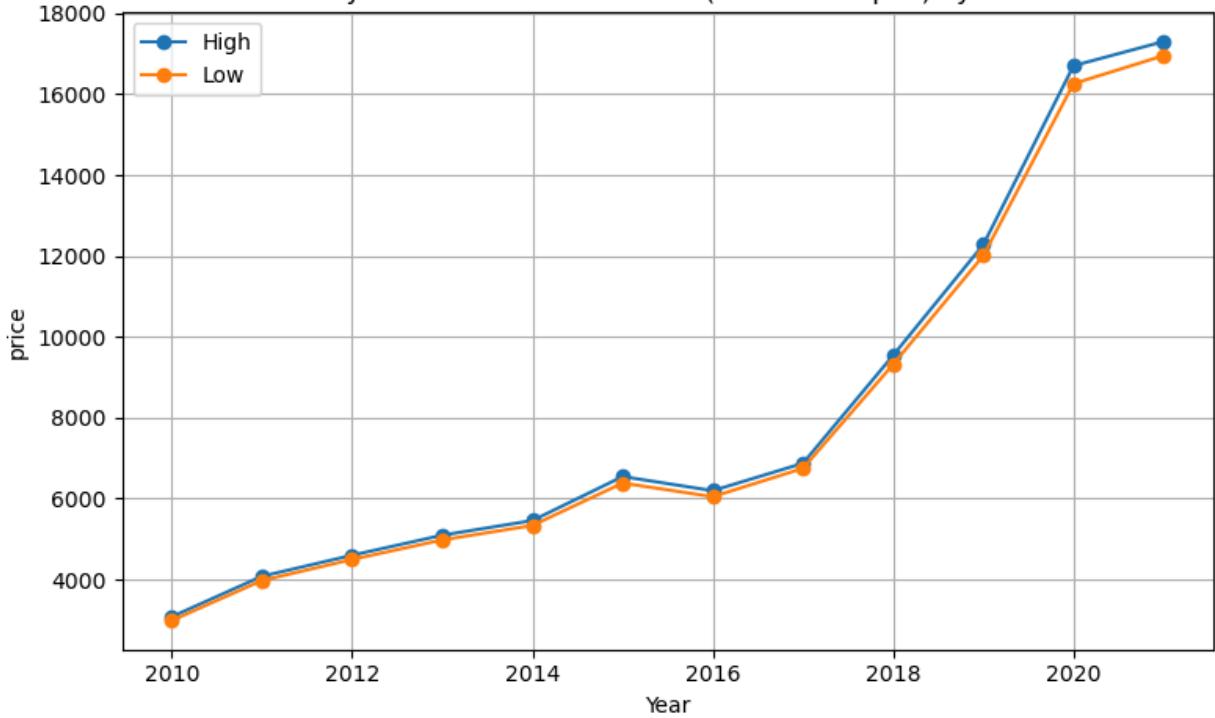
Nifty 50 Index for 'MARUTI' (Close and Open) by Year



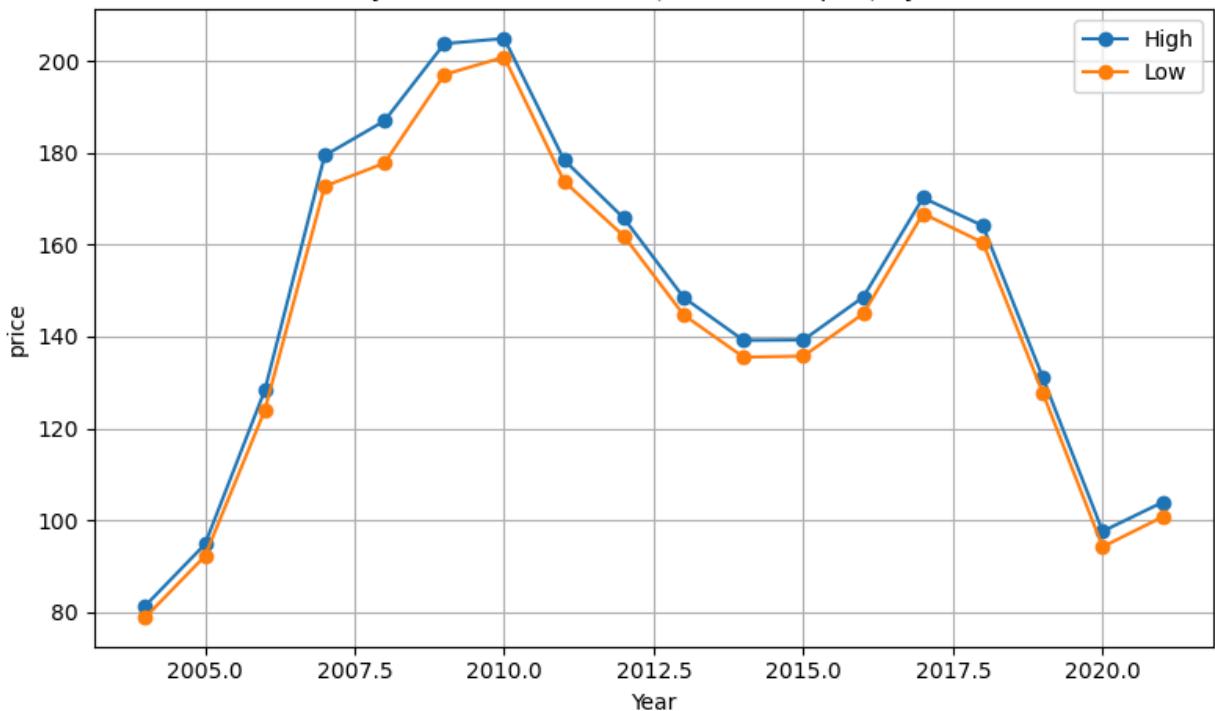
Nifty 50 Index for 'M&M' (Close and Open) by Year



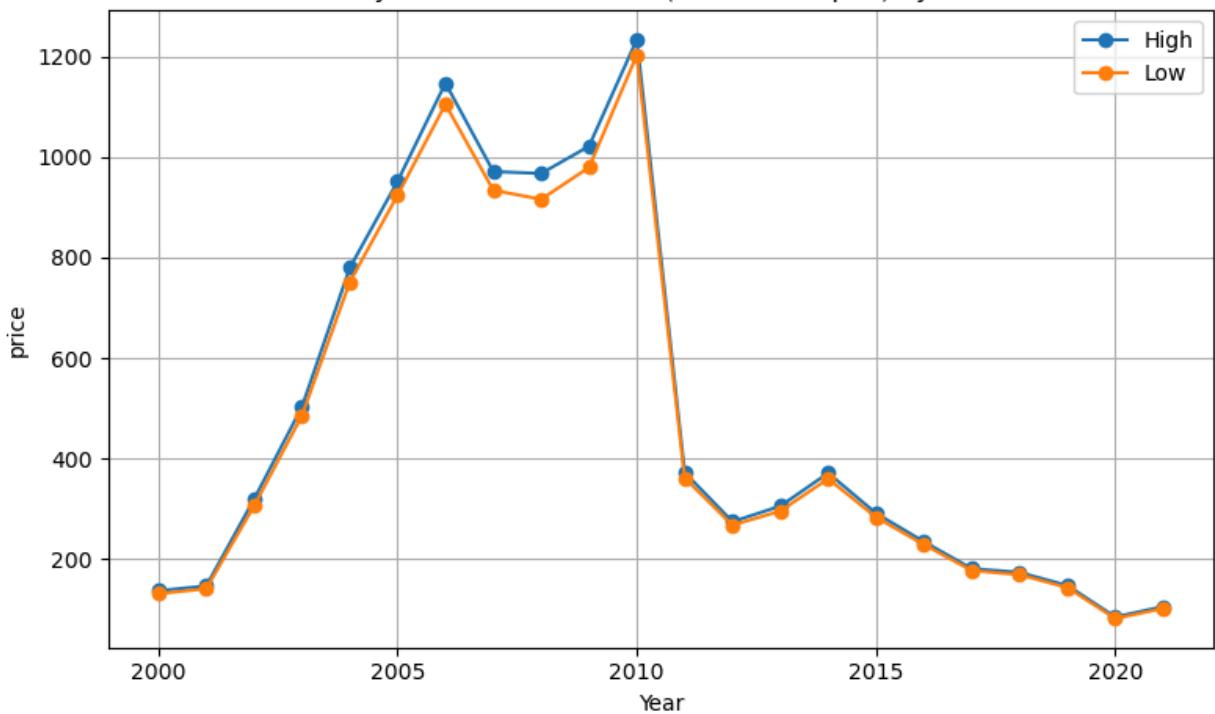
Nifty 50 Index for 'NESTLEIND' (Close and Open) by Year

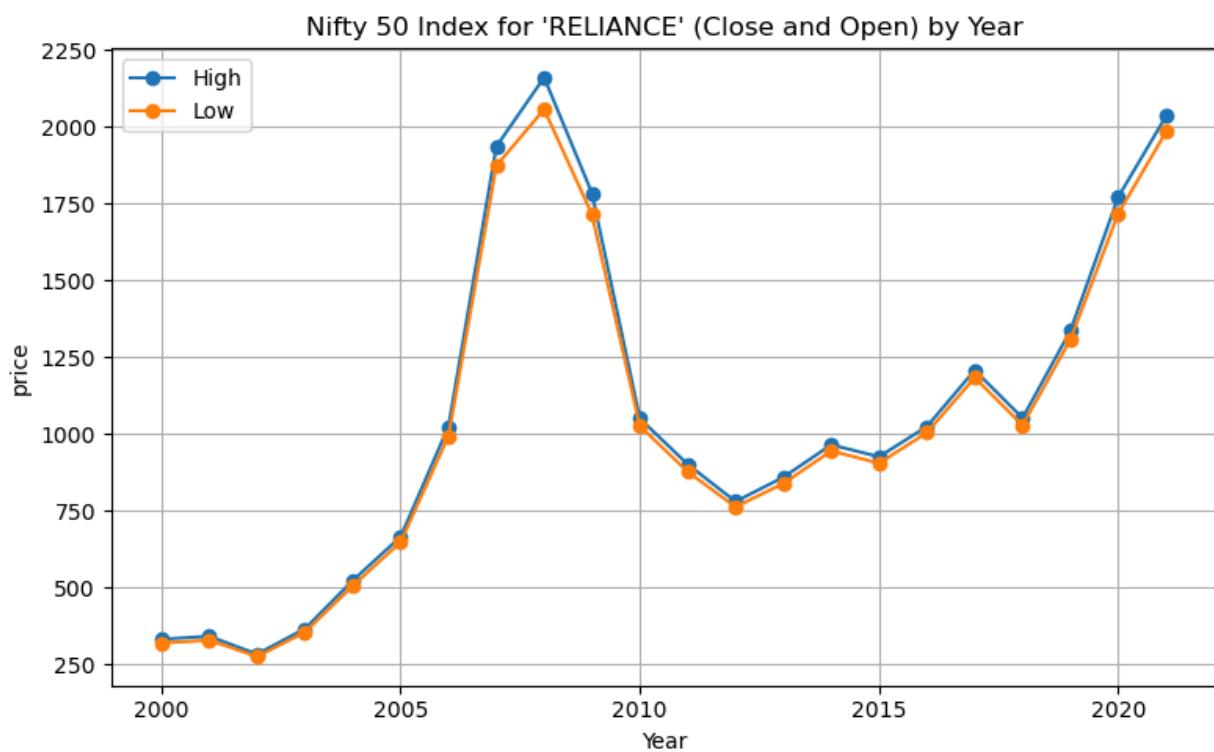
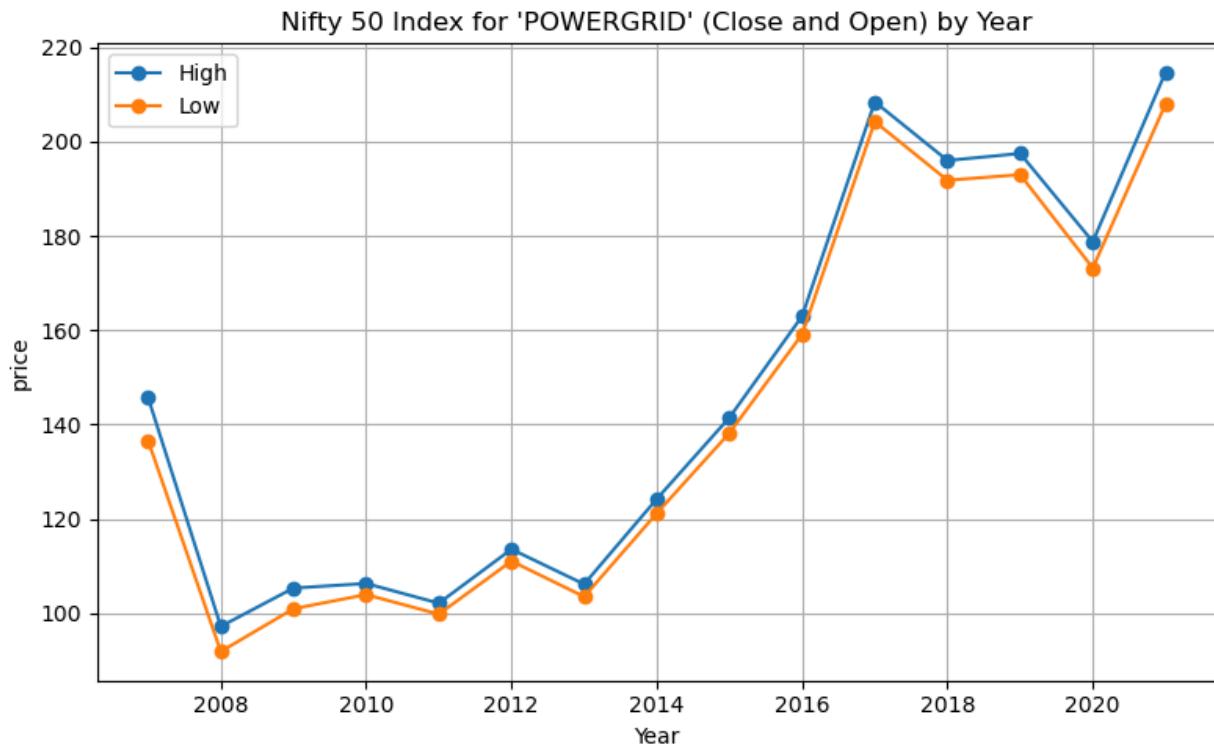


Nifty 50 Index for 'NTPC' (Close and Open) by Year

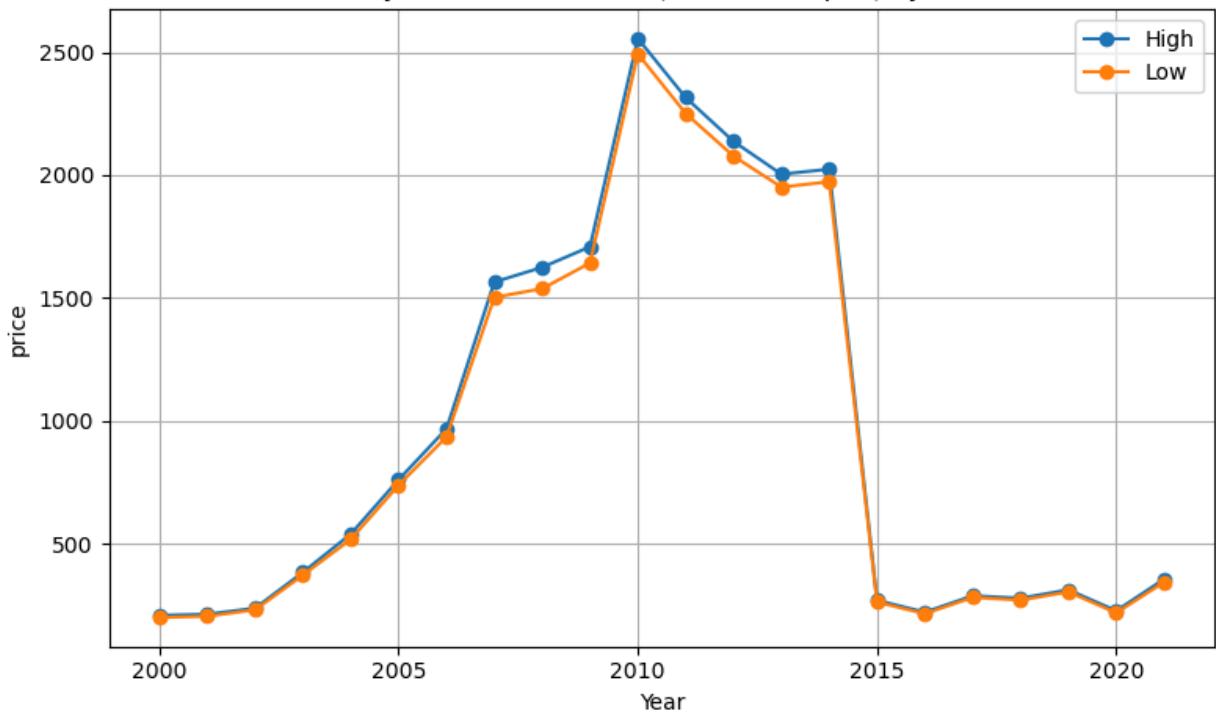


Nifty 50 Index for 'ONGC' (Close and Open) by Year

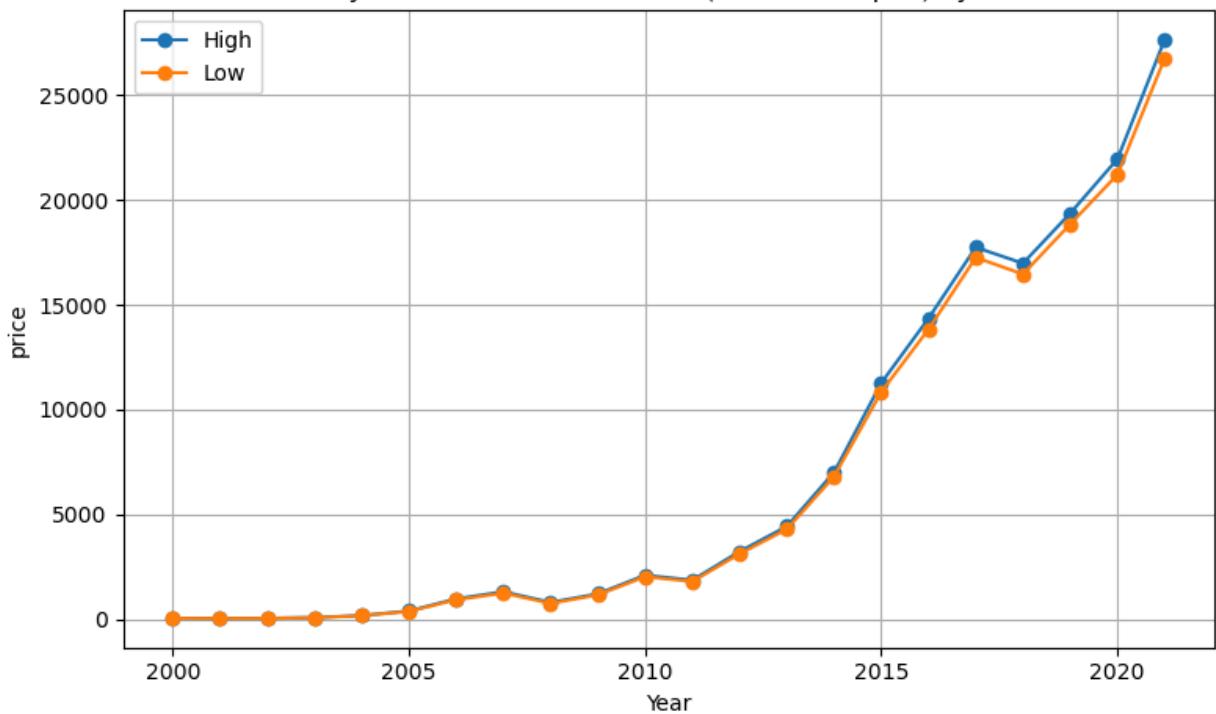




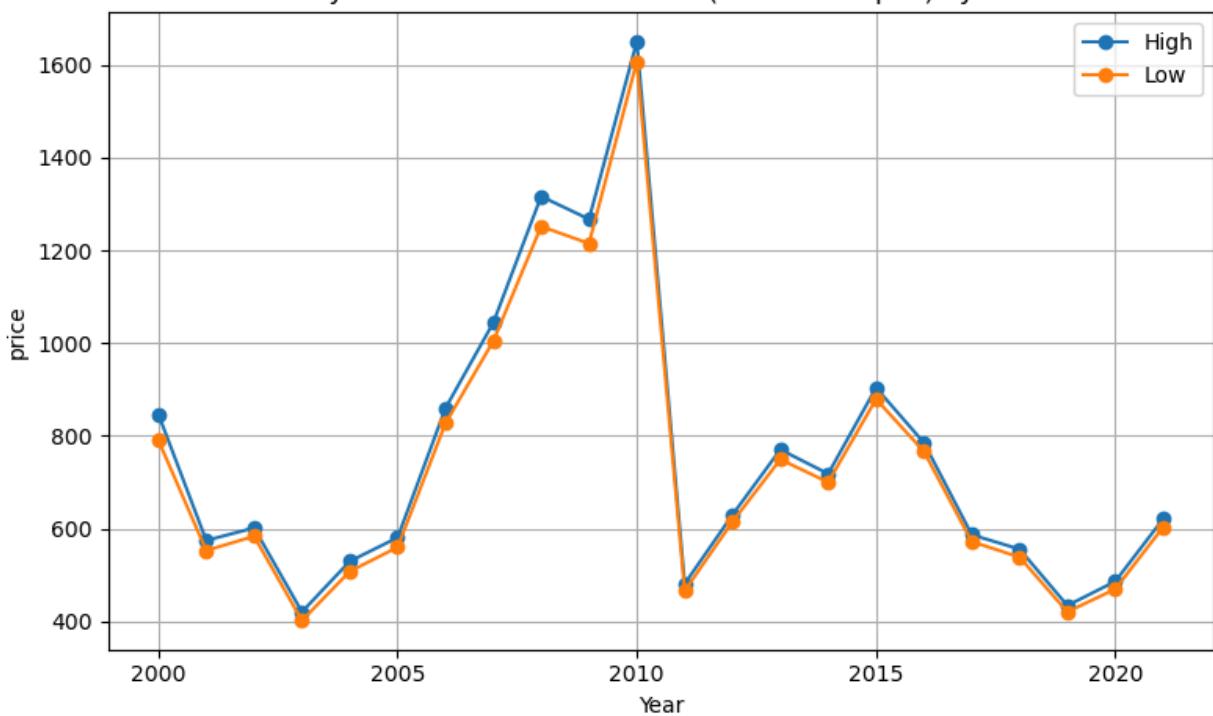
Nifty 50 Index for 'SBIN' (Close and Open) by Year



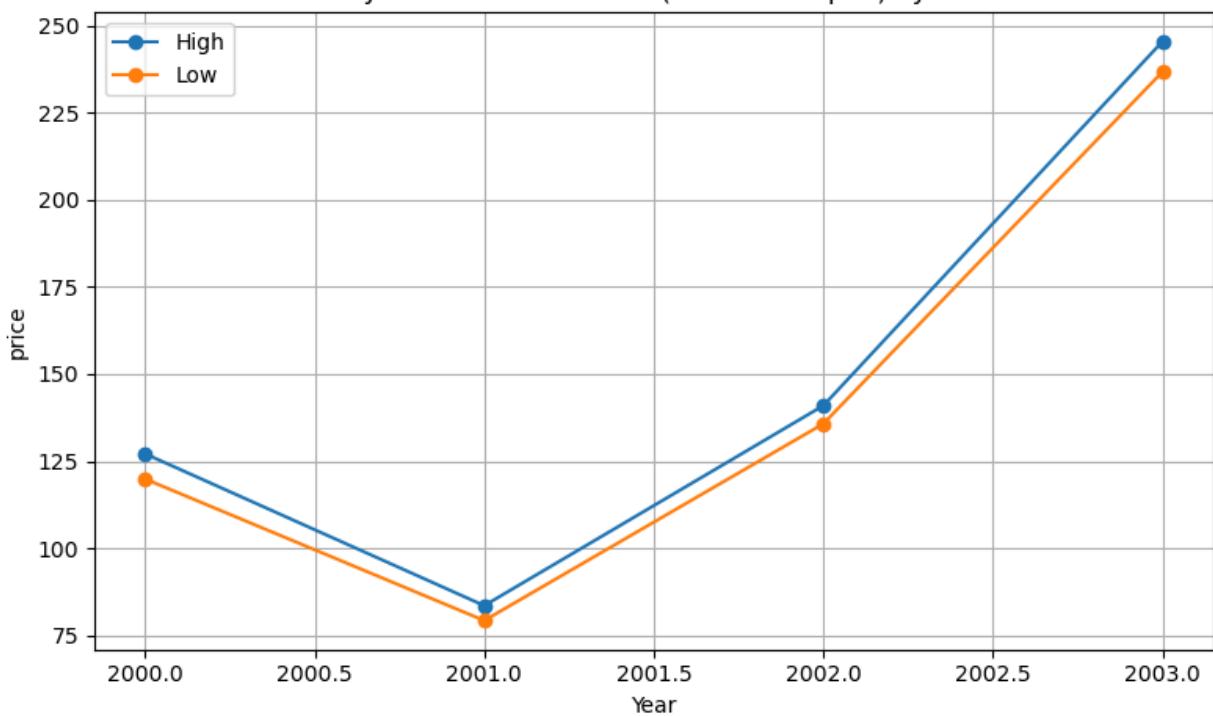
Nifty 50 Index for 'SHREECEM' (Close and Open) by Year



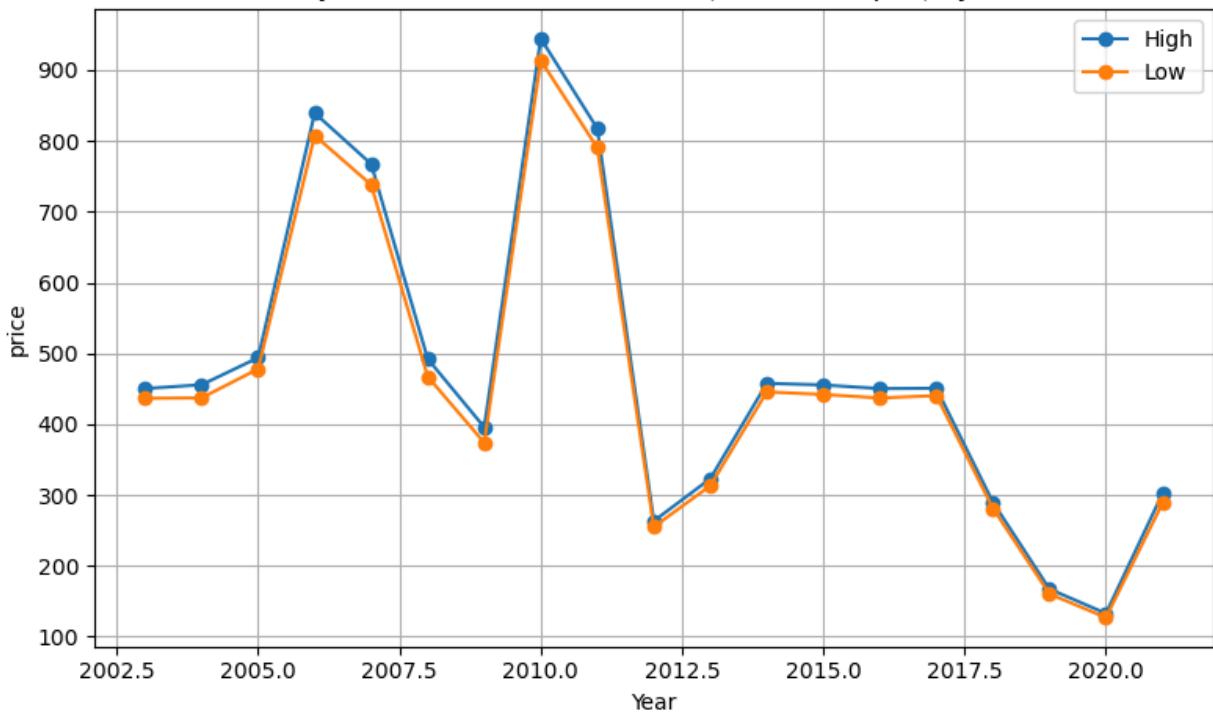
Nifty 50 Index for 'SUNPHARMA' (Close and Open) by Year



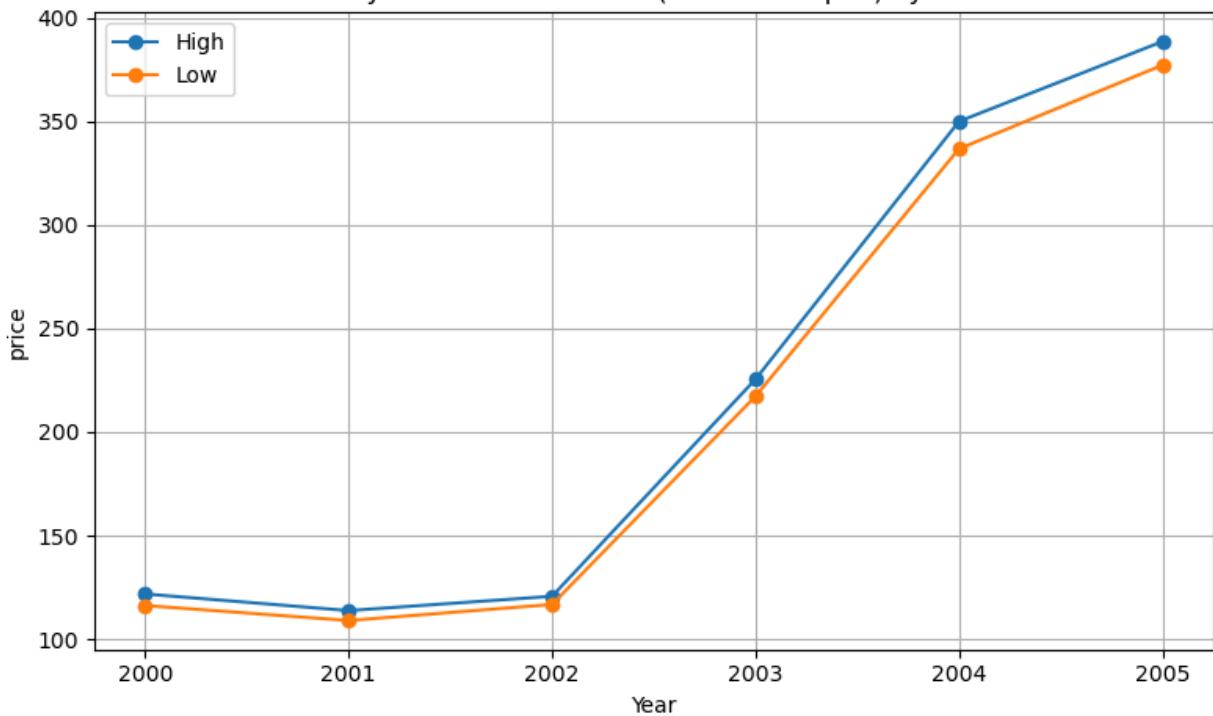
Nifty 50 Index for 'TELCO' (Close and Open) by Year



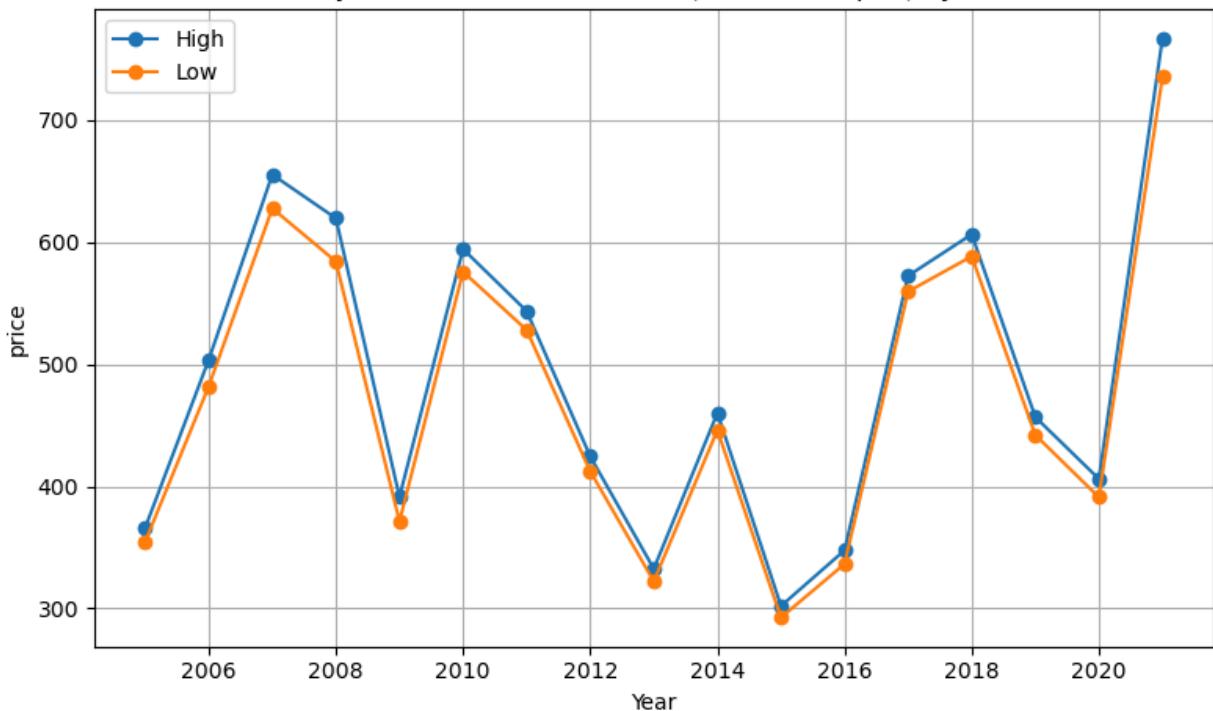
Nifty 50 Index for 'TATAMOTORS' (Close and Open) by Year



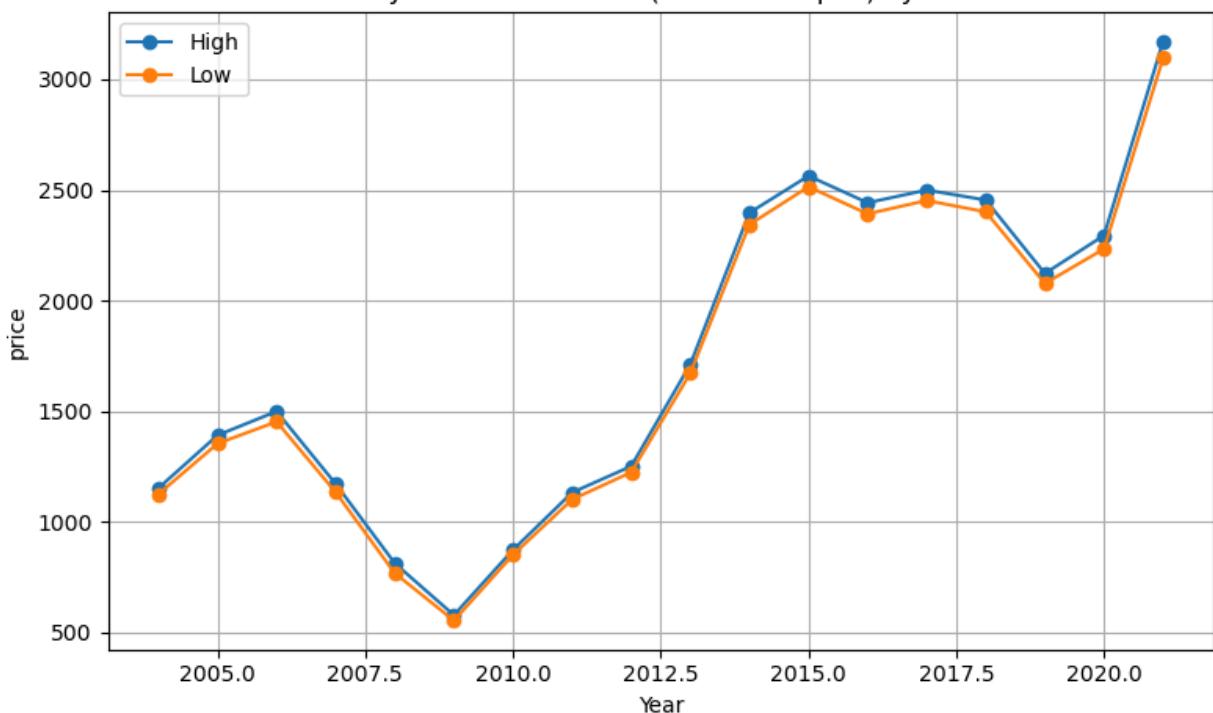
Nifty 50 Index for 'TISCO' (Close and Open) by Year



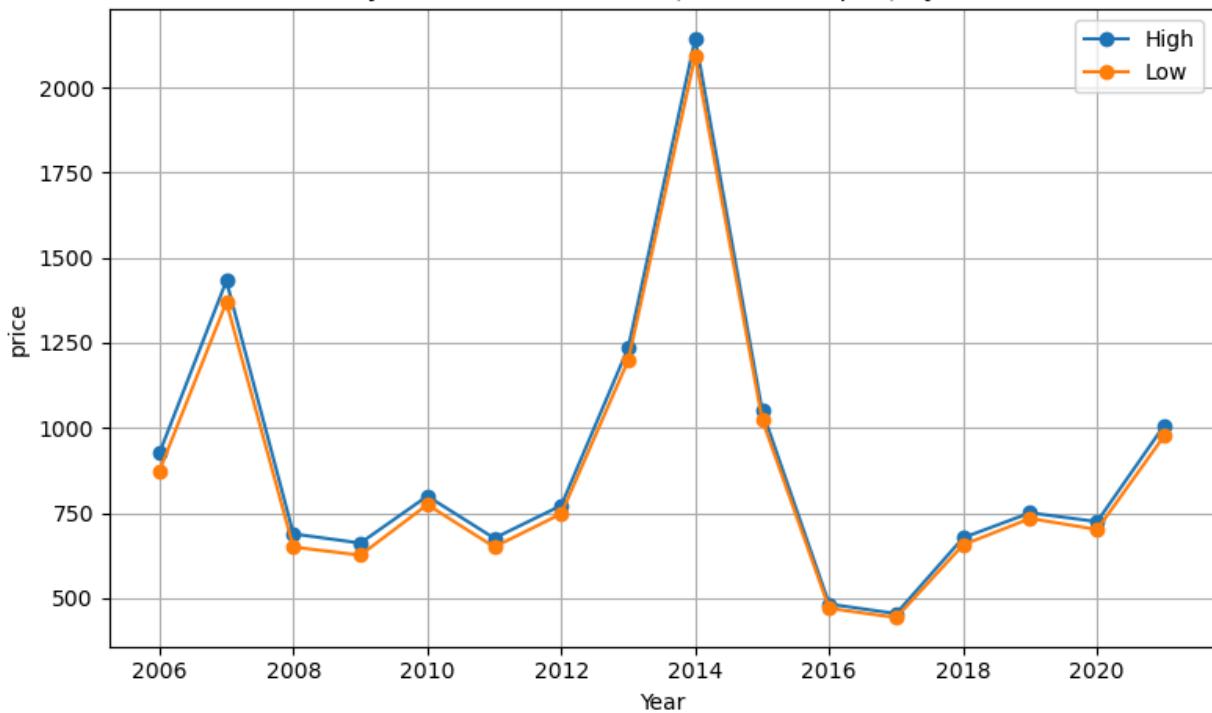
Nifty 50 Index for 'TATASTEEL' (Close and Open) by Year



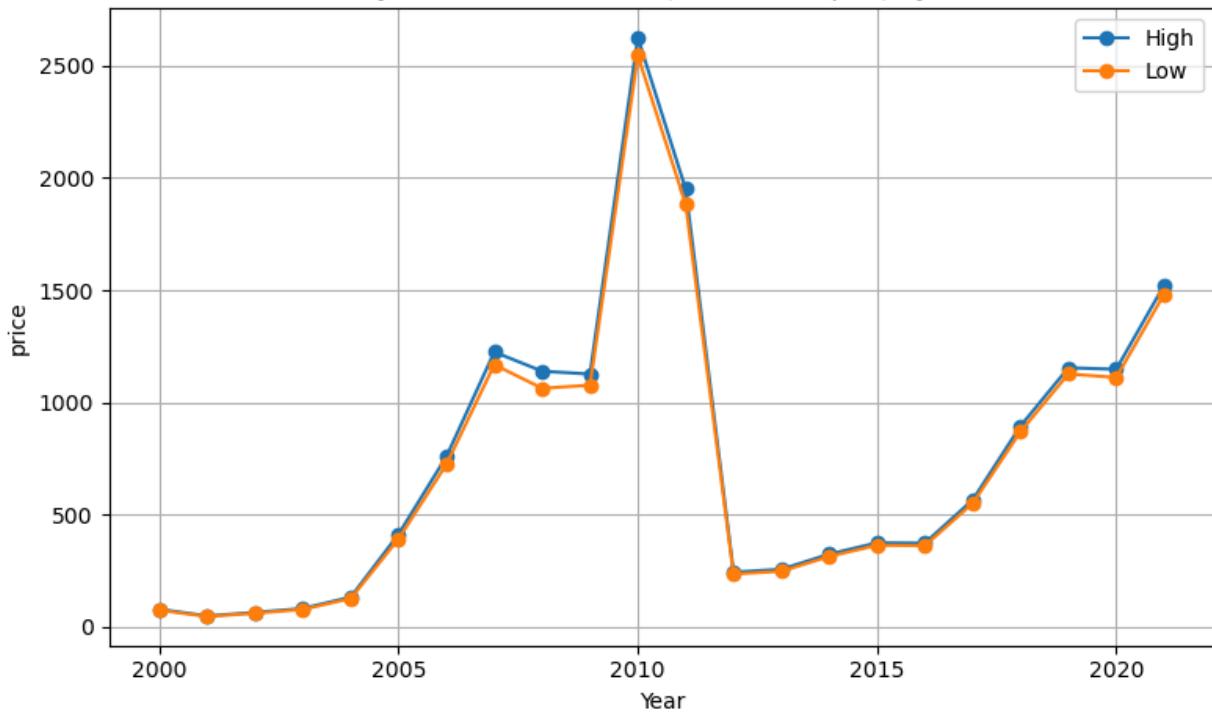
Nifty 50 Index for 'TCS' (Close and Open) by Year



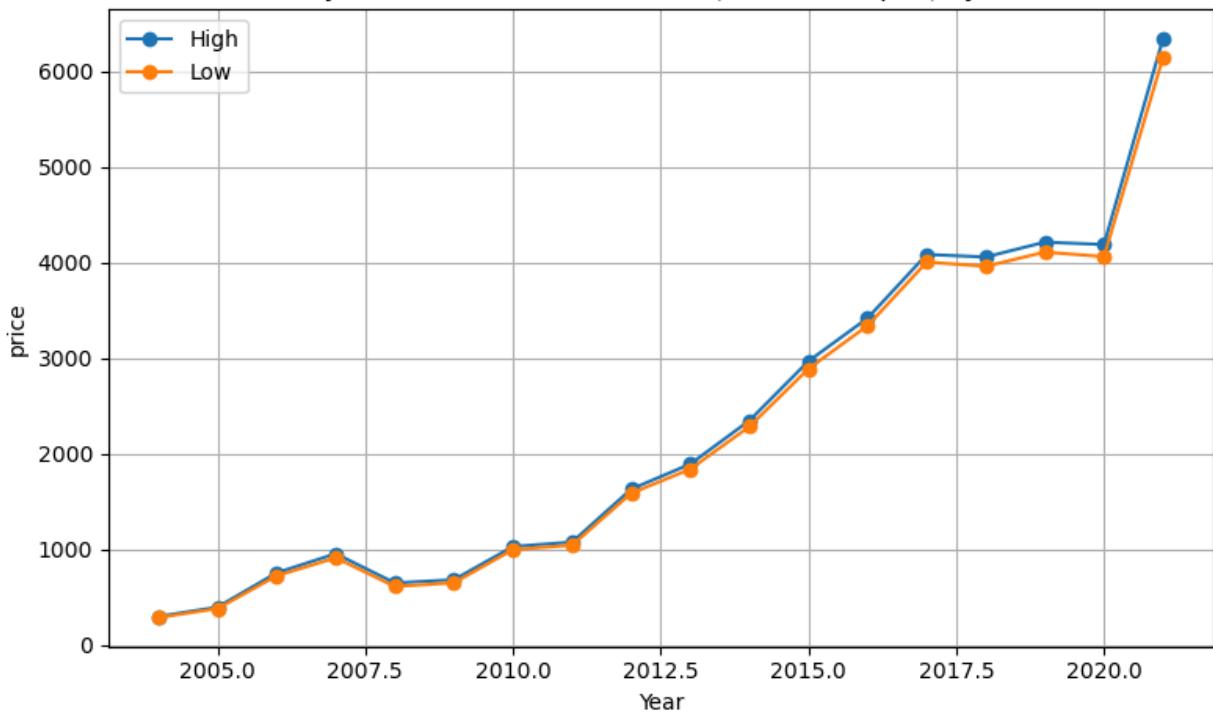
Nifty 50 Index for 'TECHM' (Close and Open) by Year



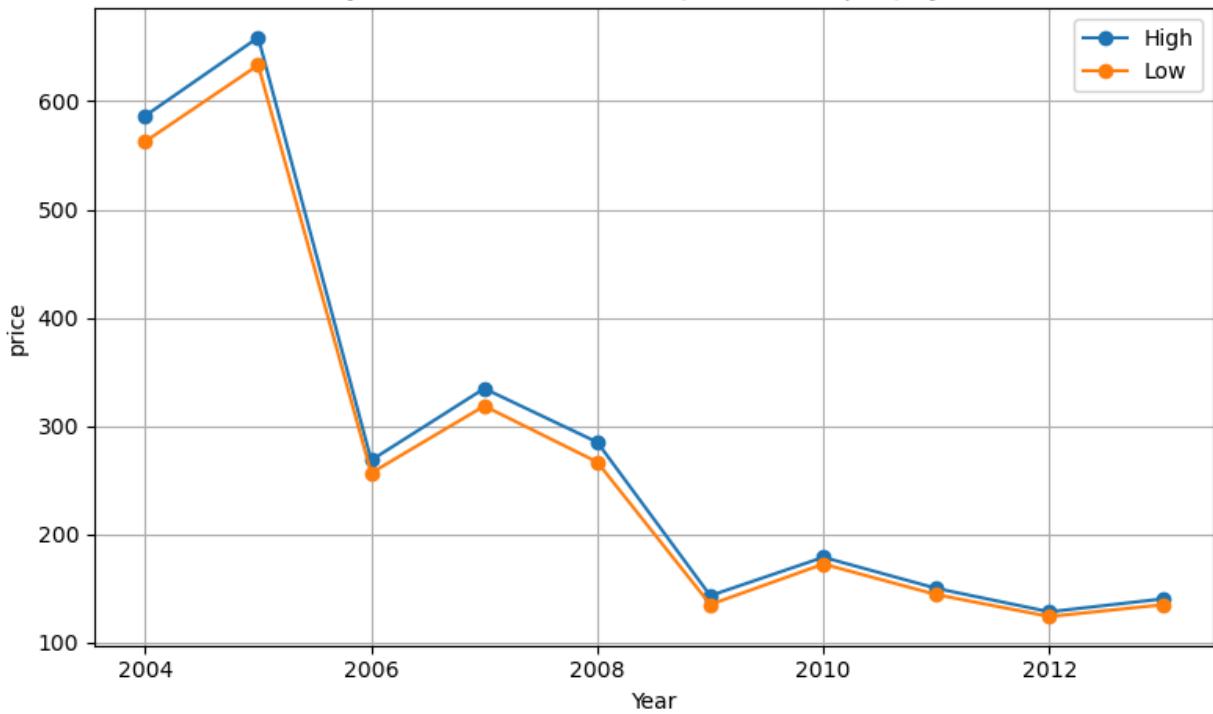
Nifty 50 Index for 'TITAN' (Close and Open) by Year

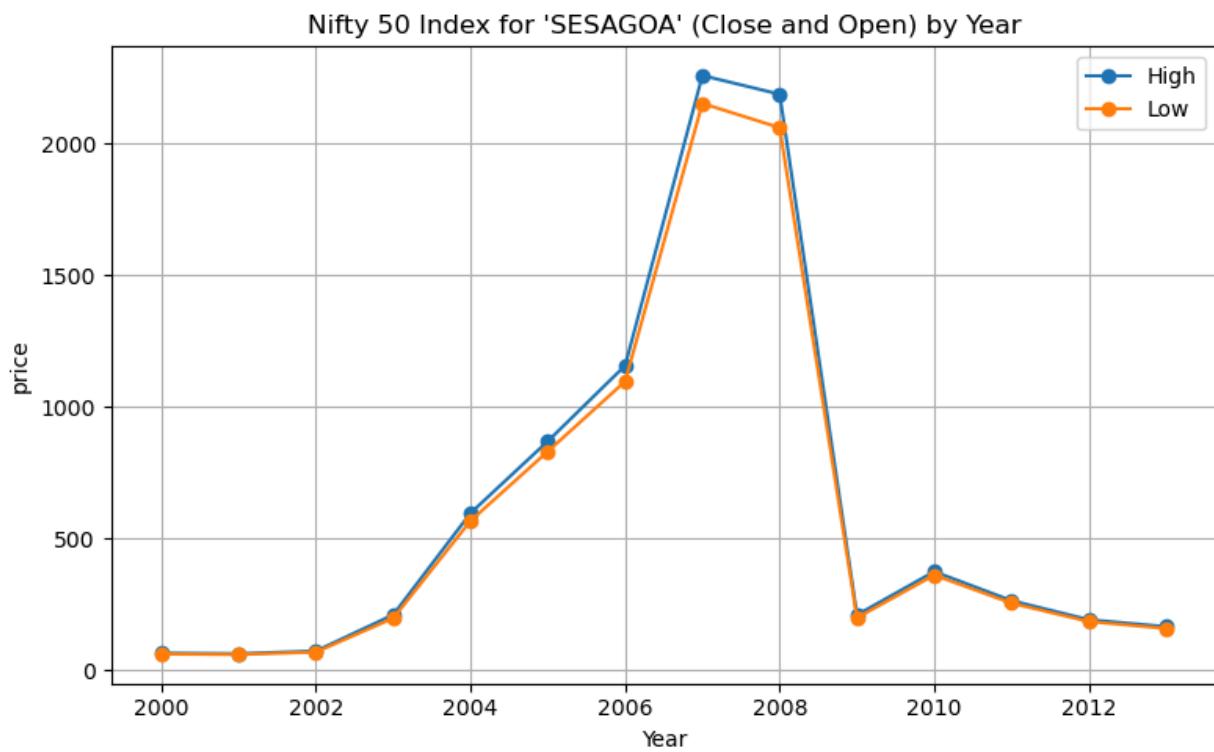
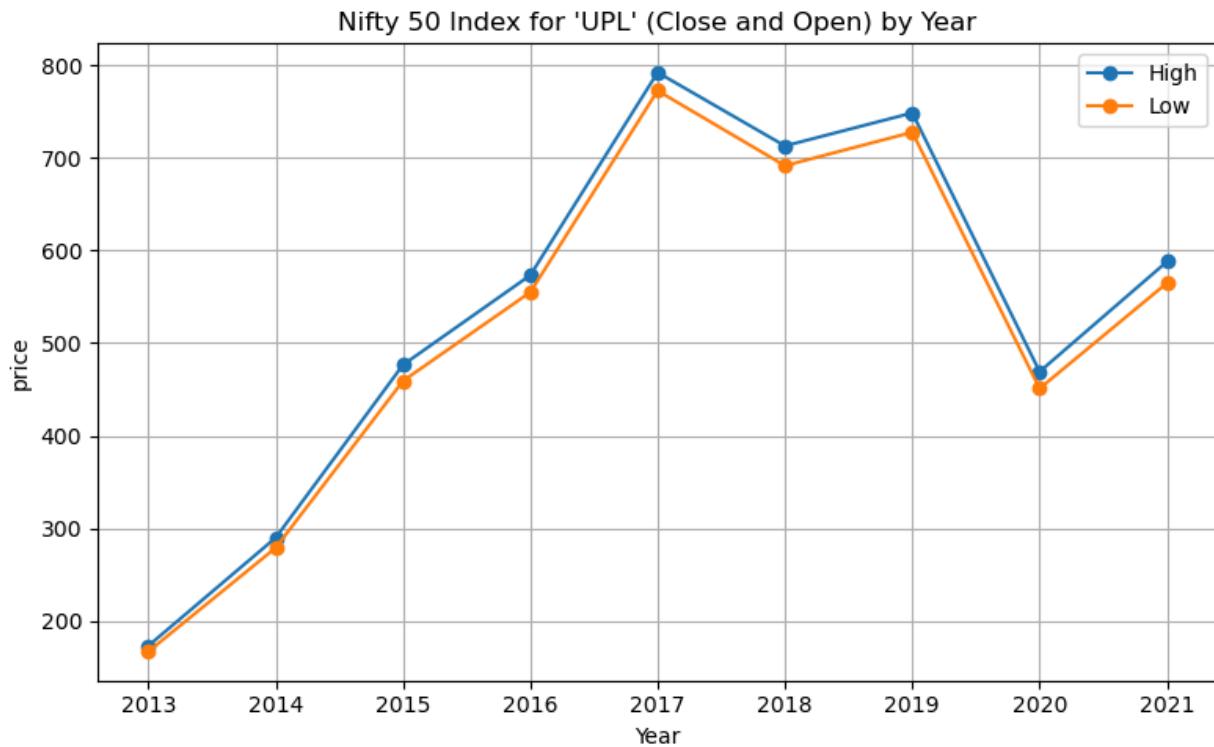


Nifty 50 Index for 'ULTRACEMCO' (Close and Open) by Year

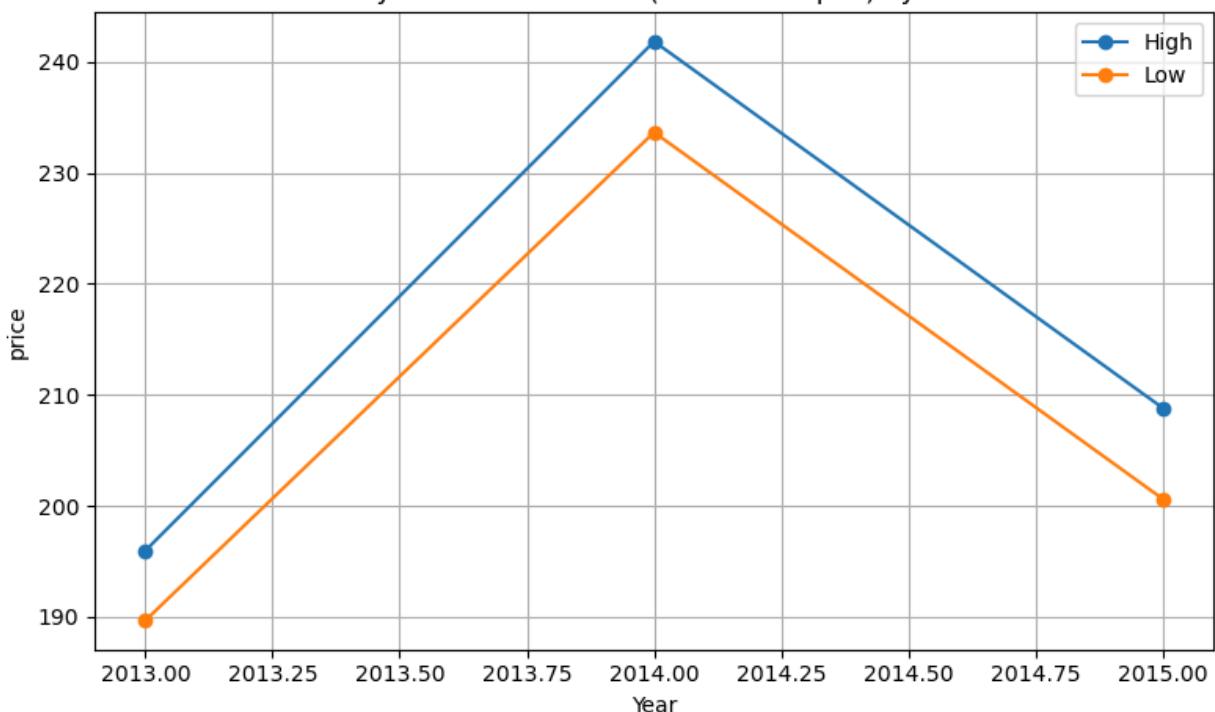


Nifty 50 Index for 'UNIPHOS' (Close and Open) by Year

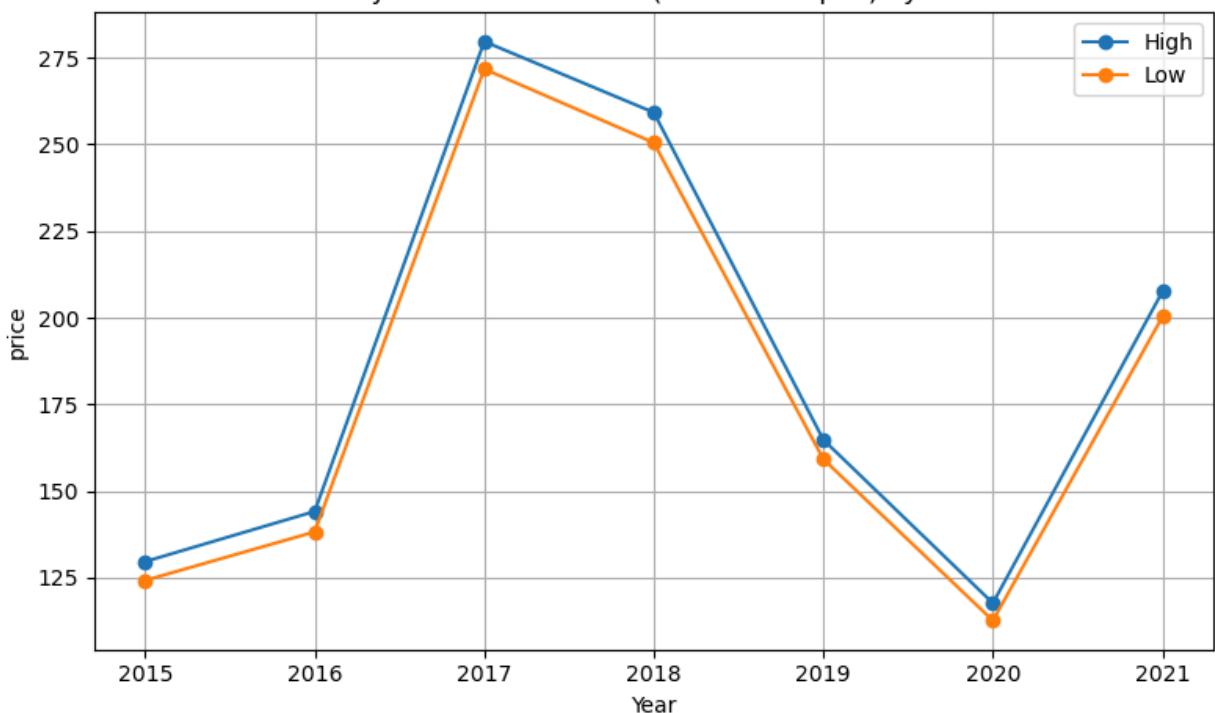




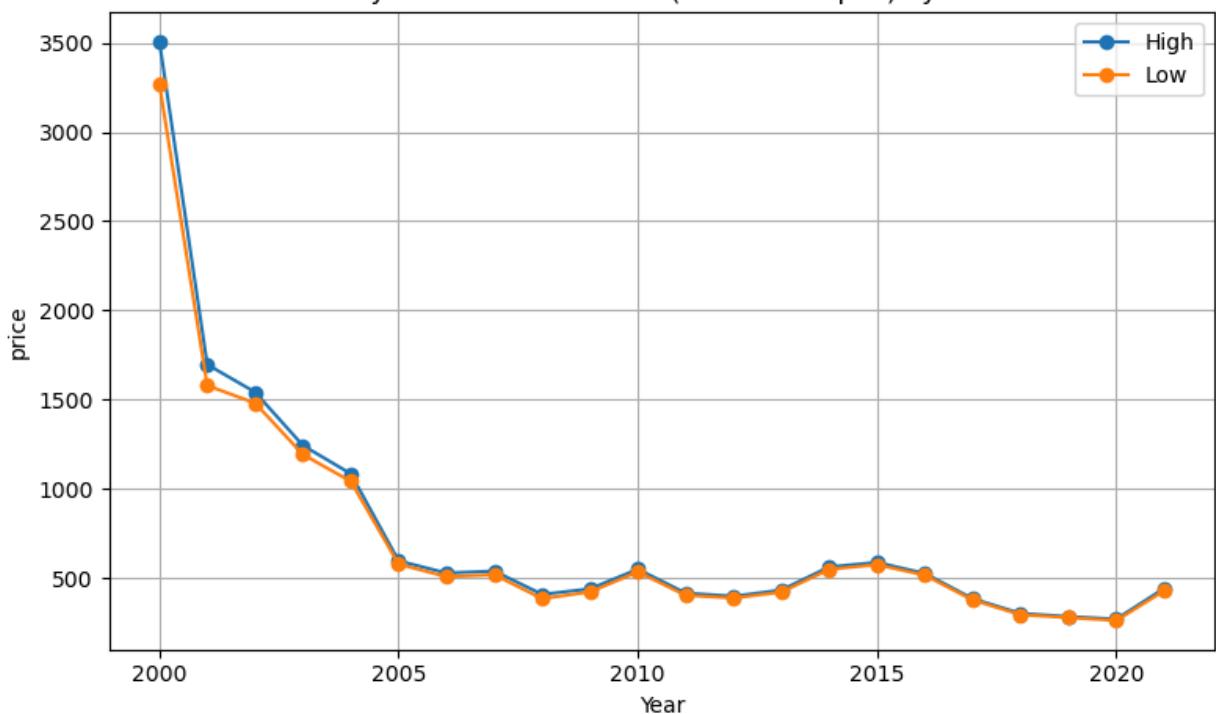
Nifty 50 Index for 'SSLT' (Close and Open) by Year



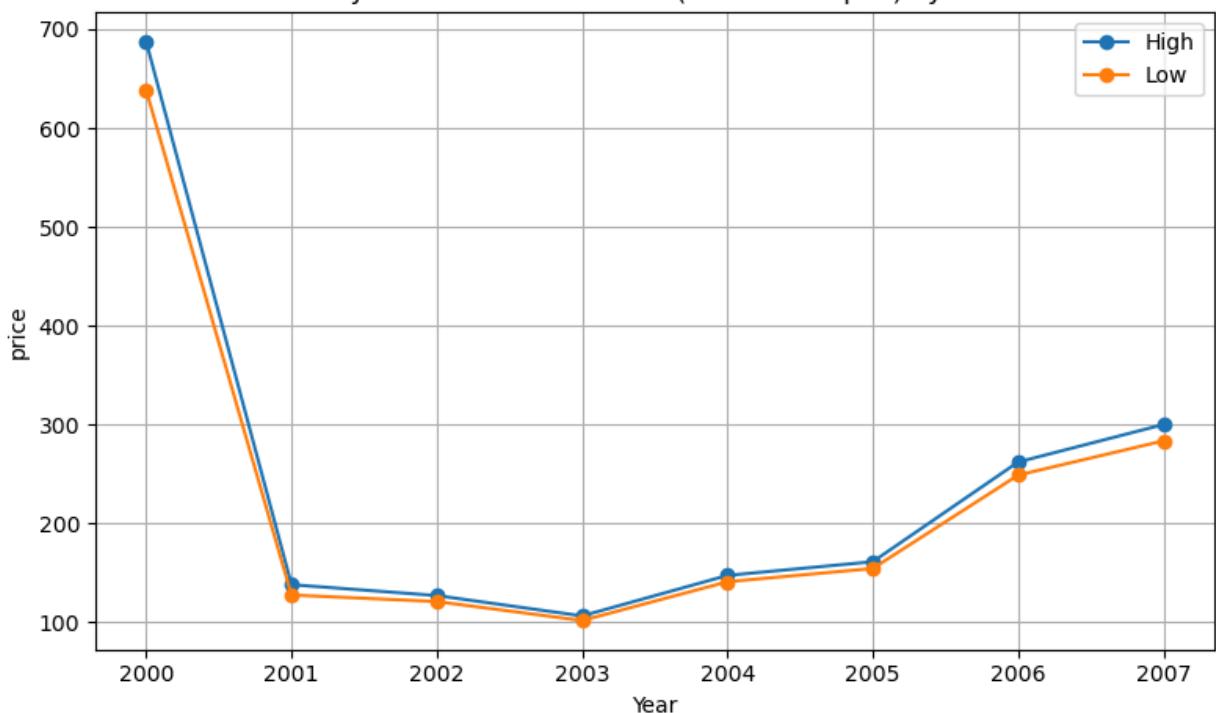
Nifty 50 Index for 'VEDL' (Close and Open) by Year

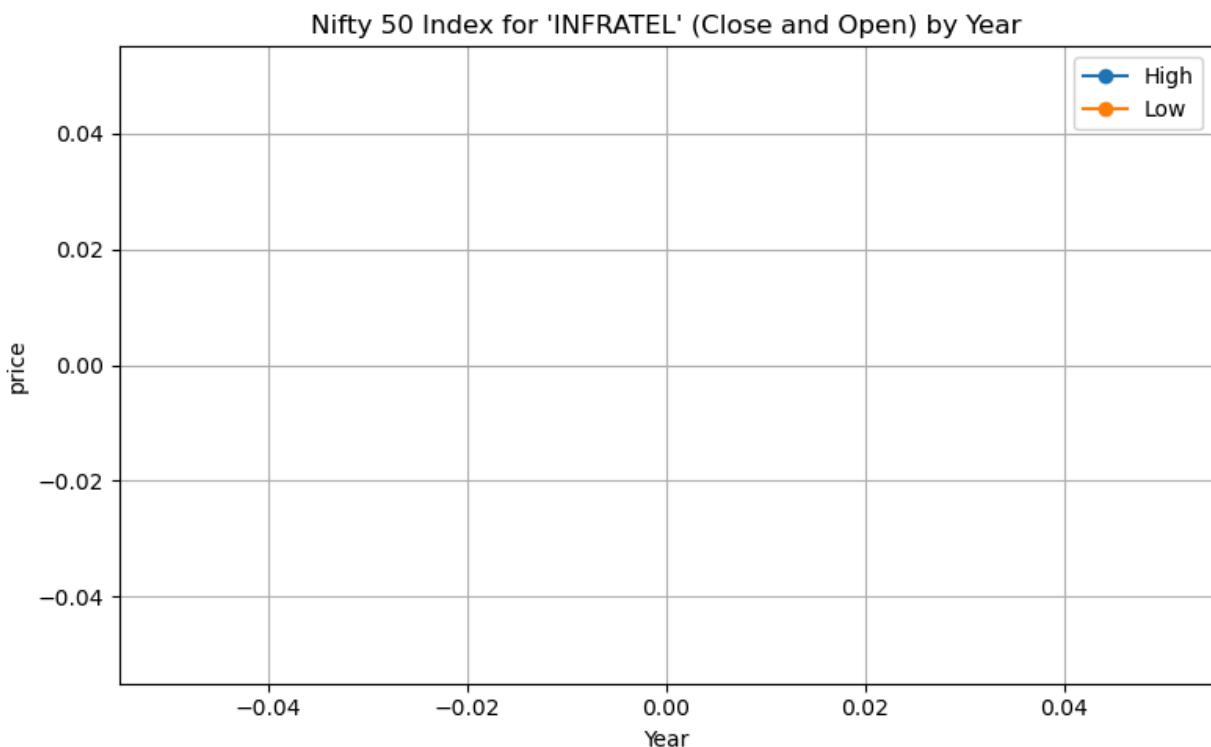
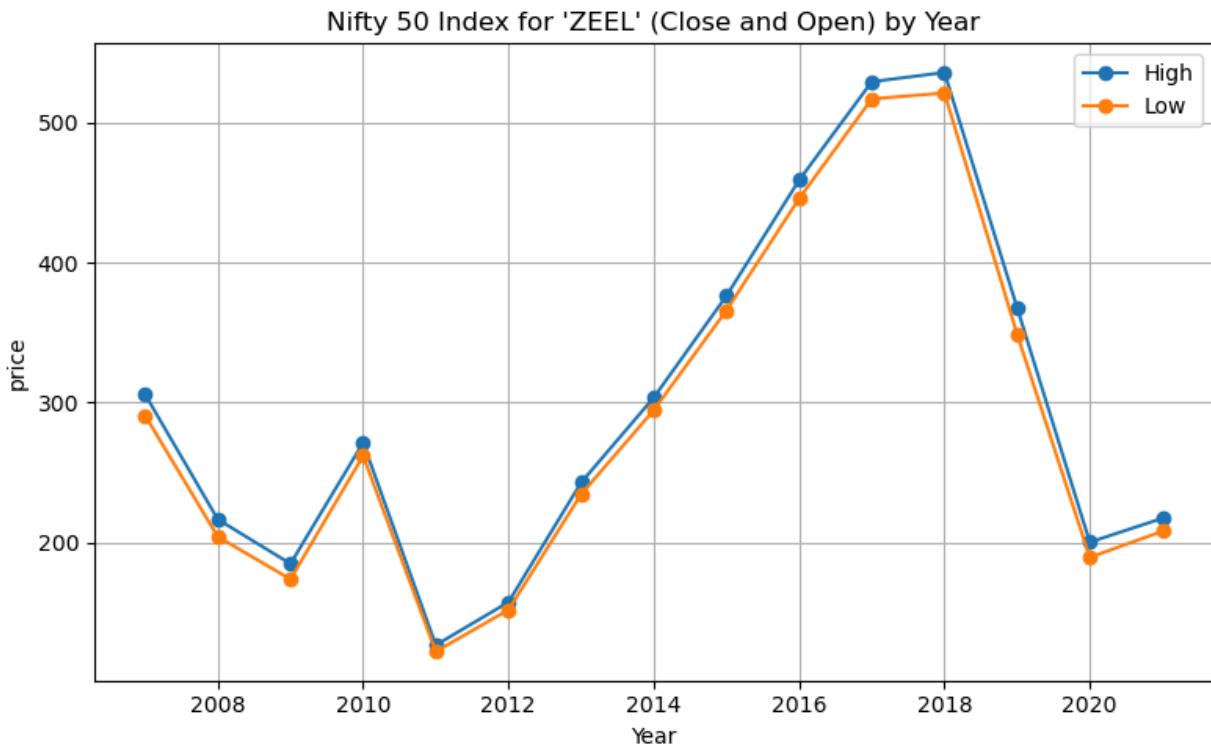


Nifty 50 Index for 'WIPRO' (Close and Open) by Year



Nifty 50 Index for 'ZEEETELE' (Close and Open) by Year





- This code segment utilizes Python and Matplotlib to generate individual line plots representing the annual mean high and low prices of stocks within the Nifty 50 index. For each unique stock symbol in the dataset, the code creates a distinct plot, adjusting the figure size accordingly.
- By isolating the data for each stock symbol, the code groups the information by year, calculating the average high and low prices for every year using the 'groupby' function. The

resulting line plots display trends in these yearly average high and low prices, showcasing the fluctuation patterns over time for each stock within the Nifty 50 index.

- This visualization strategy facilitates a clear comparison of how high and low prices have trended annually for different stocks. Investors and analysts can interpret these trends to identify historical patterns, assess market volatility, and gain insights into potential price ranges for various stocks over the years, aiding in informed decision-making and strategic analysis within the realm of stock market investments.

```
In [12]: nifty_blank = ['JSWSTL', 'INFRATEL']
nifty_data[nifty_data['Symbol'].isin(nifty_blank)]
```

Out[12]:

	Date	Symbol	Series	Prev Close	Open	High	Low	Last	Close	VWAP	Volume
127798	2005-03-23	JSWSTL	EQ	10.00	455.00	458.50	383.60	386.9	390.15	419.86	2087710.0 8.76
127799	2005-03-24	JSWSTL	EQ	390.15	392.85	398.50	357.50	371.8	369.20	372.01	1226479.0 4.56
127800	2005-03-28	JSWSTL	EQ	369.20	376.70	394.05	375.00	380.0	378.85	383.64	1235794.0 4.74
127801	2005-03-29	JSWSTL	EQ	378.85	382.90	383.80	363.25	369.1	368.05	375.26	624072.0 2.34
127802	2005-03-30	JSWSTL	EQ	368.05	367.00	371.90	360.05	362.7	362.15	365.13	466349.0 1.70
...
281417	2005-09-12	JSWSTL	EQ	282.60	285.00	291.00	285.00	289.0	288.25	288.71	421914.0 1.21
281418	2005-09-13	JSWSTL	EQ	288.25	288.50	303.00	287.10	296.6	297.50	295.89	667860.0 1.97
281419	2005-09-14	JSWSTL	EQ	297.50	299.00	307.50	291.10	294.3	295.40	301.00	648158.0 1.95
281420	2005-09-15	JSWSTL	EQ	295.40	297.00	299.00	294.95	296.0	296.50	297.00	371305.0 1.10
417065	NaT	INFRATEL	EQ	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN

247 rows × 19 columns

```
In [13]: symbols_to_drop = ['JSWSTL', 'INFRATEL']
nifty_data_2 = nifty_data[~nifty_data['Symbol'].isin(symbols_to_drop)]
```

- Excluding the symbols 'JSWSTL' and 'INFRATEL' from the dataset due to inadequate available data, aiming to ensure data integrity and analytical robustness throughout the analysis process.

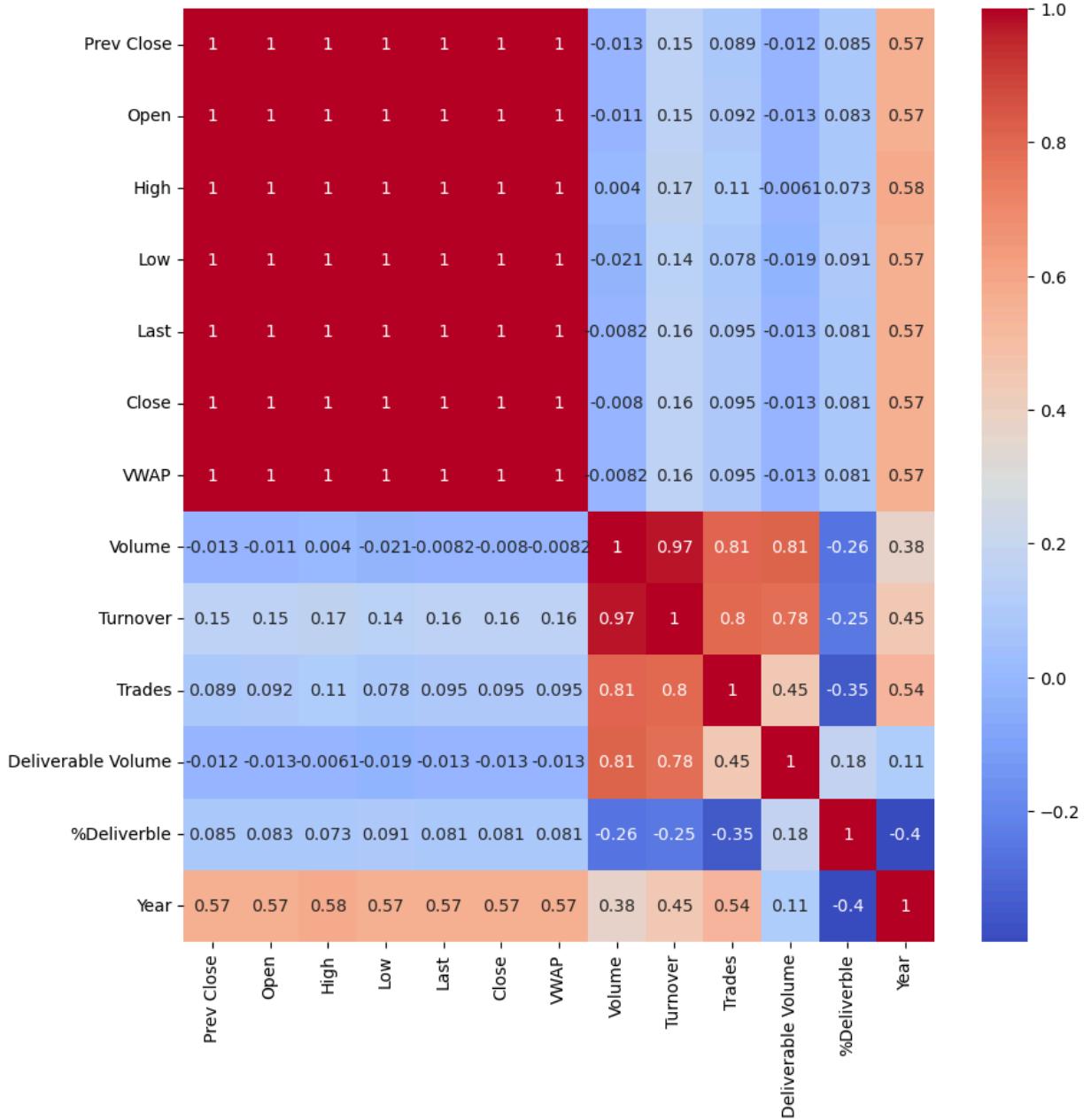
A correlation matrix was generated to analyze the relationships between chosen stocks, outlined and elaborated upon in the report. This matrix provides insights into how the price movements of these stocks relate to each other, aiding in understanding potential patterns or dependencies in their behavior.

```
In [14]: corr = nifty_data_2[nifty_data_2['Symbol']=='HEROMOTOCO'].corr()  
plt.figure(figsize=(10,10))  
sns.heatmap(corr, annot=True, cmap="coolwarm")
```

```
C:\Users\devan\AppData\Local\Temp\ipykernel_16832\4069535145.py:1: FutureWarning: The  
default value of numeric_only in DataFrame.corr is deprecated. In a future version, i  
t will default to False. Select only valid columns or specify the value of numeric_on  
ly to silence this warning.
```

```
corr = nifty_data_2[nifty_data_2['Symbol']=='HEROMOTOCO'].corr()
```

```
Out[14]: <Axes: >
```

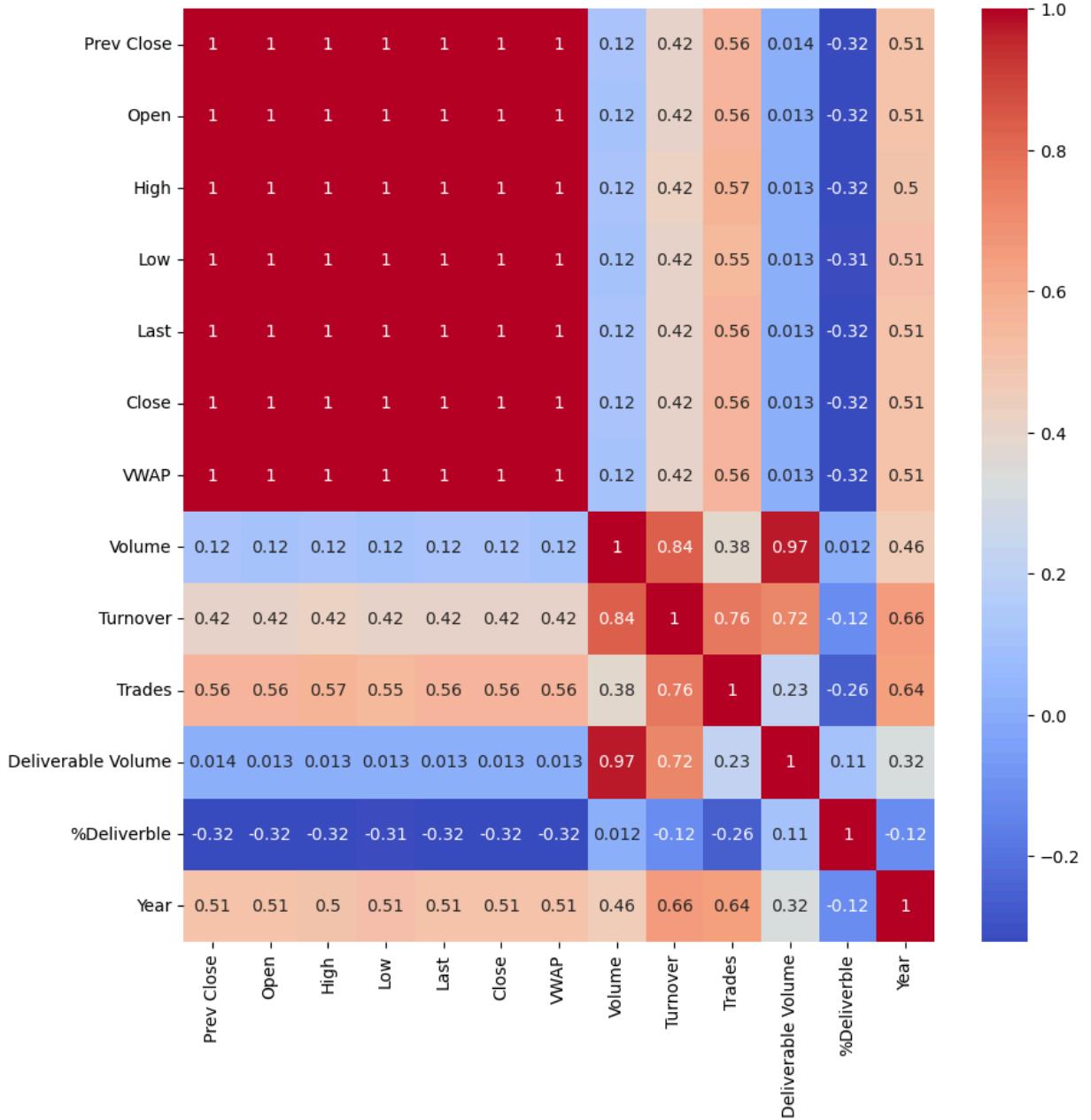


```
In [15]: corr = nifty_data_2[nifty_data_2['Symbol']=='HDFC'].corr()
plt.figure(figsize=(10,10))
sns.heatmap(corr, annot=True, cmap="coolwarm")
```

C:\Users\devan\AppData\Local\Temp\ipykernel_16832\728104081.py:1: FutureWarning: The default value of numeric_only in DataFrame.corr is deprecated. In a future version, it will default to False. Select only valid columns or specify the value of numeric_only to silence this warning.

```
corr = nifty_data_2[nifty_data_2['Symbol']=='HDFC'].corr()
```

Out[15]: <Axes: >

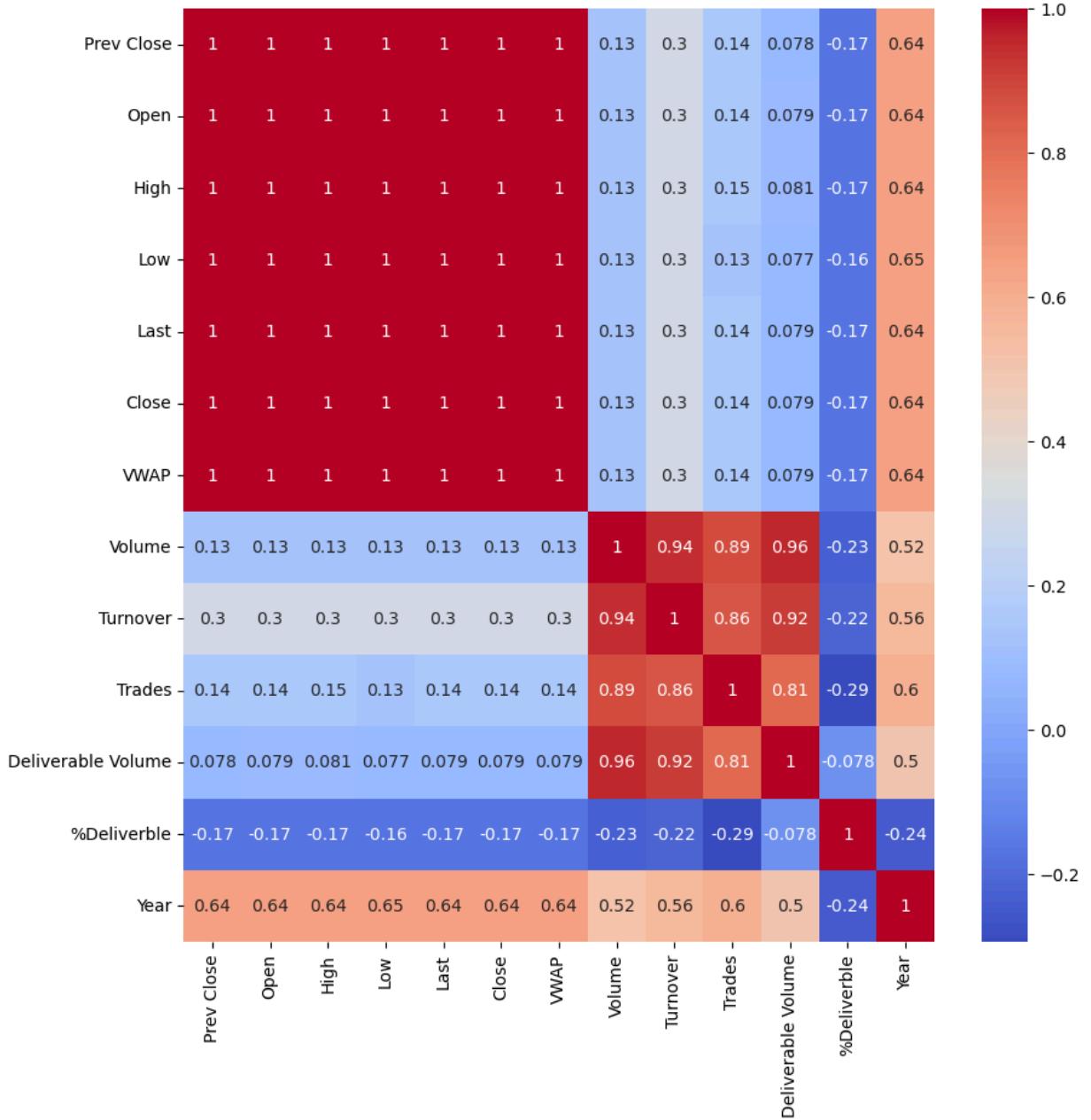


```
In [16]: corr = nifty_data_2[nifty_data_2['Symbol']=='HDFCBANK'].corr()
plt.figure(figsize=(10,10))
sns.heatmap(corr, annot=True, cmap="coolwarm")
```

C:\Users\devan\AppData\Local\Temp\ipykernel_16832\83096412.py:1: FutureWarning: The default value of numeric_only in DataFrame.corr is deprecated. In a future version, it will default to False. Select only valid columns or specify the value of numeric_only to silence this warning.

```
corr = nifty_data_2[nifty_data_2['Symbol']=='HDFCBANK'].corr()
```

Out[16]: <Axes: >

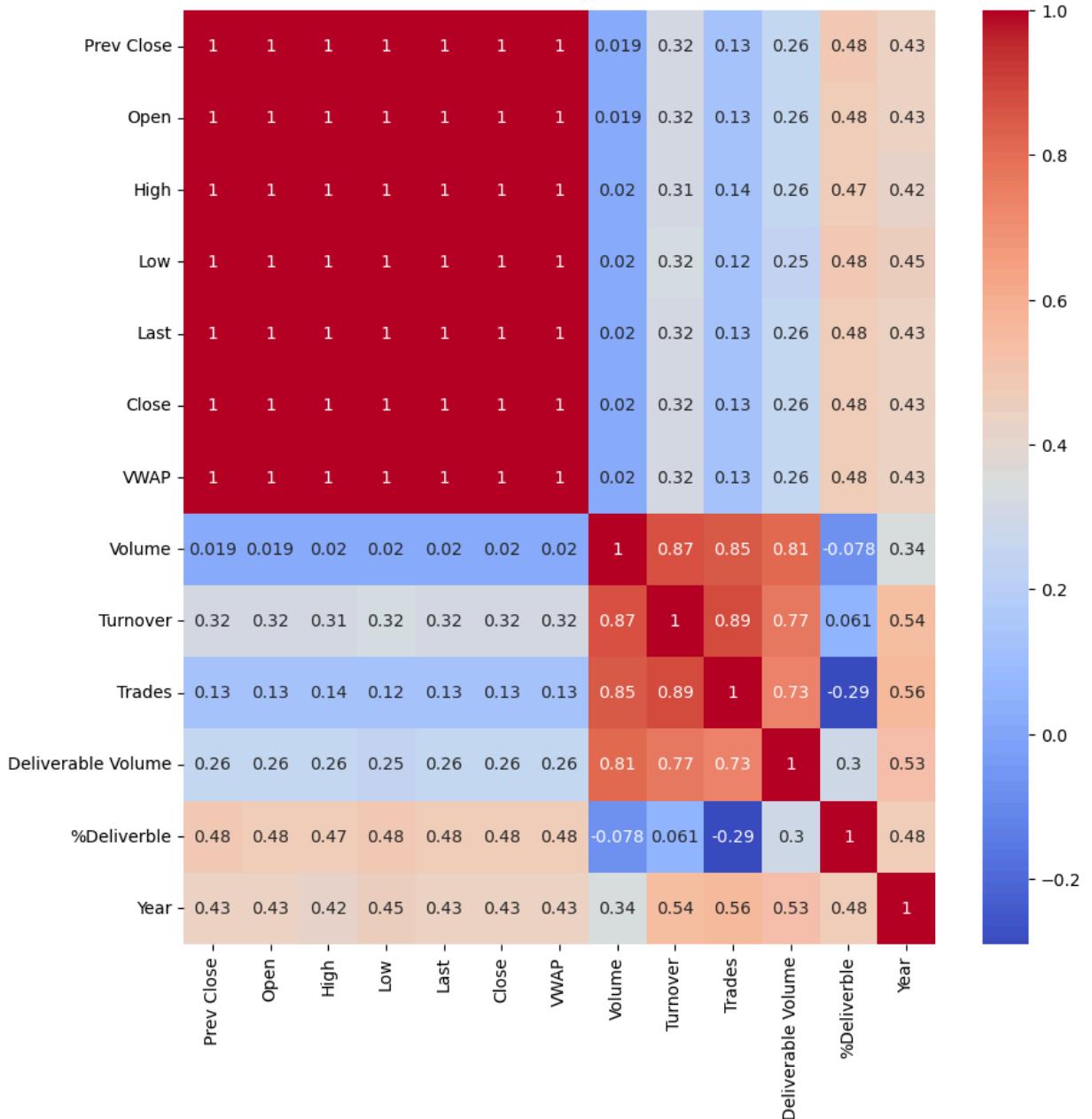


```
In [17]: corr = nifty_data_2[nifty_data_2['Symbol']=='HCLTECH'].corr()
plt.figure(figsize=(10,10))
sns.heatmap(corr, annot=True, cmap="coolwarm")
```

C:\Users\devan\AppData\Local\Temp\ipykernel_16832\251171166.py:1: FutureWarning: The default value of numeric_only in DataFrame.corr is deprecated. In a future version, it will default to False. Select only valid columns or specify the value of numeric_only to silence this warning.

```
corr = nifty_data_2[nifty_data_2['Symbol']=='HCLTECH'].corr()
```

Out[17]: <Axes: >



- A correlation matrix for stocks such as 'HEROMOTOCO', 'HDFC', 'HDFC BANK', and 'HCL TECH' enables an extensive analysis of how its price movements align or diverge with other variables. This matrix quantifies the degree and direction of linear relationships between 'HEROMOTOCO' and the mentioned stocks, assigning values from -1 to 1. These values signify the strength and nature of correlations: 1 denotes a perfect positive correlation, -1 represents a perfect negative correlation, and 0 suggests no linear relationship. Such an analysis aids investors and analysts in understanding potential associations or diversifications within a portfolio, facilitating informed decisions based on historical price behaviors and their interconnections.

Assessing the performance of individual stocks from 2000 to 2021 by investing 32,000 INR equally in 2000 and determining the value in 2021. This analysis aims

to gauge the growth or decline of the initial investment, providing insights into the long-term returns generated by each stock.

```
In [18]: invested_amount_2000 = 500
```

```
In [19]: unique_symbols = nifty_data_2['Symbol'].unique()
results_df = pd.DataFrame(columns=['Symbol', 'First_Open_2000', 'Invested_amount_2000',
for symbol in unique_symbols:
    symbol_data = nifty_data_2[nifty_data_2['Symbol'] == symbol]
    symbol_data = symbol_data.sort_values(by='Year')
    first_open_value = symbol_data['Open'].first_valid_index()
    first_open = symbol_data.loc[first_open_value, 'Open'] if first_open_value is not
    last_close_value = symbol_data['Close'].last_valid_index()
    last_close = symbol_data.loc[last_close_value, 'Close'] if last_close_value is not
    return_amount_2021 = invested_amount_2000 * last_close / first_open if (first_open
    net = return_amount_2021 - invested_amount_2000
    results_df = results_df.append({'Symbol': symbol, 'First_Open_2000': first_open, 'Invested_amount_2000': invested_amount_2000, 'Return_amount_2021': net})
```

```
C:\Users\devan\AppData\Local\Temp\ipykernel_16832\2321537900.py:12: FutureWarning: Th  
e frame.append method is deprecated and will be removed from pandas in a future versi  
on. Use pandas.concat instead.  
    results_df = results_df.append({'Symbol': symbol, 'First_Open_2000': first_open, 'In  
vested_amount_2000':invested_amount_2000 , 'Last_Close_2021': last_close, 'Return_Amou  
nt_2021': return_amount_2021,'Net_Worth':net}, ignore_index=True)  
C:\Users\devan\AppData\Local\Temp\ipykernel_16832\2321537900.py:12: FutureWarning: Th  
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C:\Users\devan\AppData\Local\Temp\ipykernel_16832\2321537900.py:12: FutureWarning: Th  
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nt_2021': return_amount_2021,'Net_Worth':net}, ignore_index=True)  
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nt_2021': return_amount_2021,'Net_Worth':net}, ignore_index=True)
```

```
C:\Users\devan\AppData\Local\Temp\ipykernel_16832\2321537900.py:12: FutureWarning: Th  
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nt_2021': return_amount_2021,'Net_Worth':net}, ignore_index=True)  
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nt_2021': return_amount_2021,'Net_Worth':net}, ignore_index=True)  
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    results_df = results_df.append({'Symbol': symbol, 'First_Open_2000': first_open, 'In  
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nt_2021': return_amount_2021,'Net_Worth':net}, ignore_index=True)  
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nt_2021': return_amount_2021,'Net_Worth':net}, ignore_index=True)  
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    results_df = results_df.append({'Symbol': symbol, 'First_Open_2000': first_open, 'In  
vested_amount_2000':invested_amount_2000 , 'Last_Close_2021': last_close, 'Return_Amou  
nt_2021': return_amount_2021,'Net_Worth':net}, ignore_index=True)  
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C:\Users\devan\AppData\Local\Temp\ipykernel_16832\2321537900.py:12: FutureWarning: Th
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    results_df = results_df.append({'Symbol': symbol, 'First_Open_2000': first_open, 'In
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nt_2021': return_amount_2021,'Net_Worth':net}, ignore_index=True)
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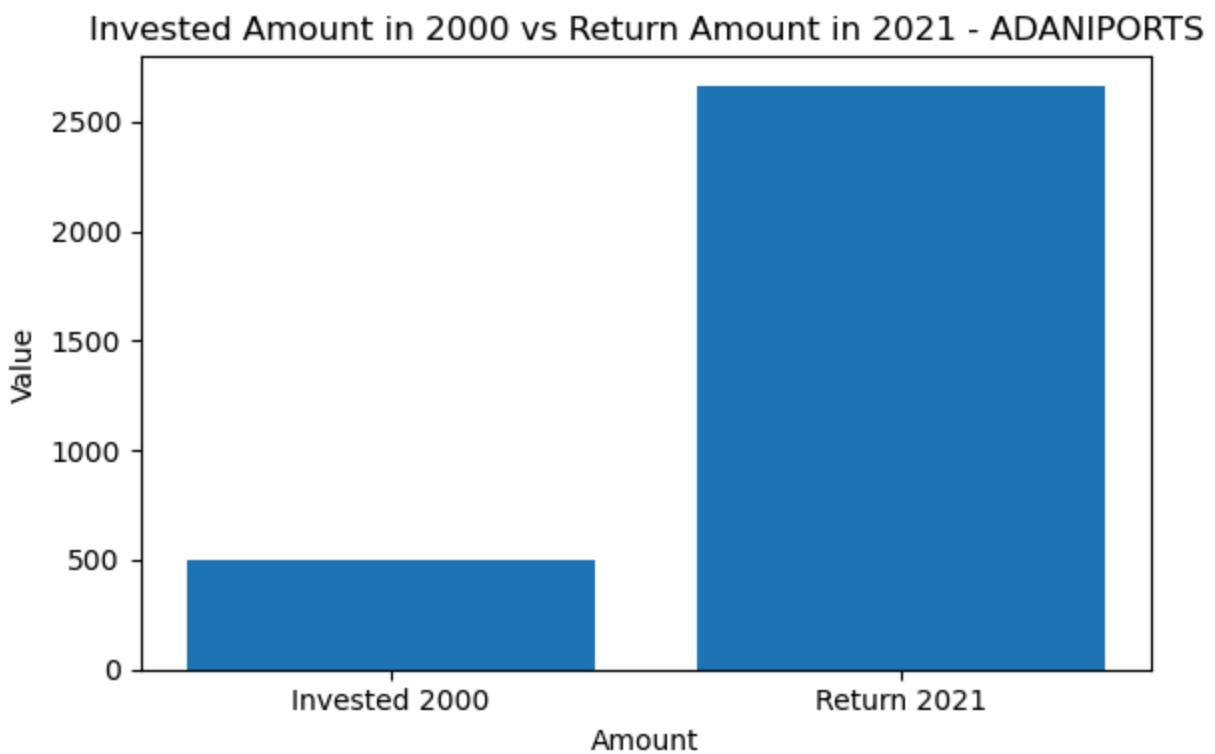
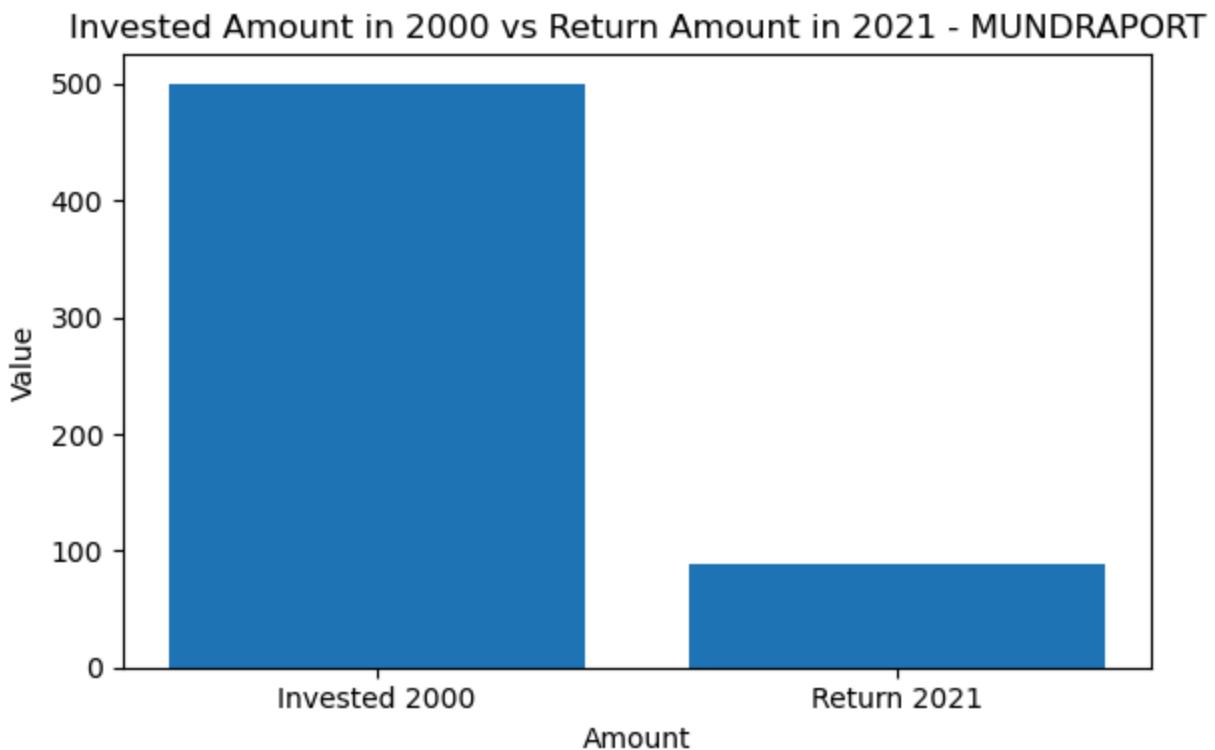
In [20]: `results_df`

	Symbol	First_Open_2000	Invested_amount_2000	Last_Close_2021	Return_Amount_2021	
0	MUNDRAPORT	770.0	500	135.50	87.987013	-
1	ADANIPORTS	137.1	500	730.05	2662.472648	2
2	ASIANPAINT	370.0	500	2536.40	3427.567568	2
3	UTIBANK	26.7	500	597.50	11189.138577	10
4	AXISBANK	588.0	500	714.90	607.908163	
...
59	SSLT	185.0	500	220.15	595.000000	
60	VEDL	218.4	500	257.25	588.942308	
61	WIPRO	2724.0	500	492.75	90.446035	-
62	ZEETELE	1175.0	500	238.35	101.425532	-
63	ZEEL	230.0	500	185.60	403.478261	

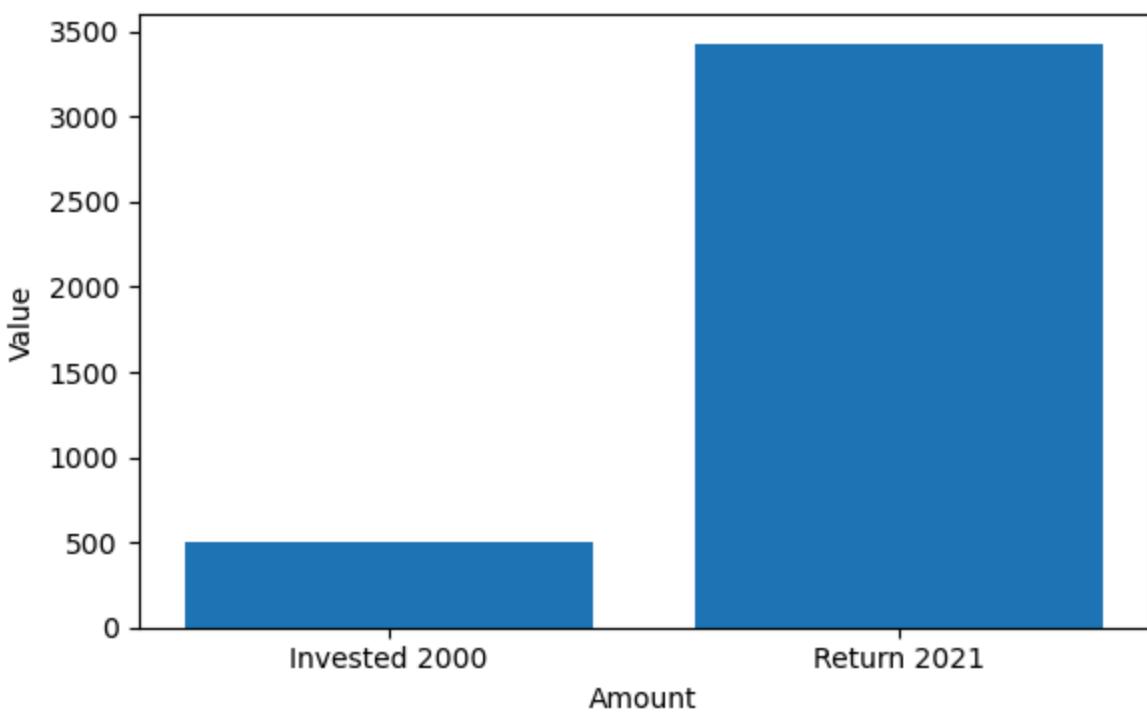
64 rows × 6 columns

In [21]: `unique_symbols = results_df['Symbol'].unique()`
`for symbol in unique_symbols:`
 `symbol_data = results_df[results_df['Symbol'] == symbol]`
 `plt.figure(figsize=(6, 4))`
 `plt.bar(['Invested 2000', 'Return 2021'], [symbol_data['Invested_amount_2000'].iloc[0], symbol_data['Return_Amount_2021'].iloc[0]])`
 `plt.xlabel('Amount')`
 `plt.ylabel('Value')`

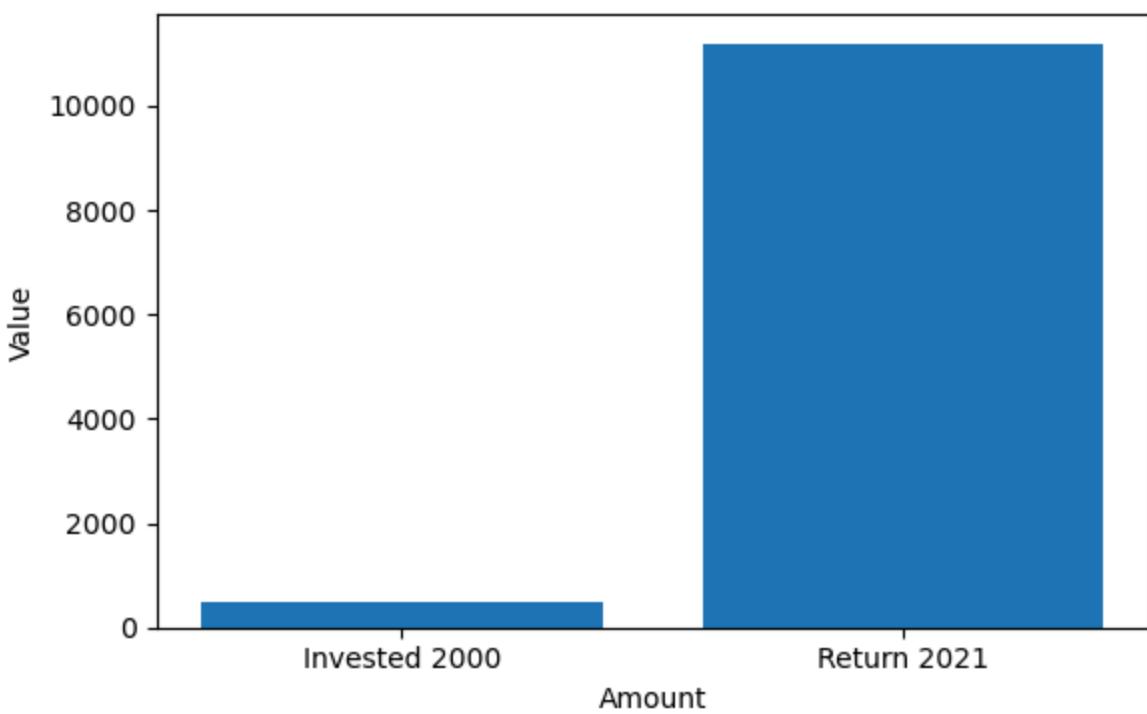
```
plt.title(f'Invested Amount in 2000 vs Return Amount in 2021 - {symbol}')
plt.tight_layout()
plt.show()
```



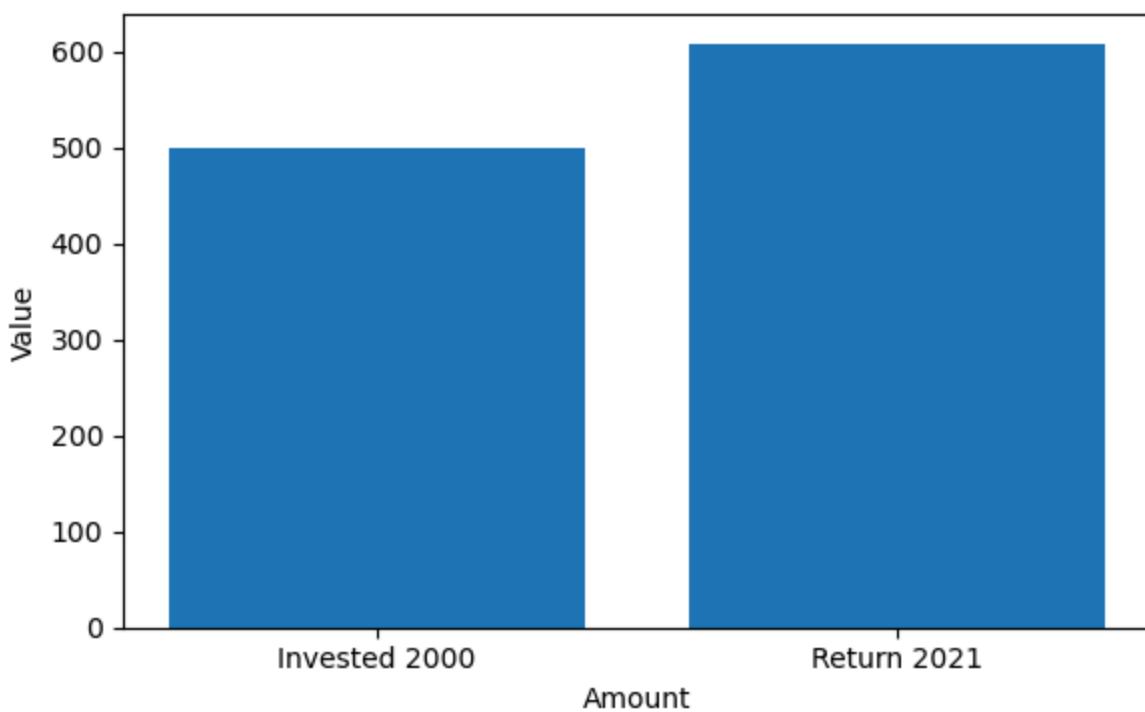
Invested Amount in 2000 vs Return Amount in 2021 - ASIANPAINT



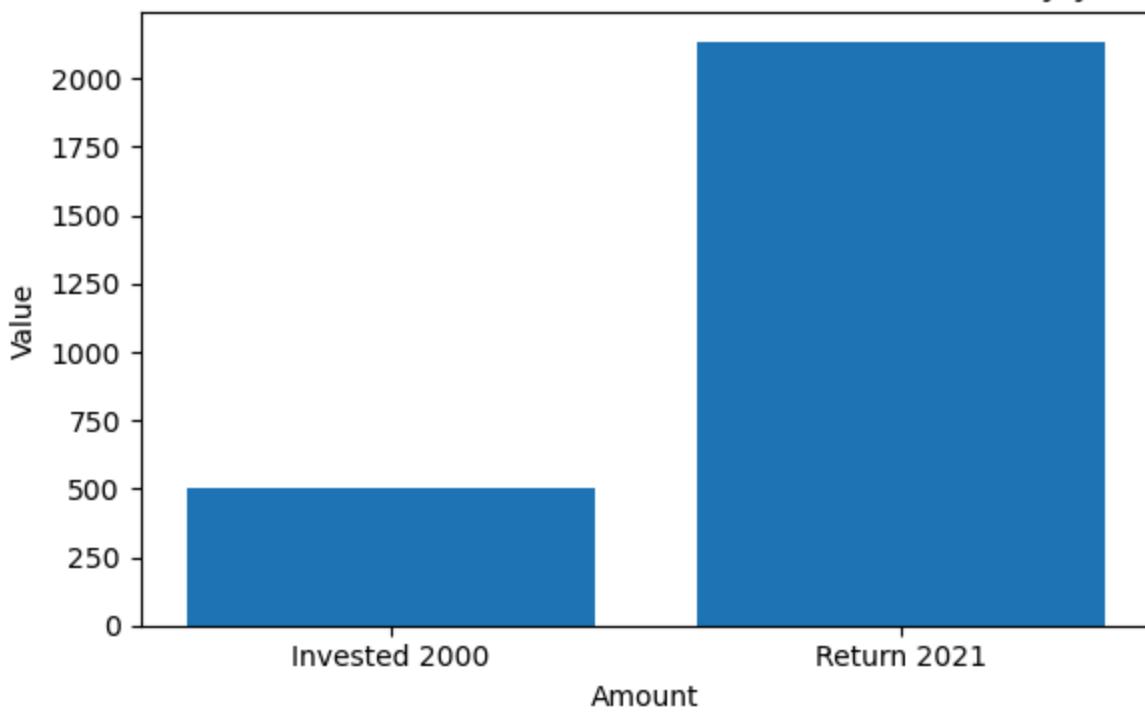
Invested Amount in 2000 vs Return Amount in 2021 - UTIBANK



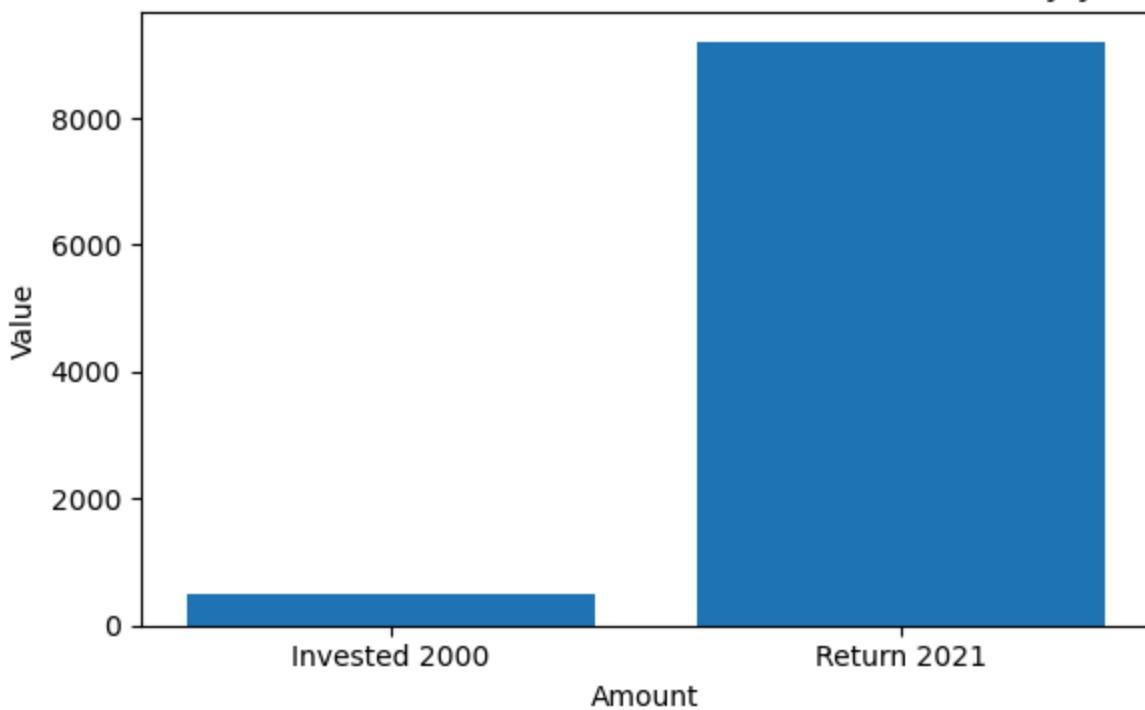
Invested Amount in 2000 vs Return Amount in 2021 - AXISBANK



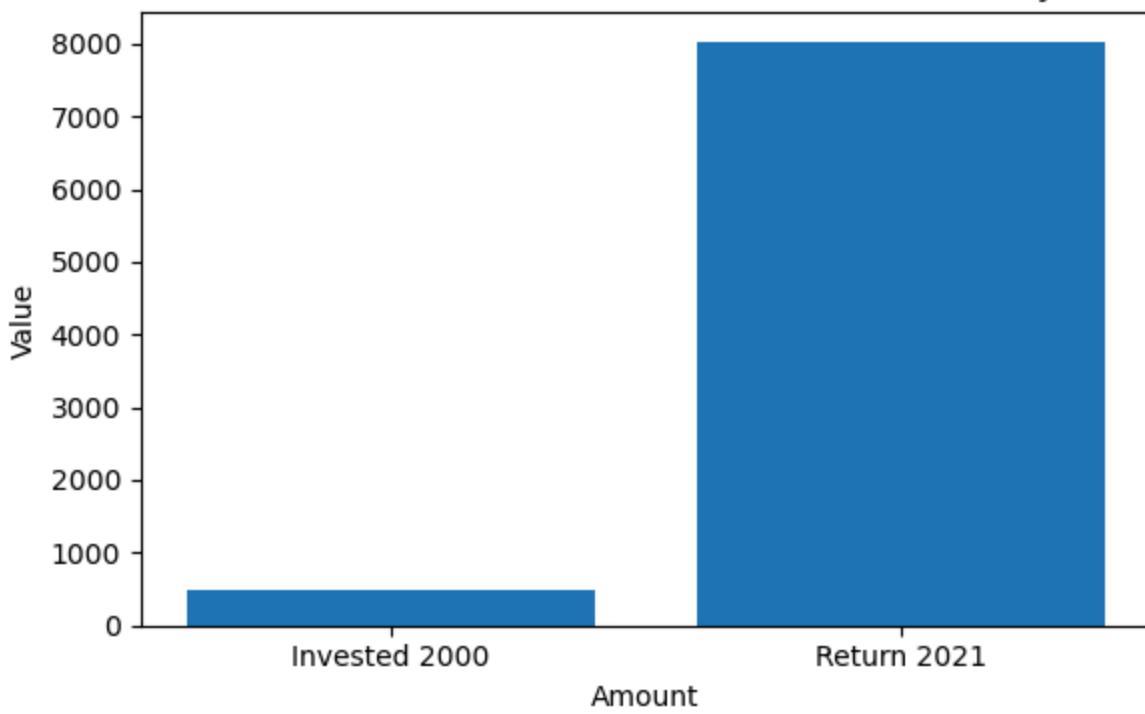
Invested Amount in 2000 vs Return Amount in 2021 - BAJAJ-AUTO



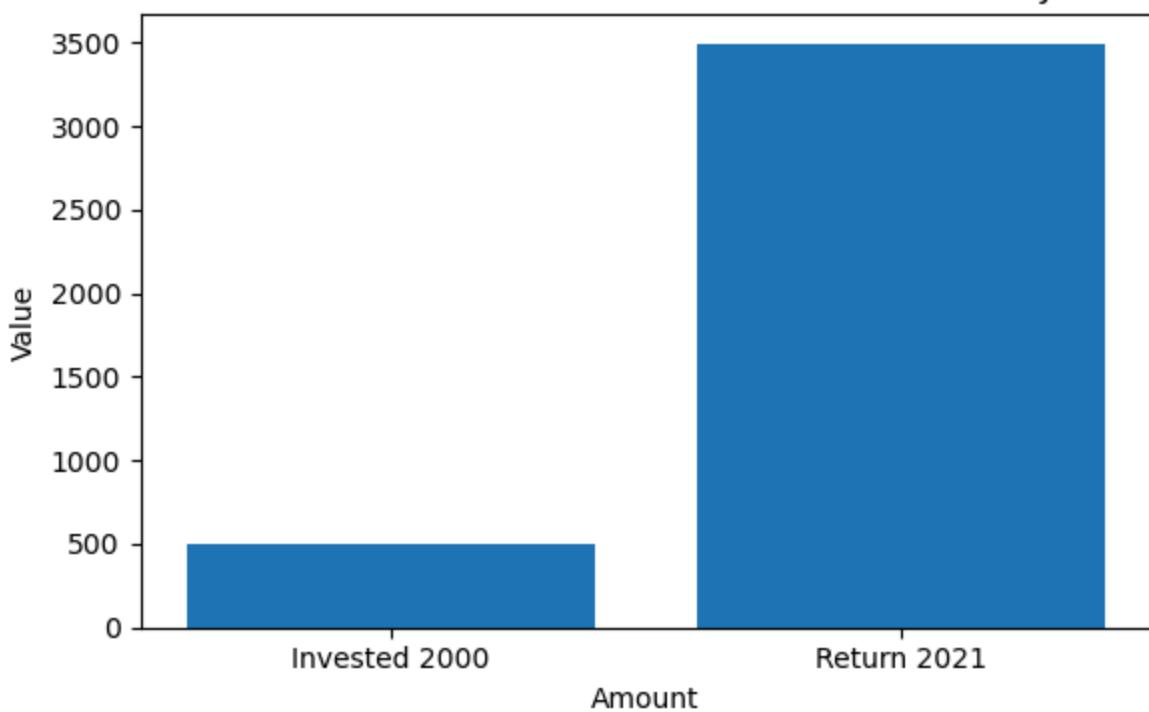
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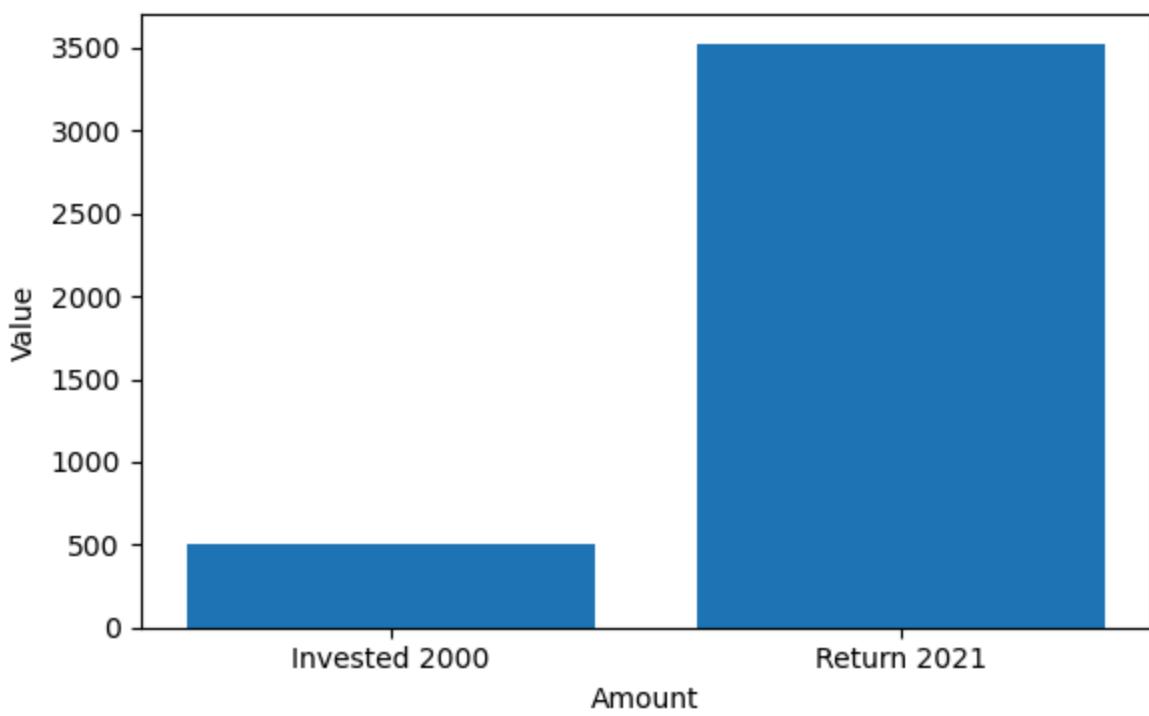
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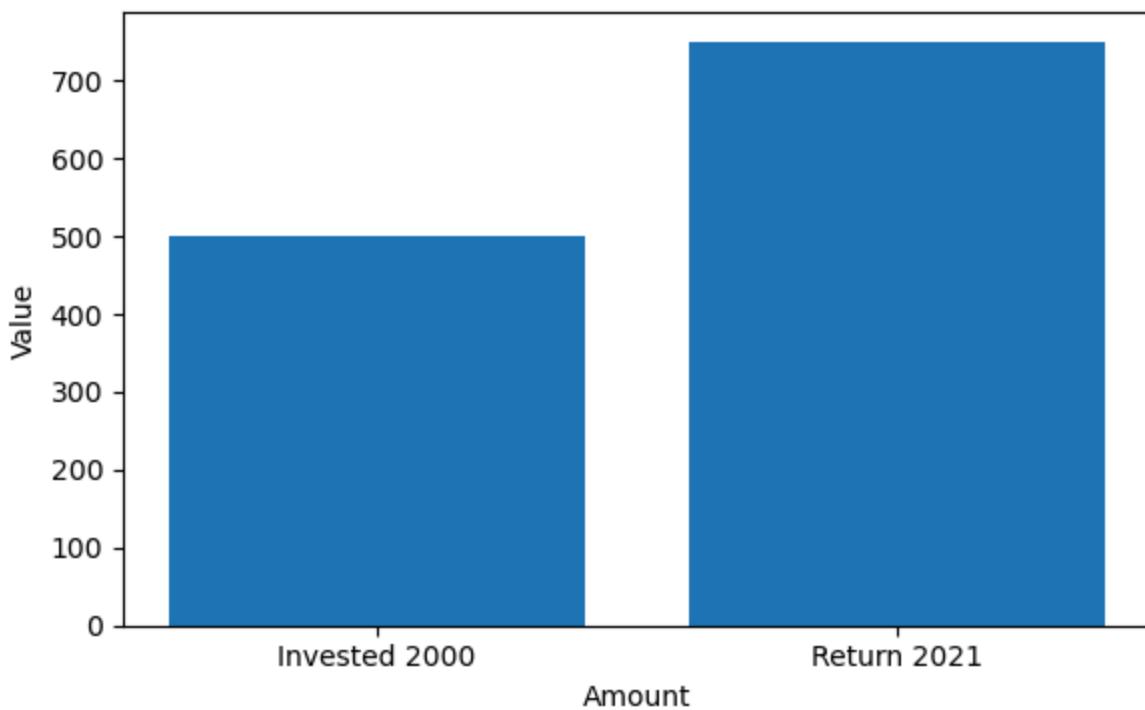
Invested Amount in 2000 vs Return Amount in 2021 - BAJFINANCE



Invested Amount in 2000 vs Return Amount in 2021 - BHARTI

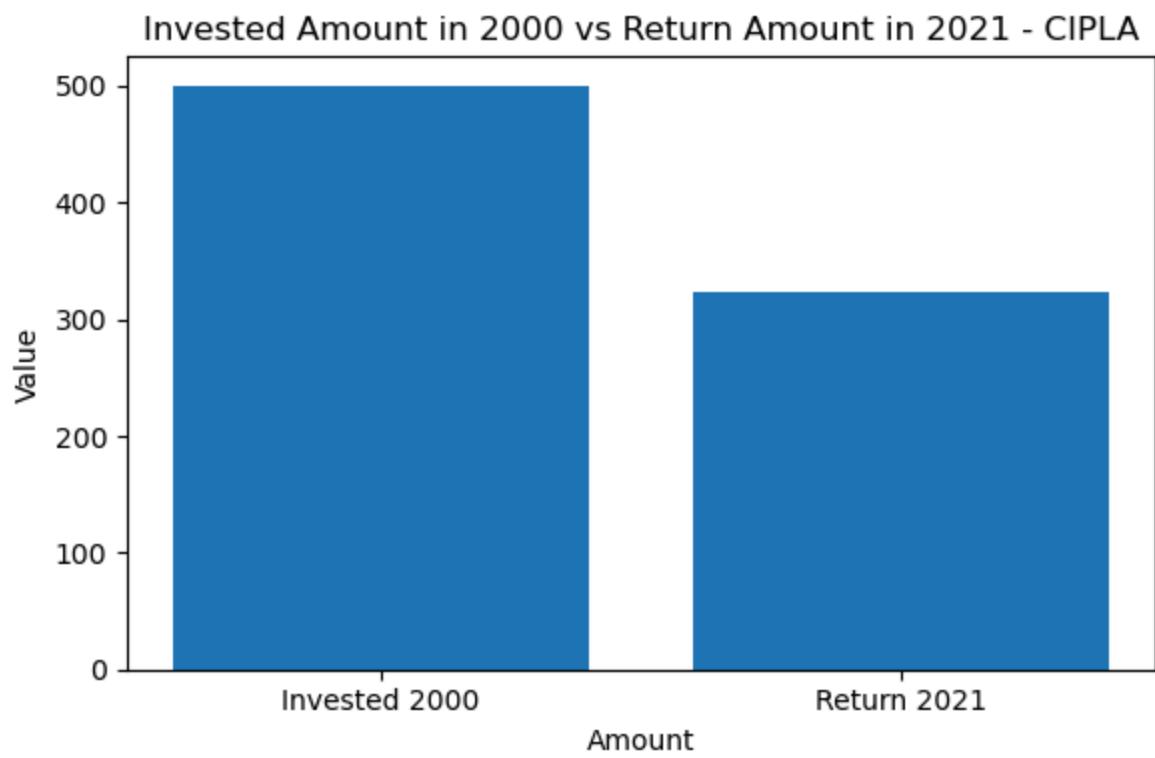
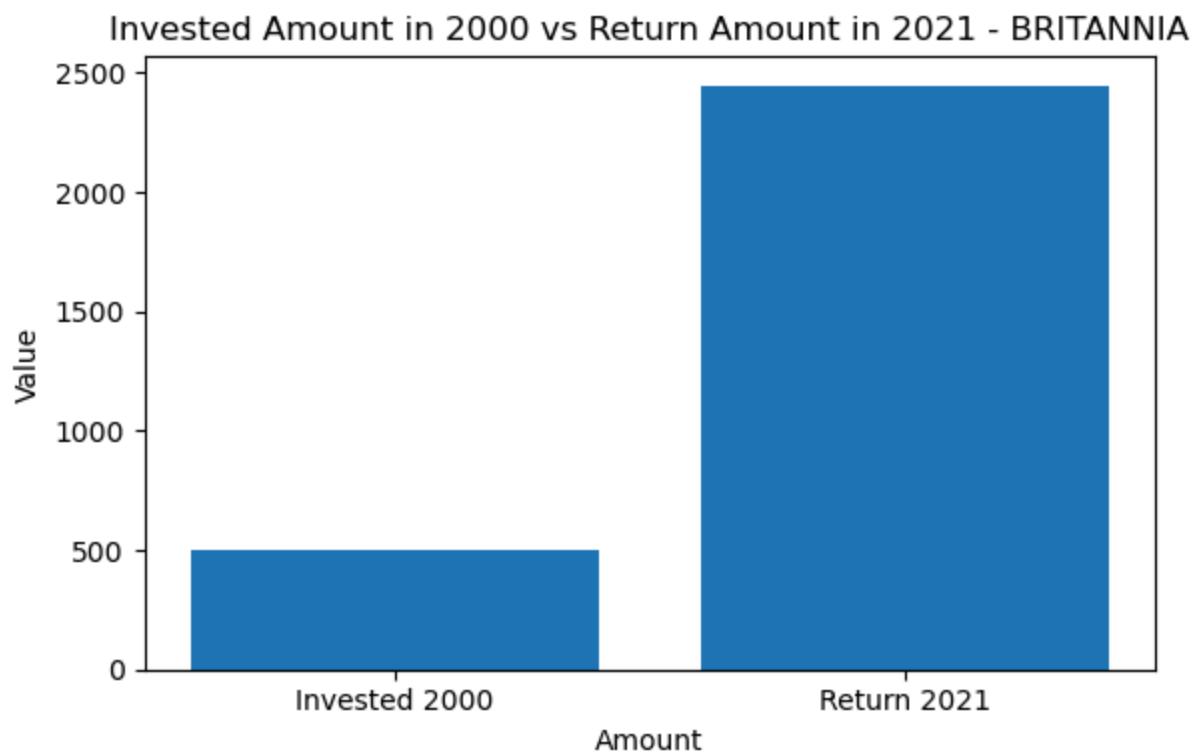


Invested Amount in 2000 vs Return Amount in 2021 - BHARTIARTL

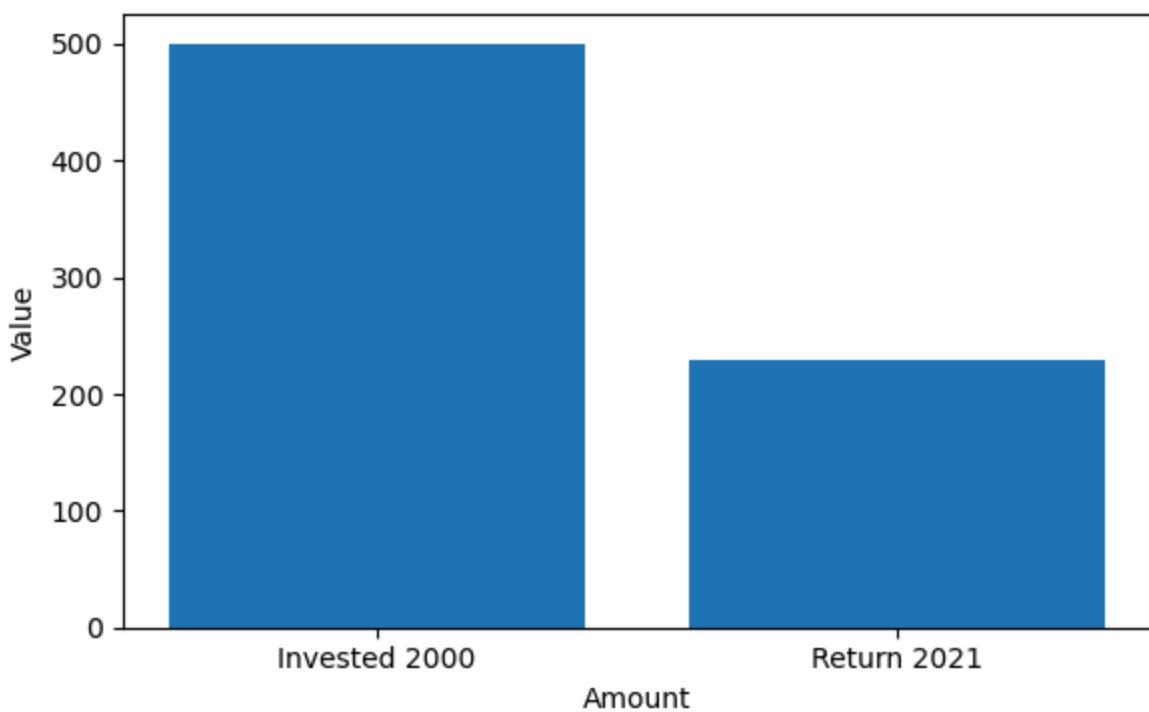


Invested Amount in 2000 vs Return Amount in 2021 - BPCL

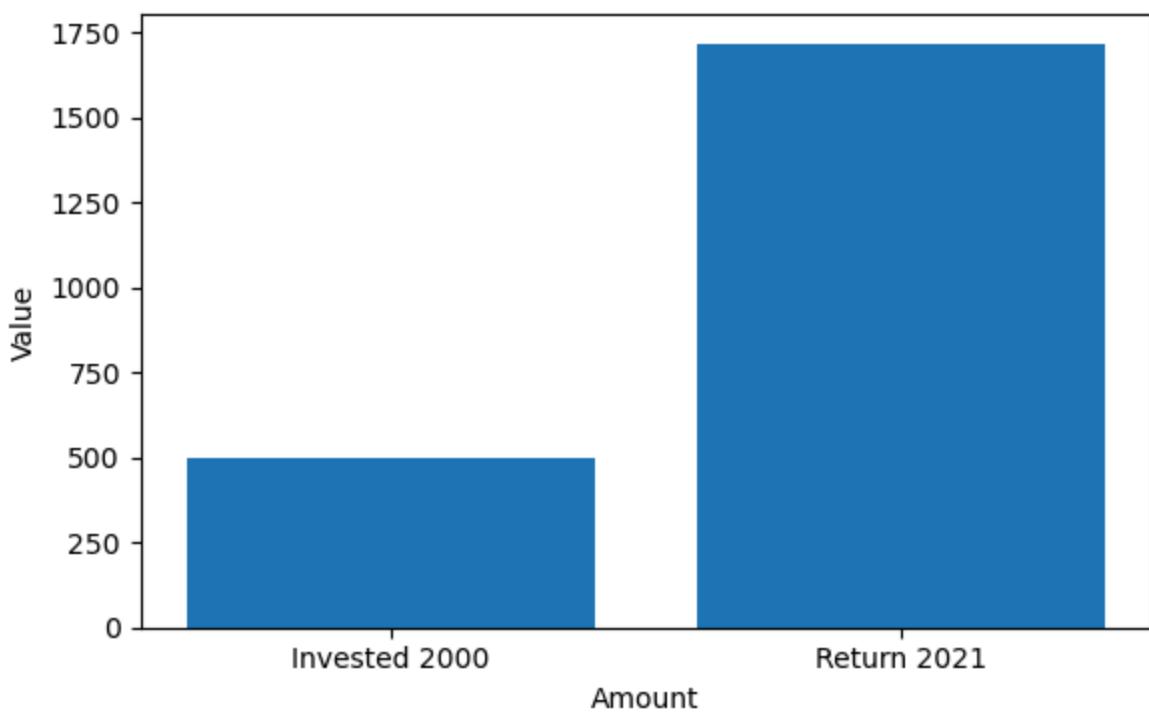




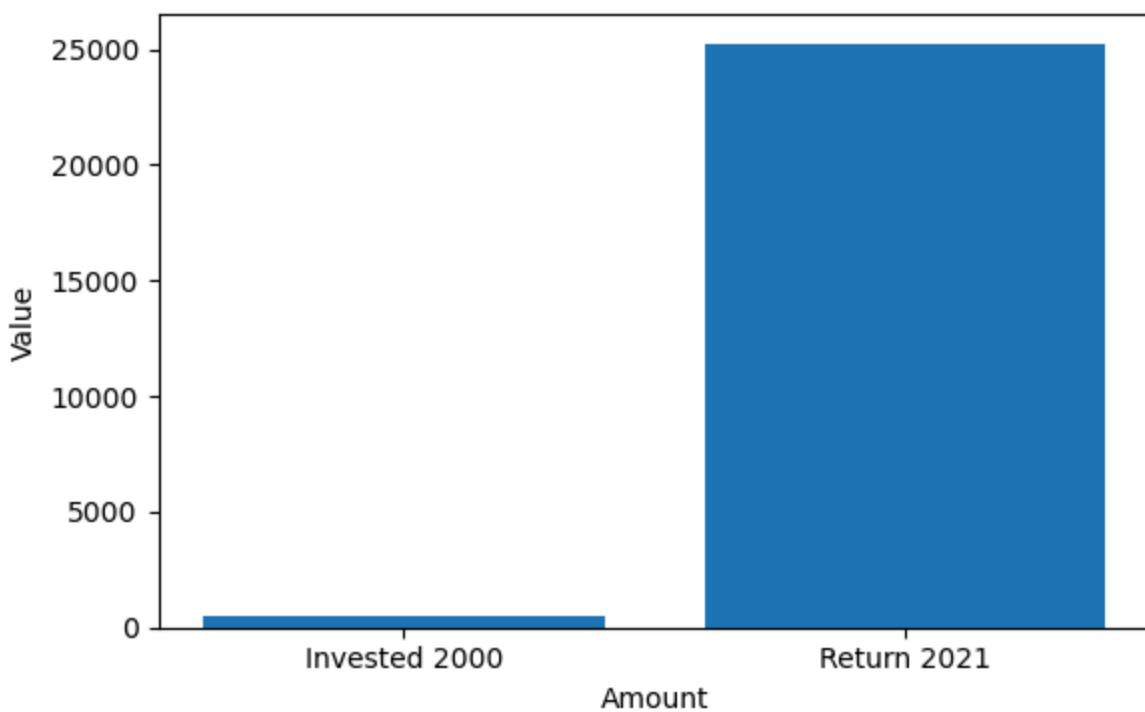
Invested Amount in 2000 vs Return Amount in 2021 - COALINDIA



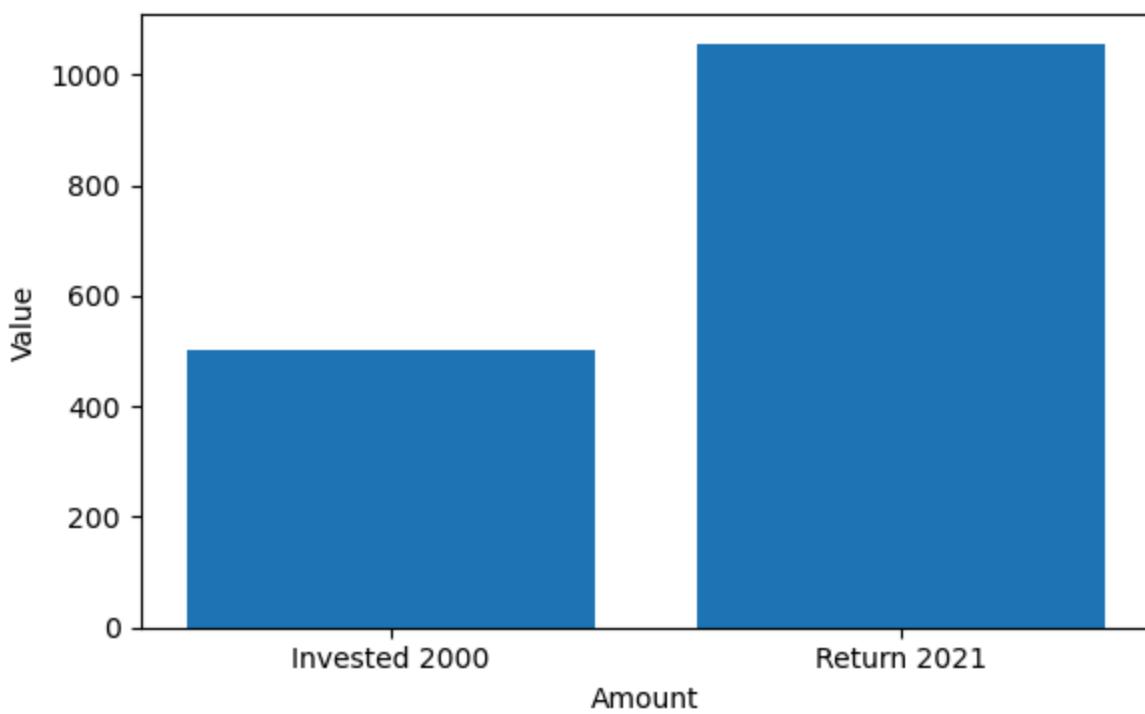
Invested Amount in 2000 vs Return Amount in 2021 - DRREDDY



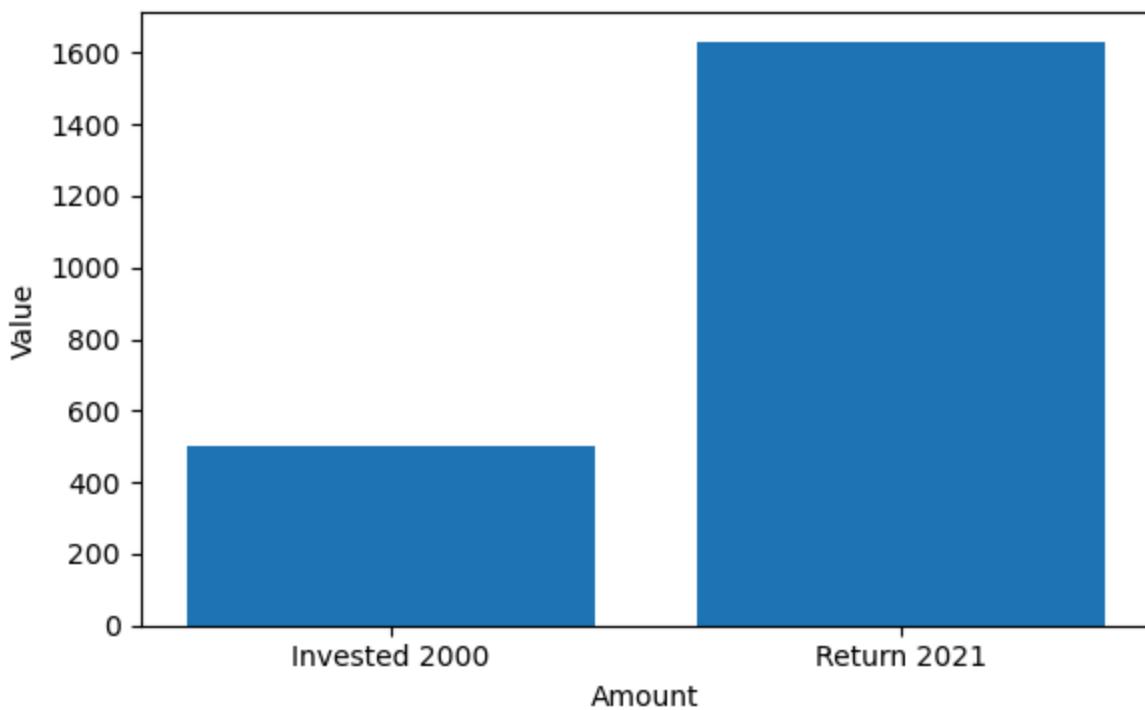
Invested Amount in 2000 vs Return Amount in 2021 - EICHERMOT



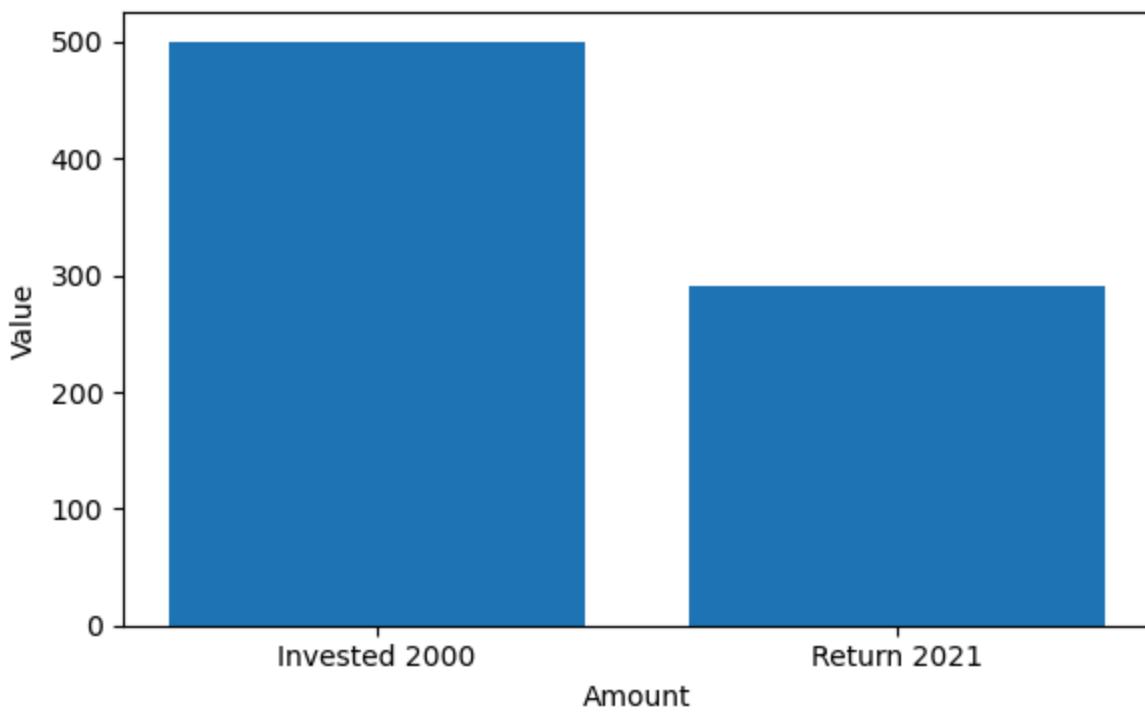
Invested Amount in 2000 vs Return Amount in 2021 - GAIL



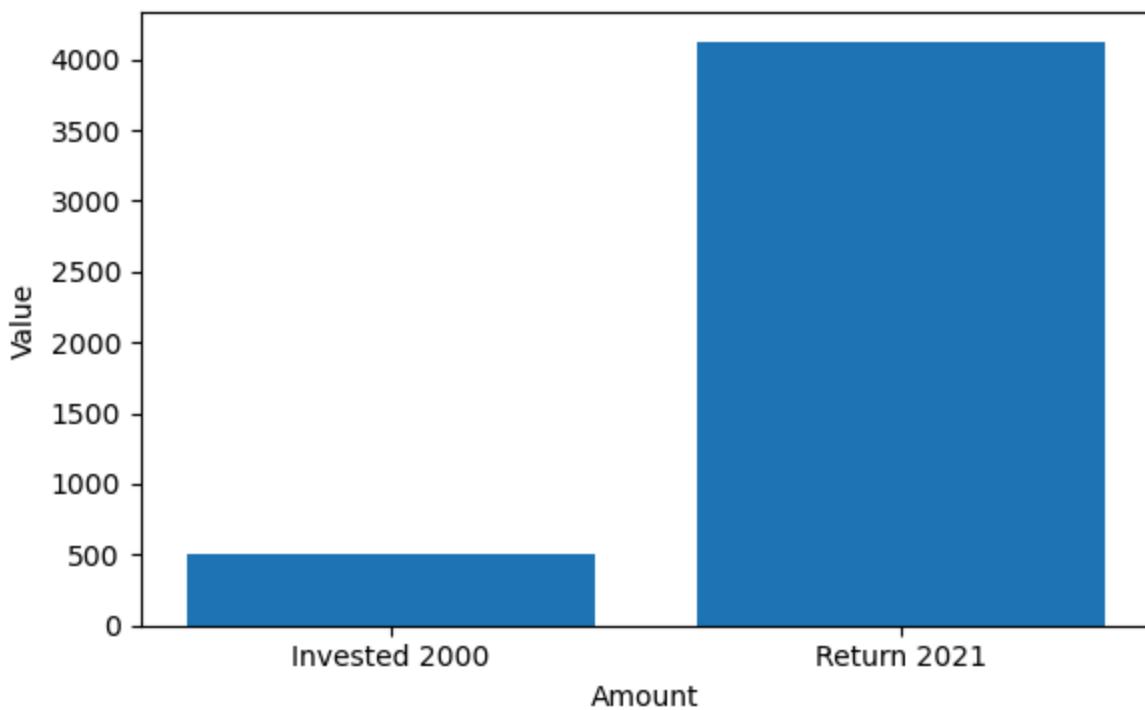
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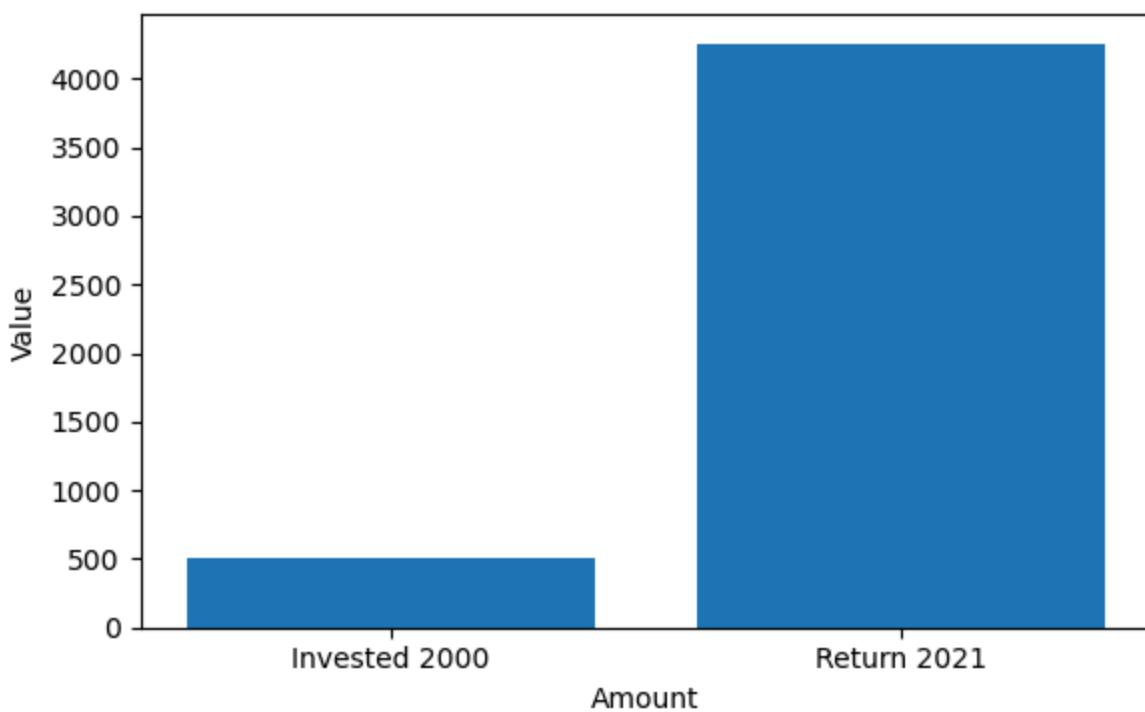
Invested Amount in 2000 vs Return Amount in 2021 - HCLTECH



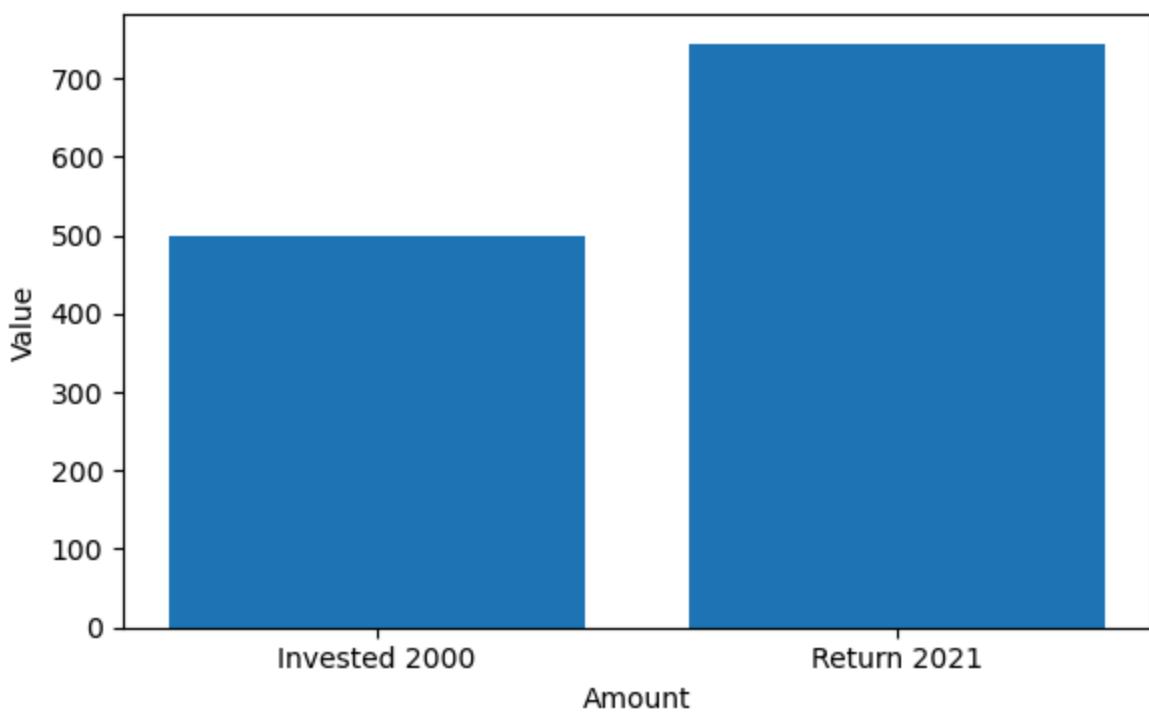
Invested Amount in 2000 vs Return Amount in 2021 - HDFC



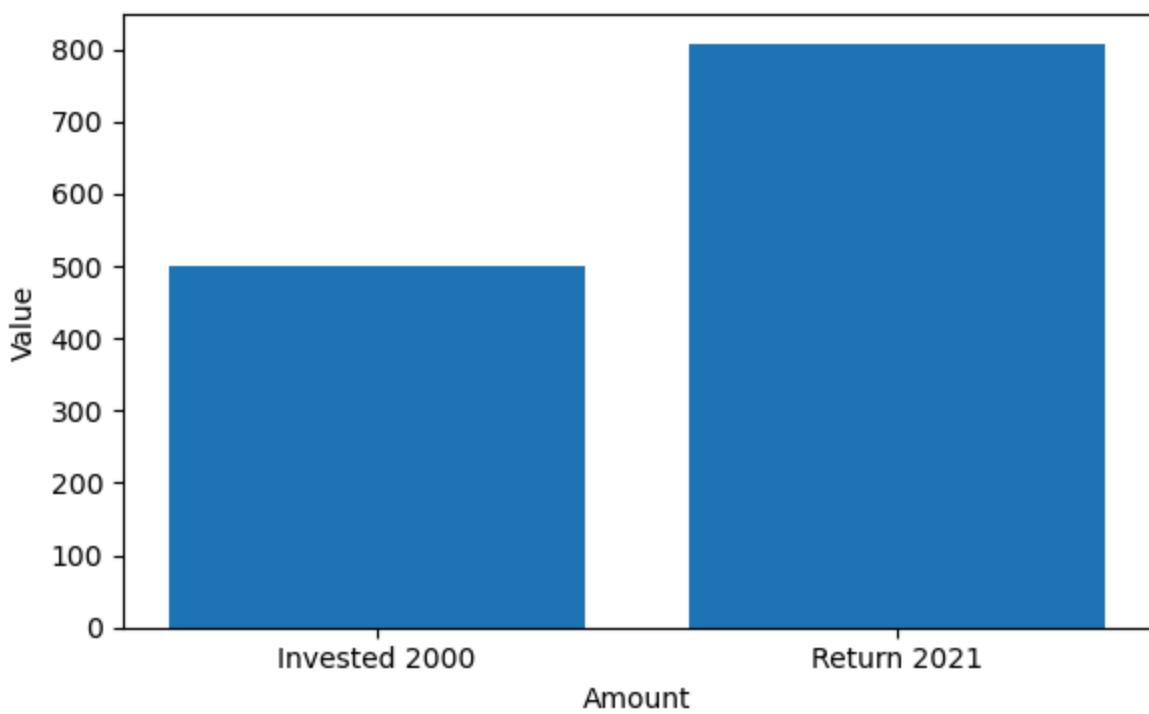
Invested Amount in 2000 vs Return Amount in 2021 - HDFCBANK



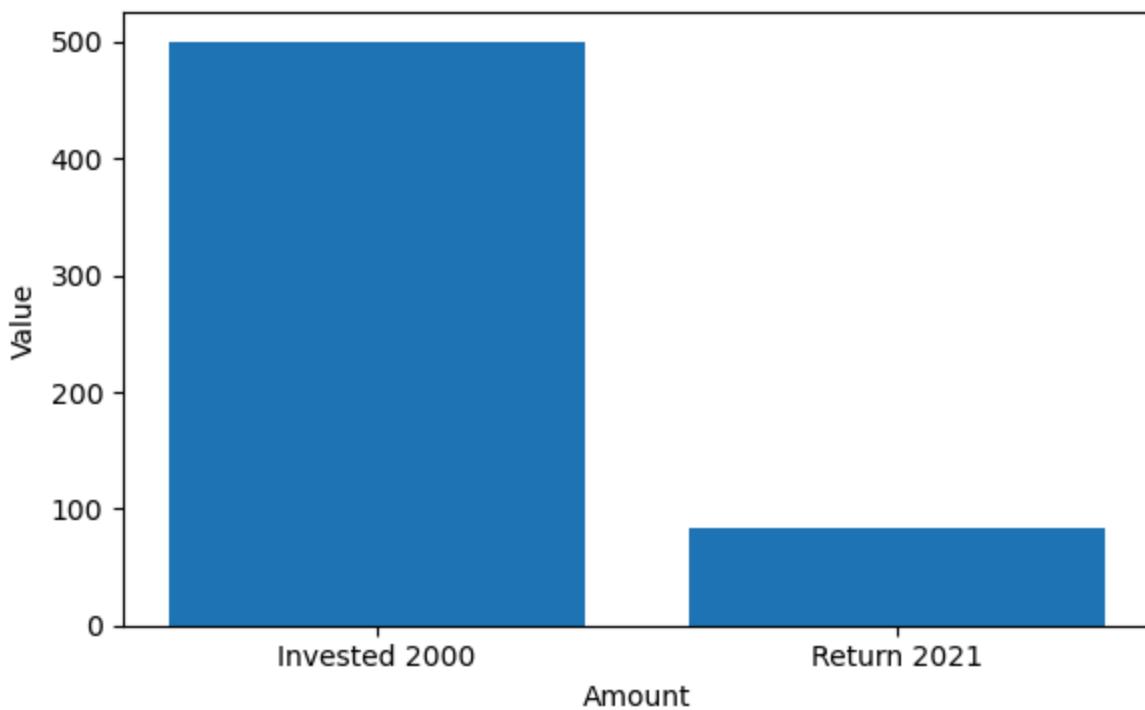
Invested Amount in 2000 vs Return Amount in 2021 - HEROHONDA



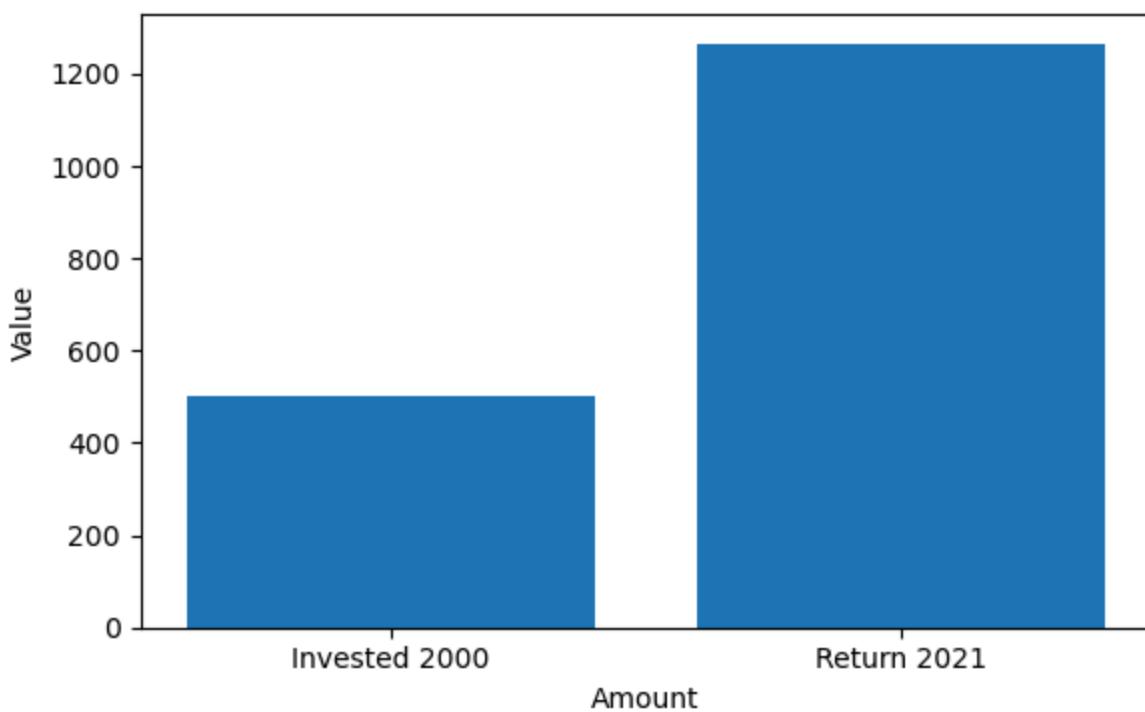
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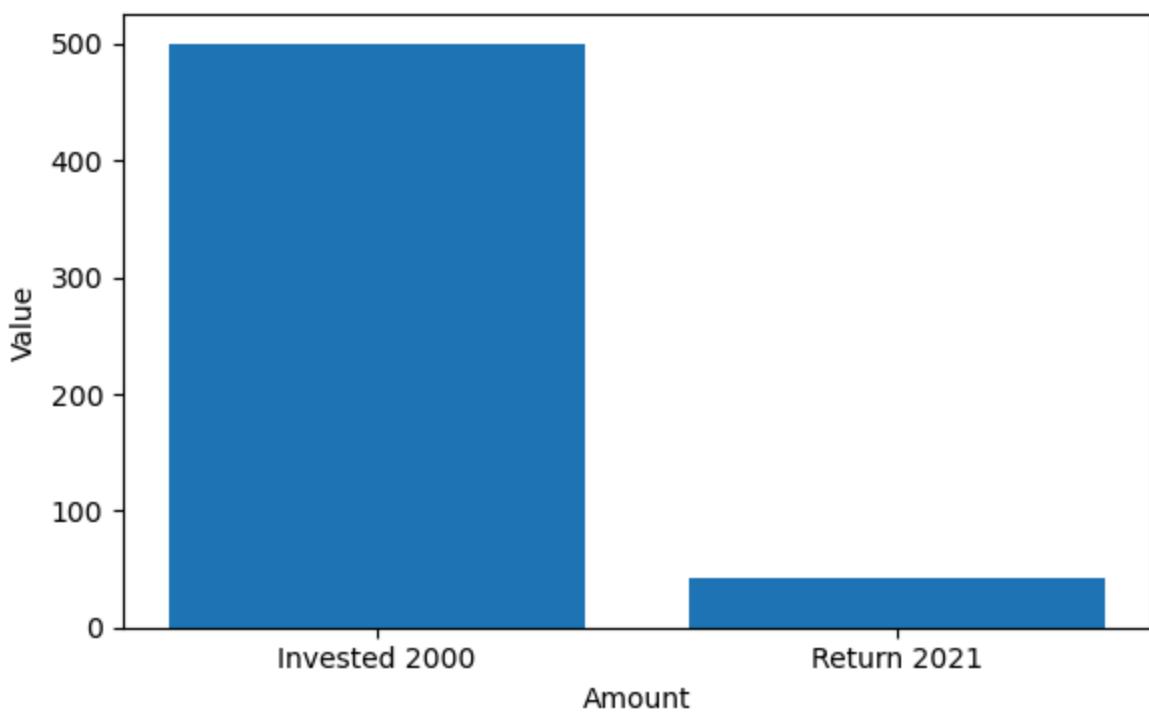
Invested Amount in 2000 vs Return Amount in 2021 - HINDALCO



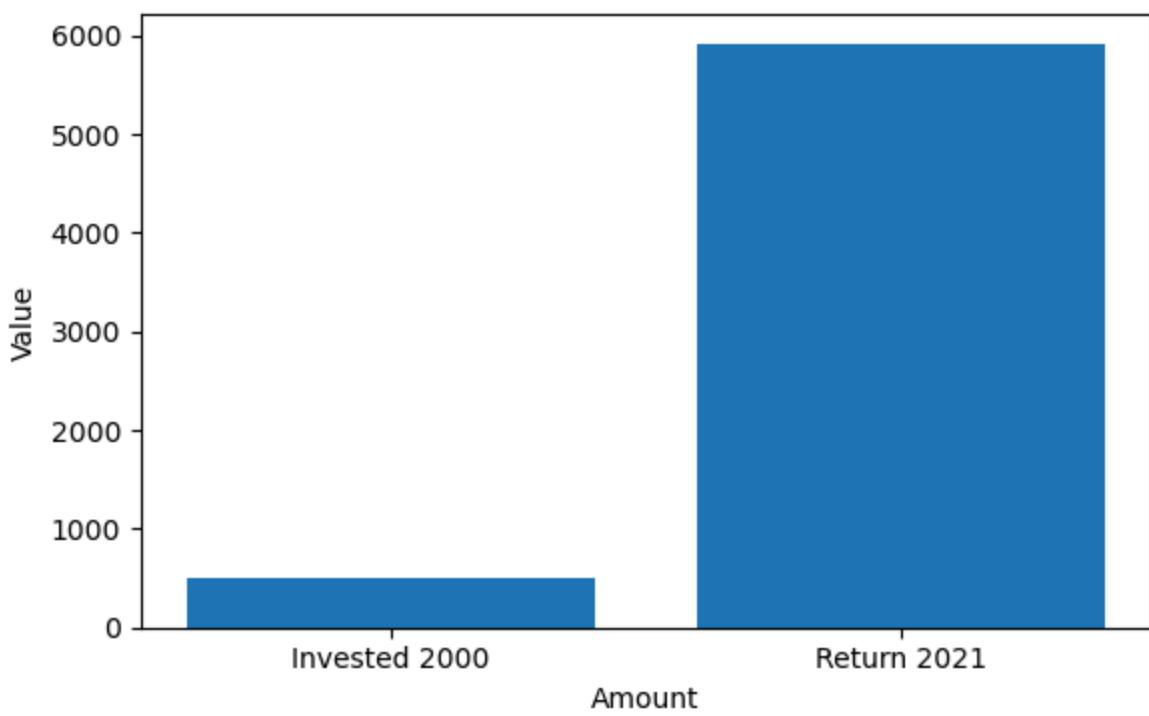
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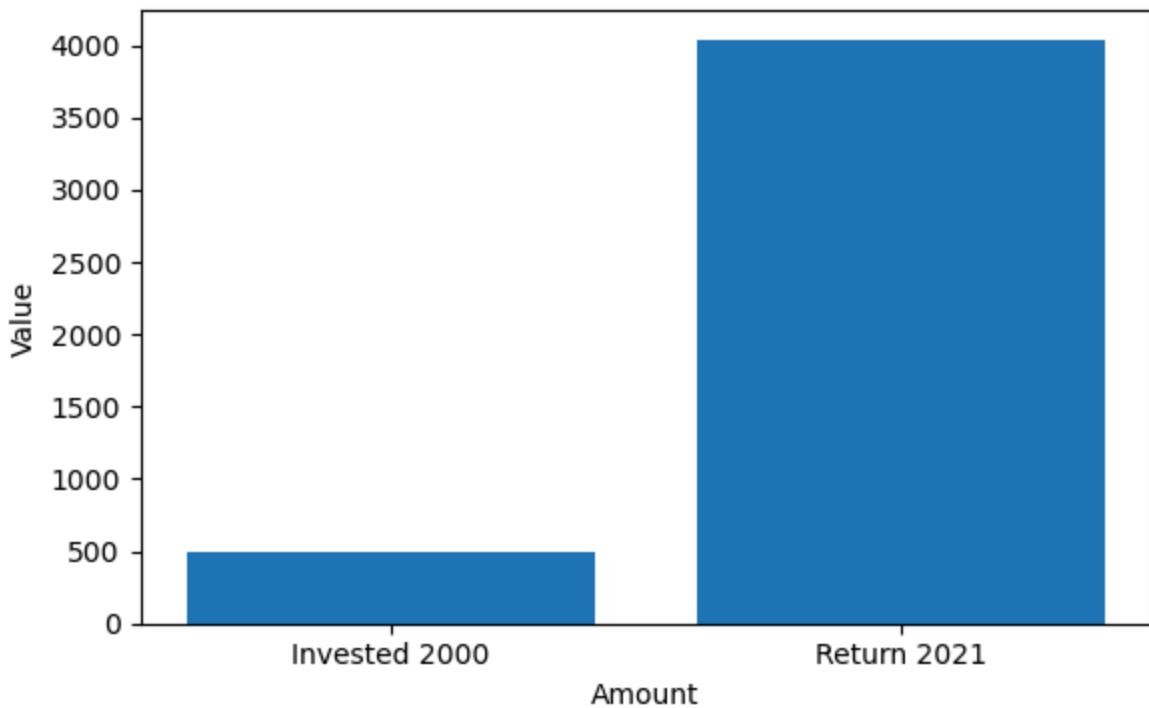
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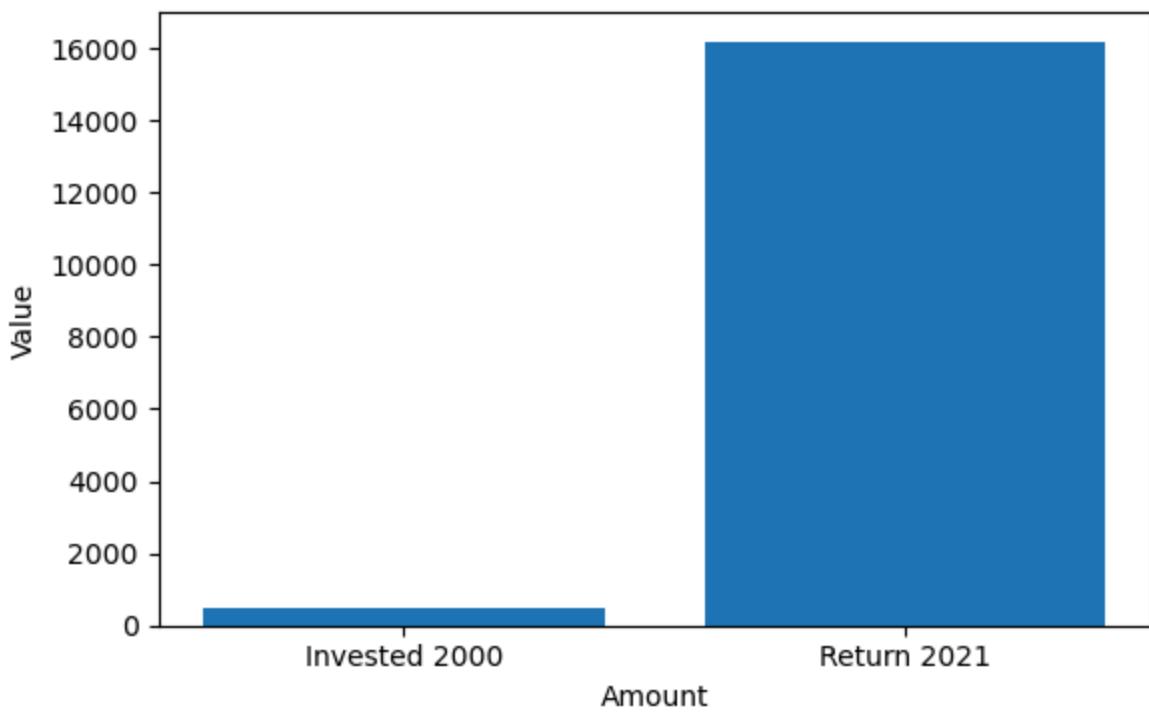
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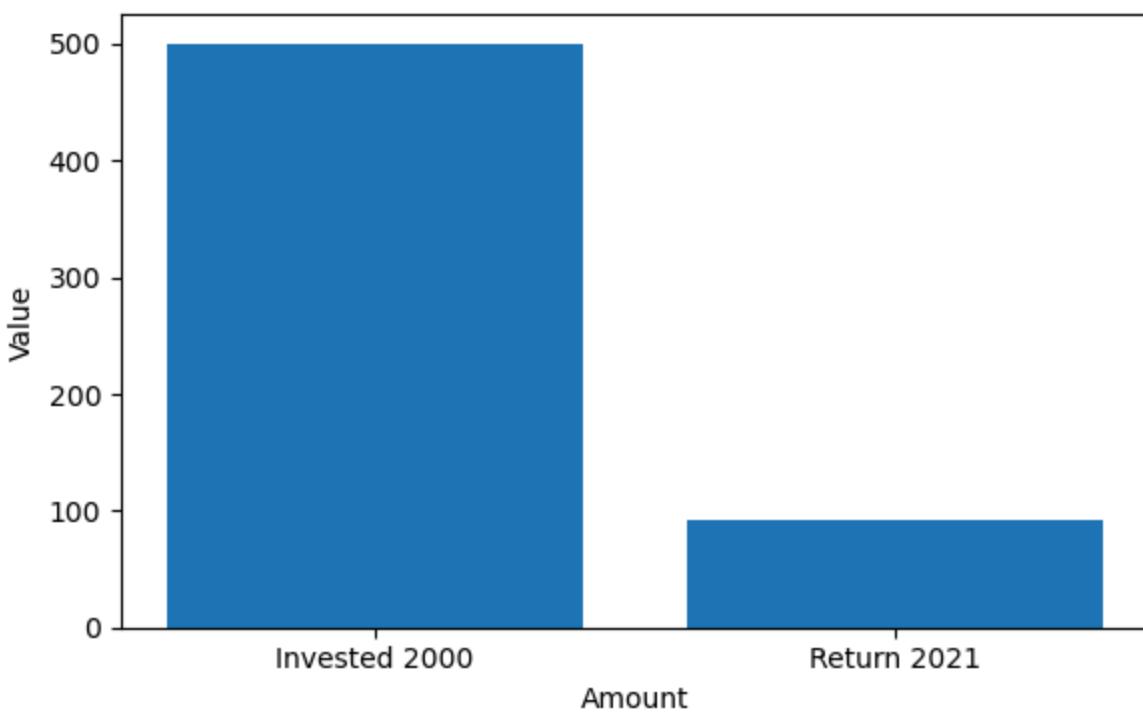
Invested Amount in 2000 vs Return Amount in 2021 - ICICIBANK



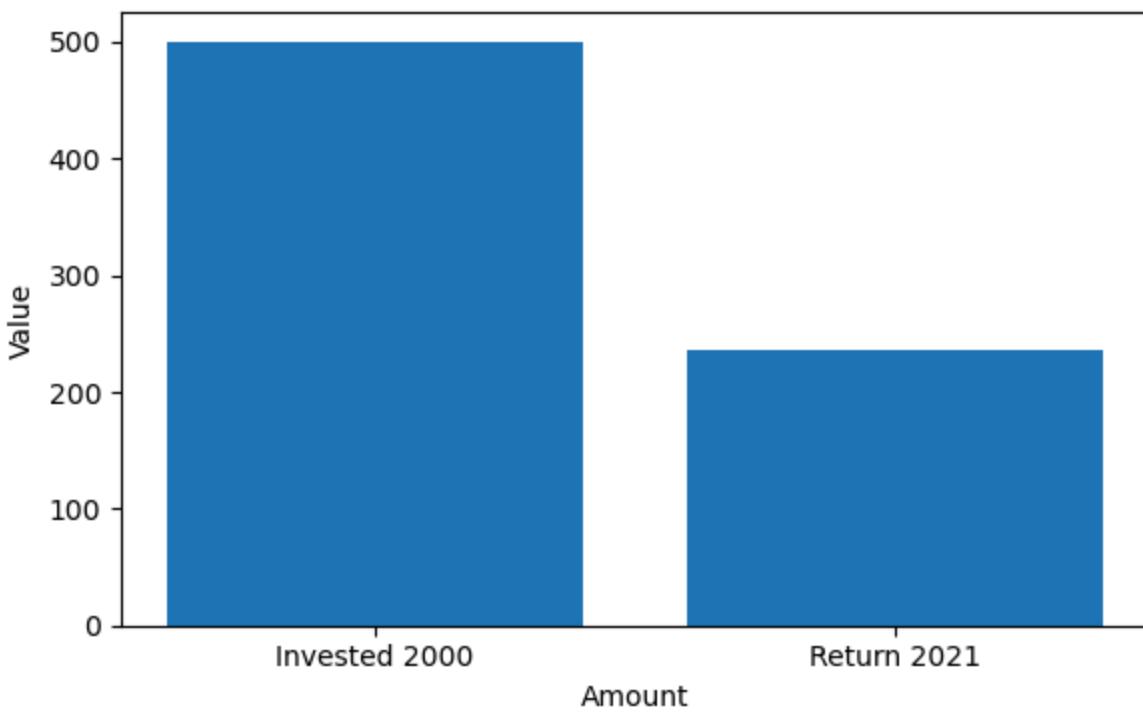
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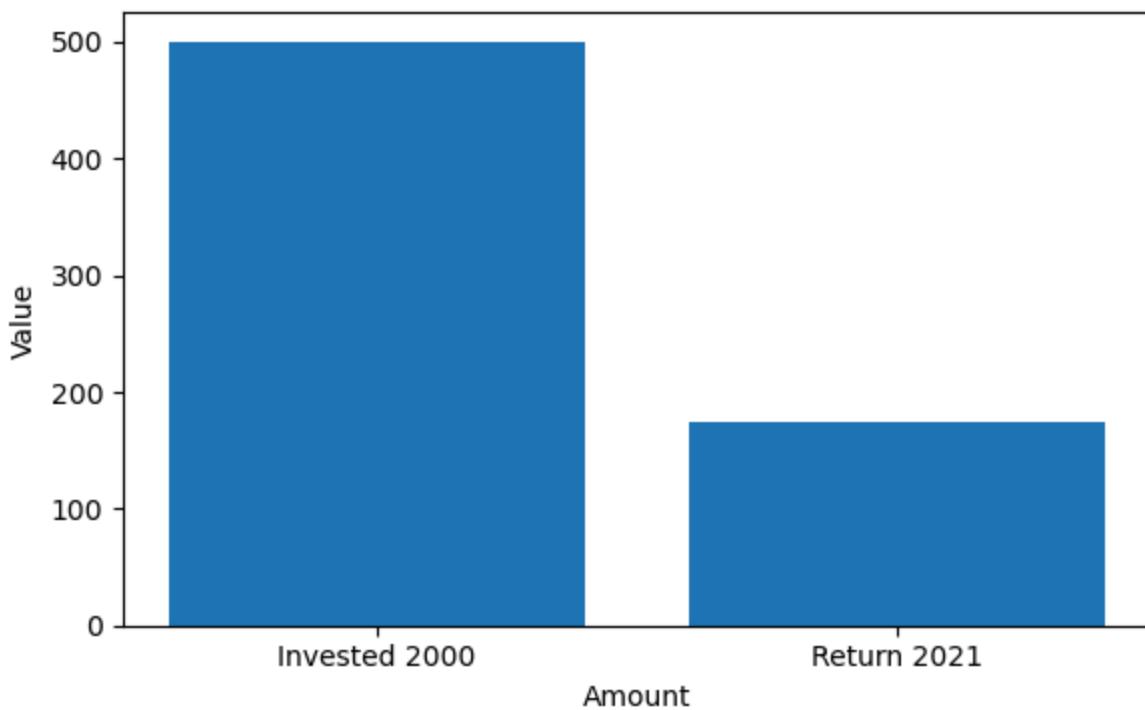
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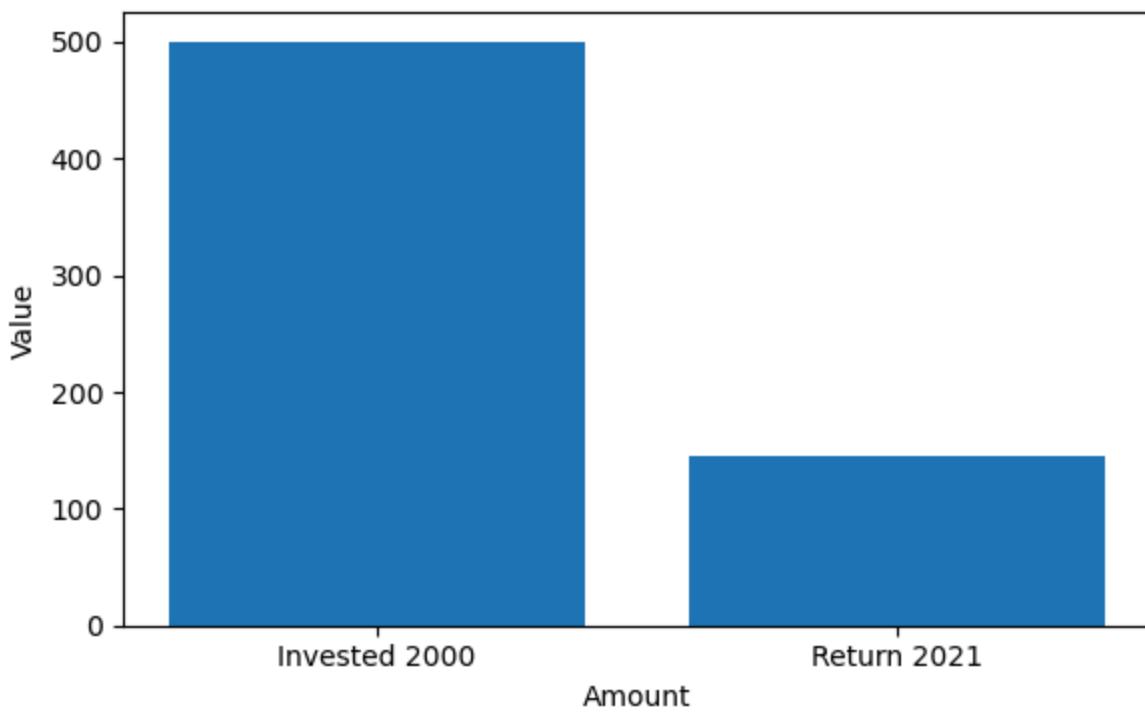
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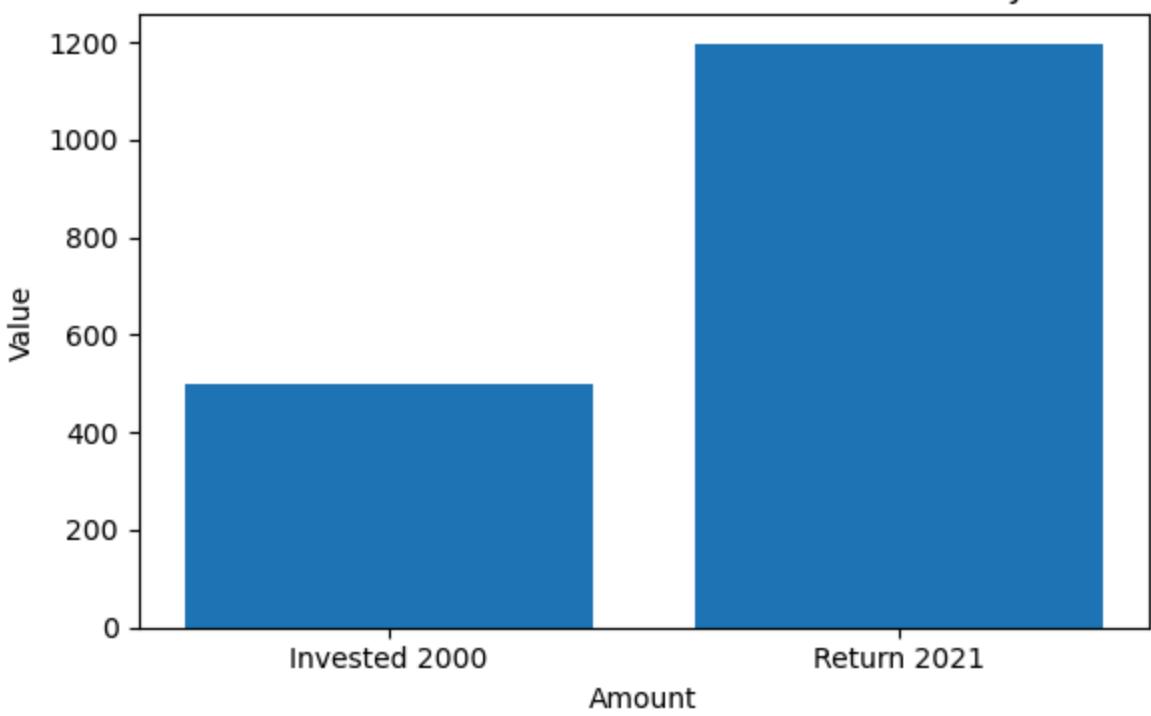
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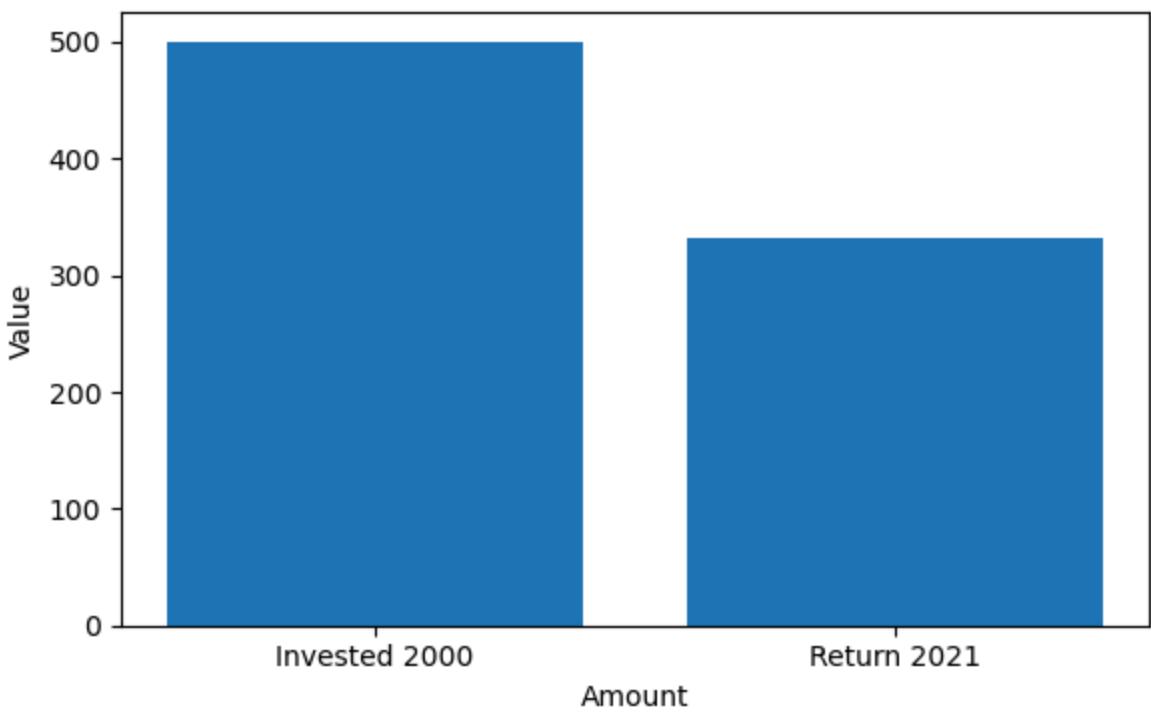
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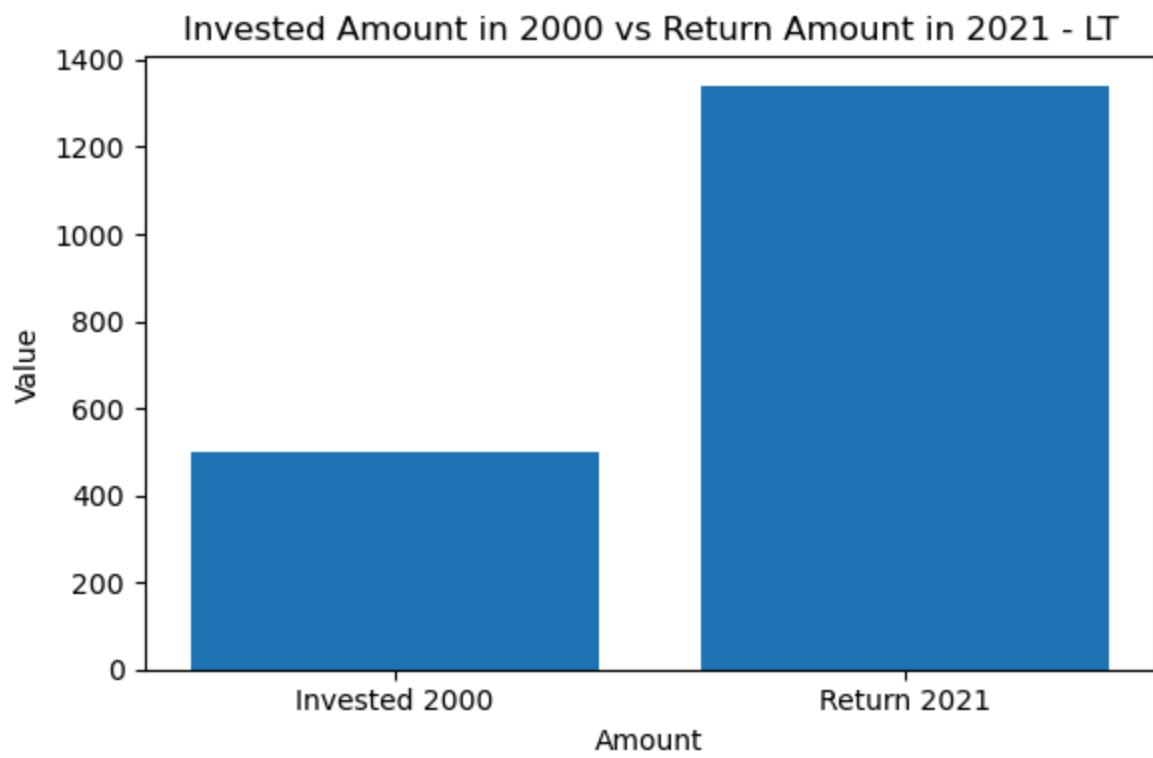
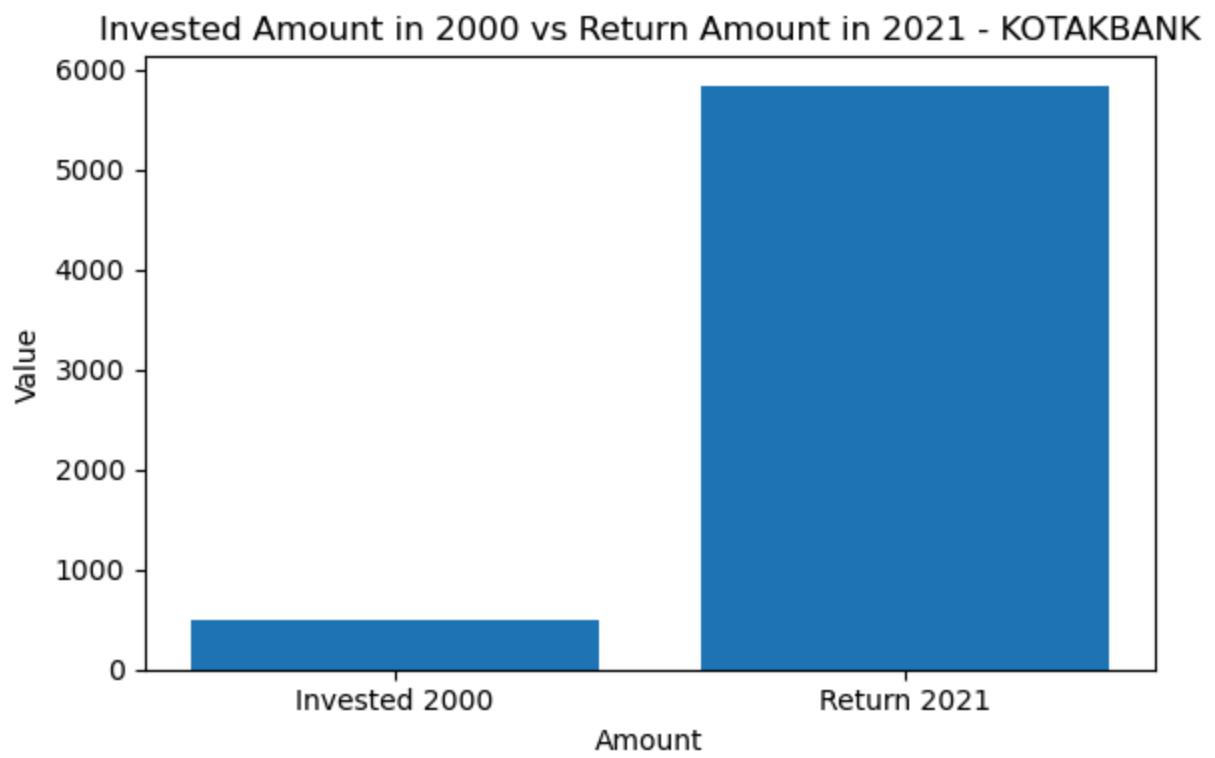


Invested Amount in 2000 vs Return Amount in 2021 - JSWSTEEL

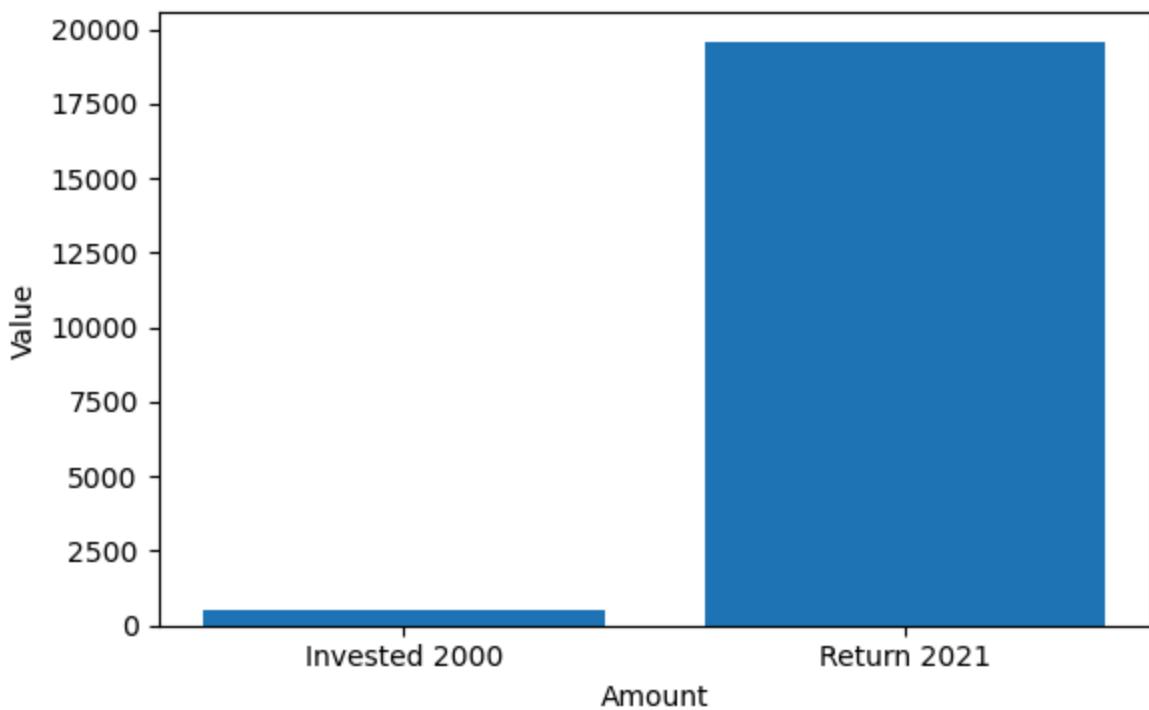


Invested Amount in 2000 vs Return Amount in 2021 - KOTAKMAH

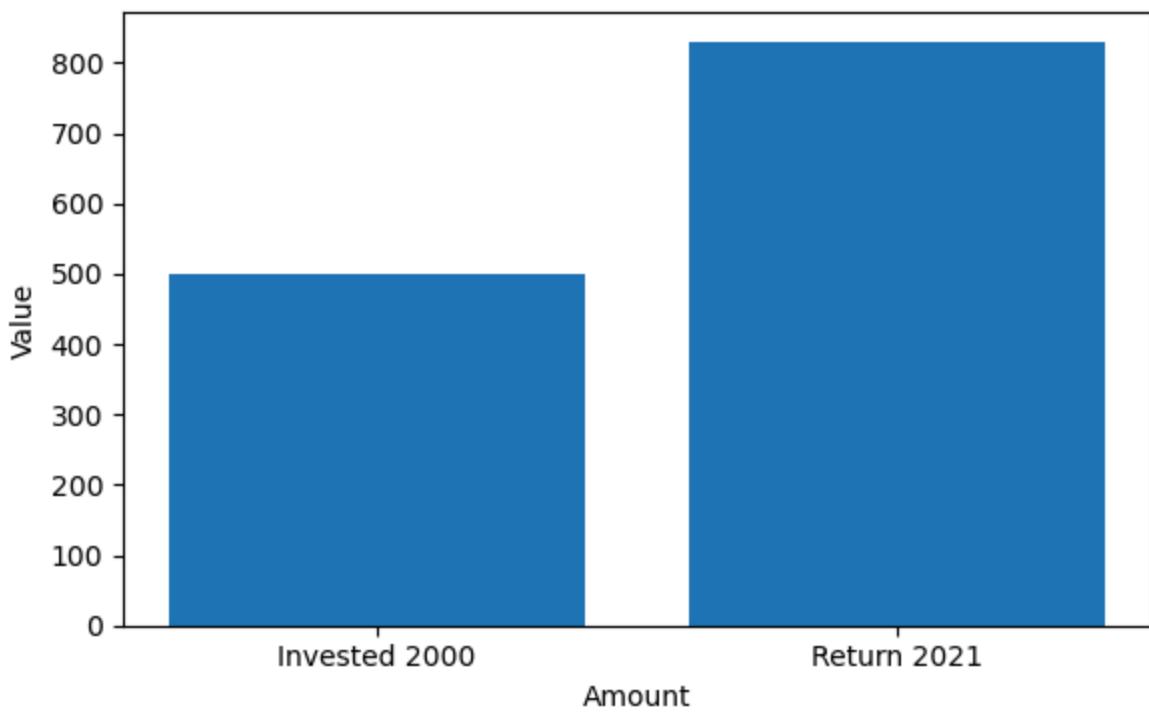




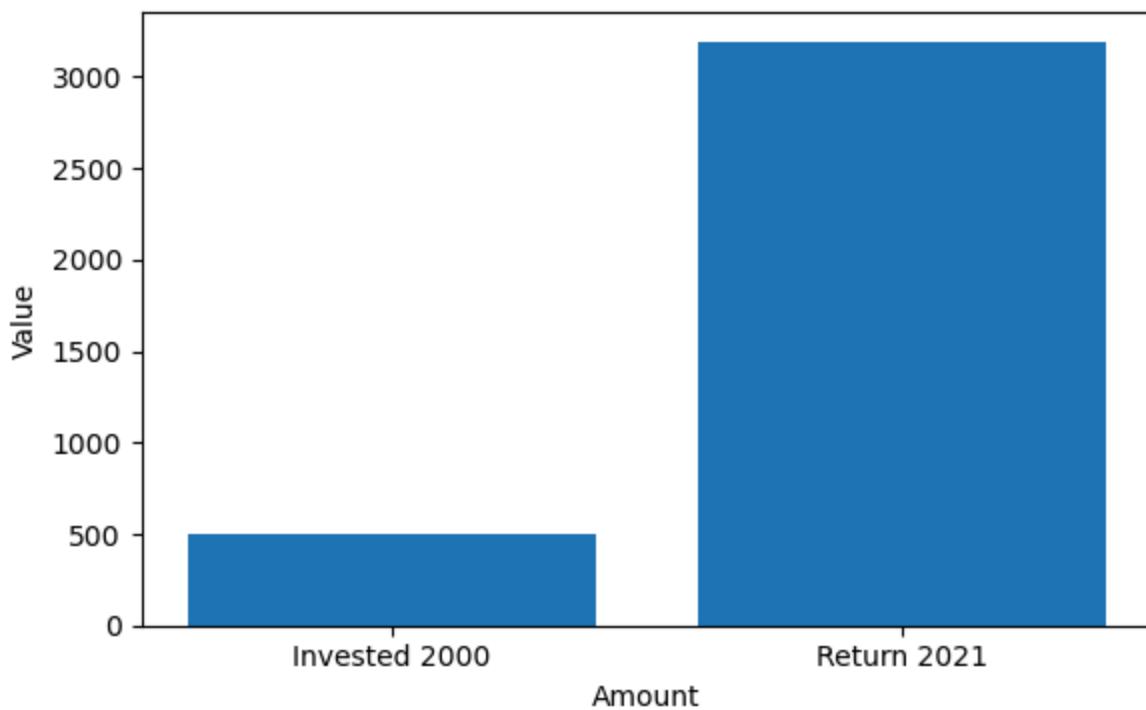
Invested Amount in 2000 vs Return Amount in 2021 - MARUTI



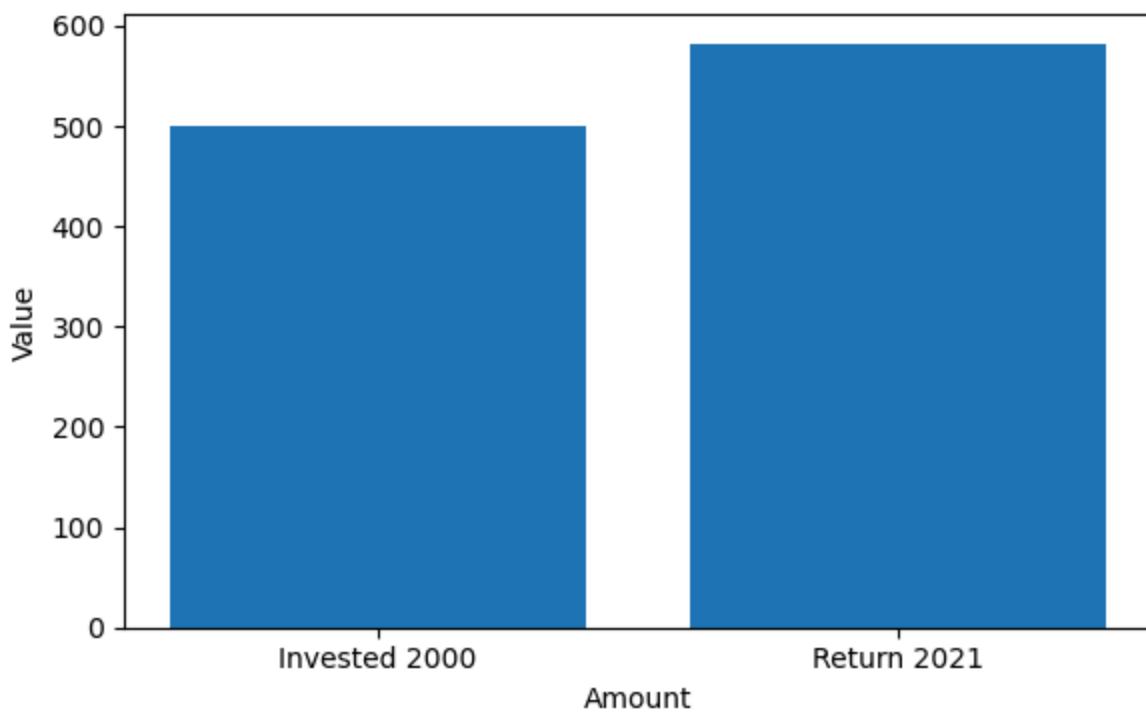
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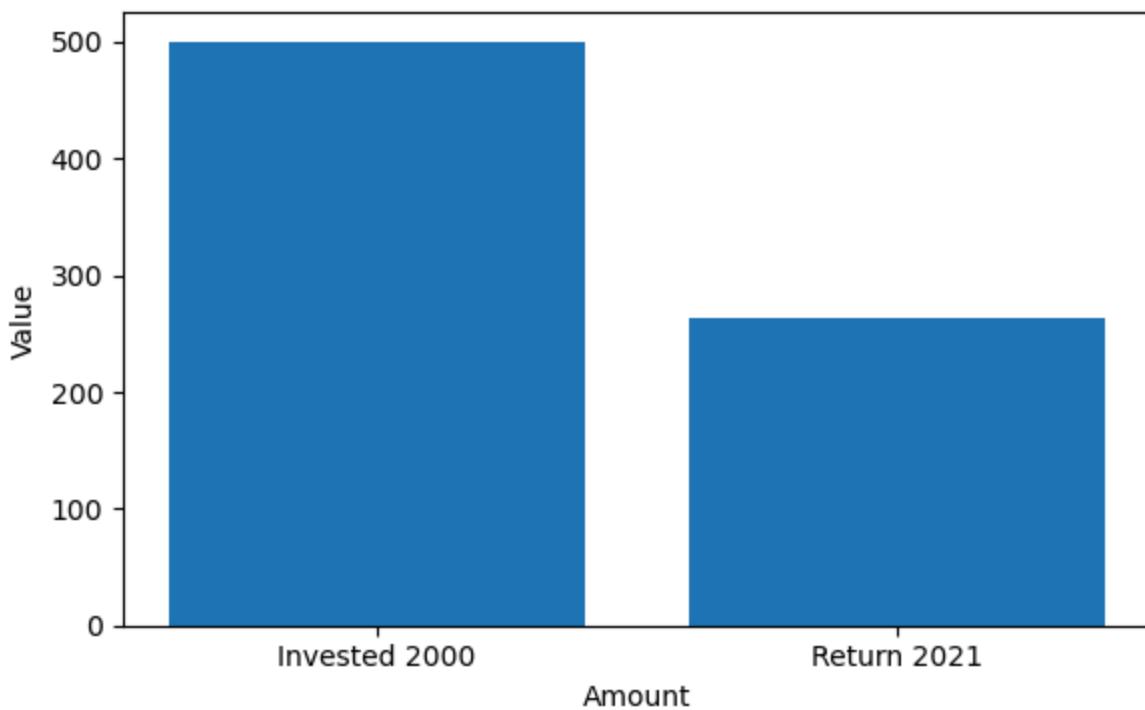
Invested Amount in 2000 vs Return Amount in 2021 - NESTLEIND



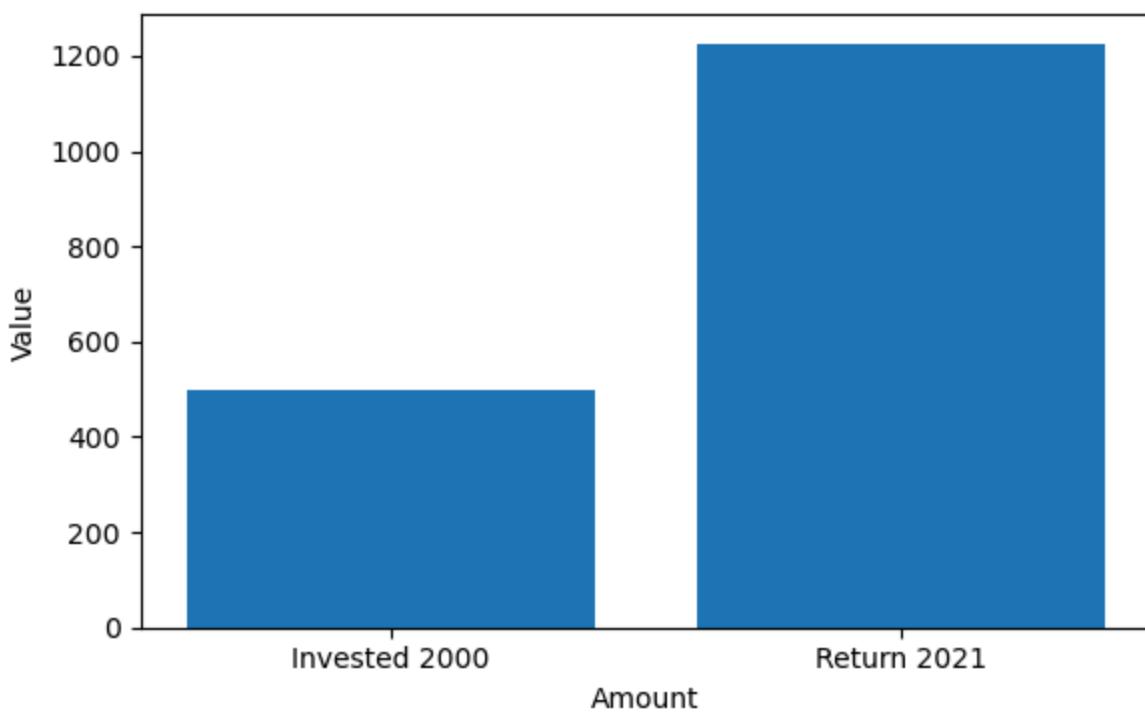
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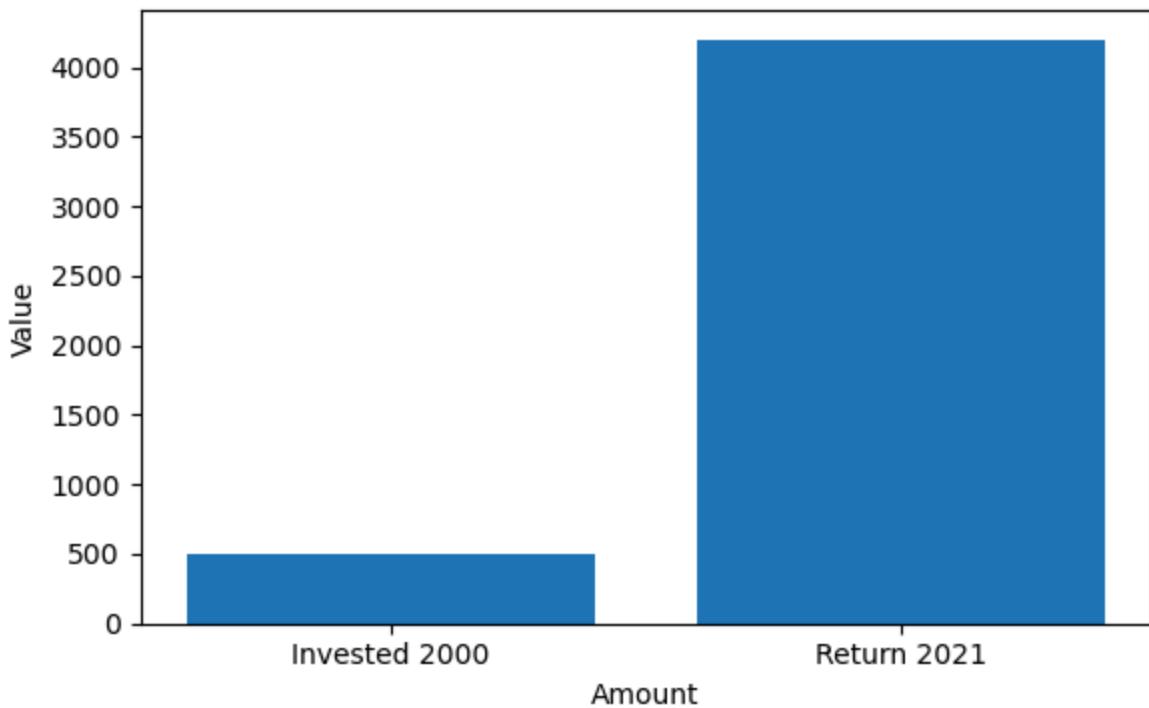
Invested Amount in 2000 vs Return Amount in 2021 - ONGC



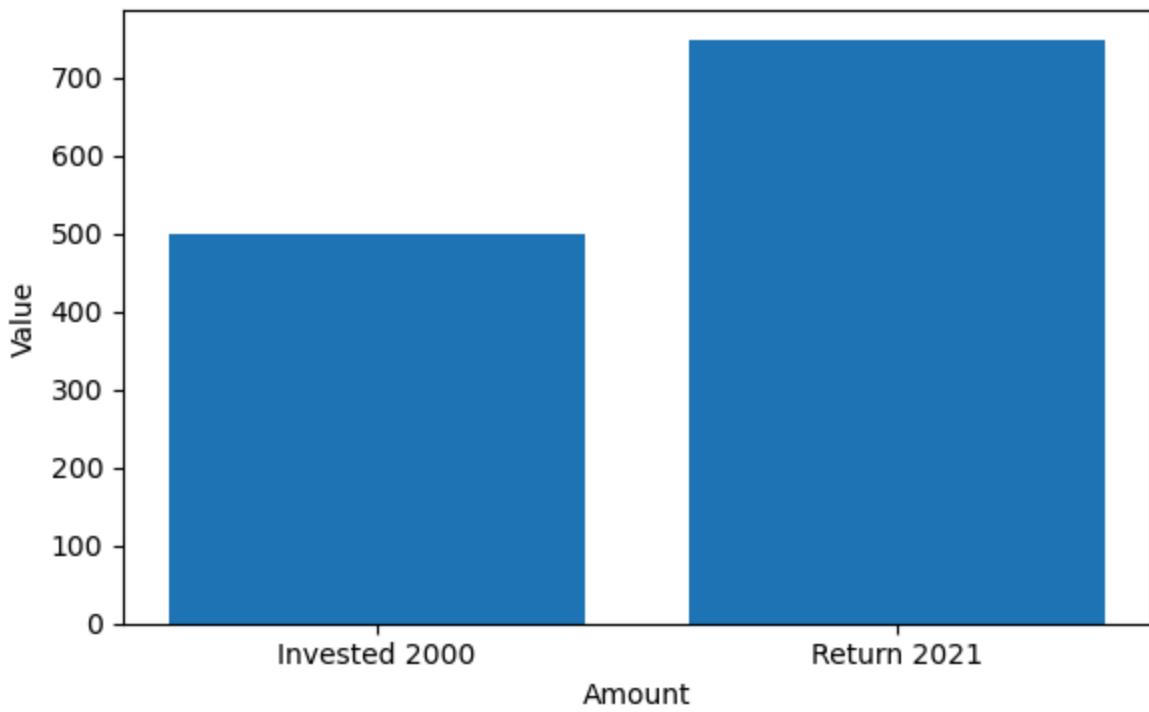
Invested Amount in 2000 vs Return Amount in 2021 - POWERGRID



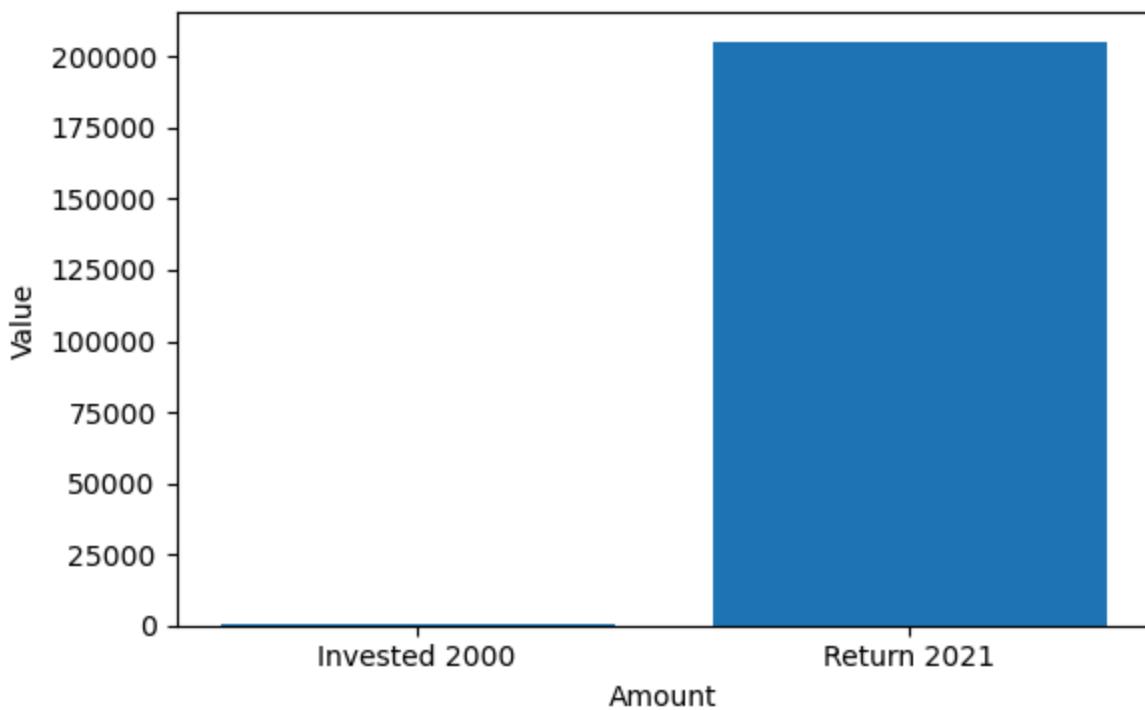
Invested Amount in 2000 vs Return Amount in 2021 - RELIANCE



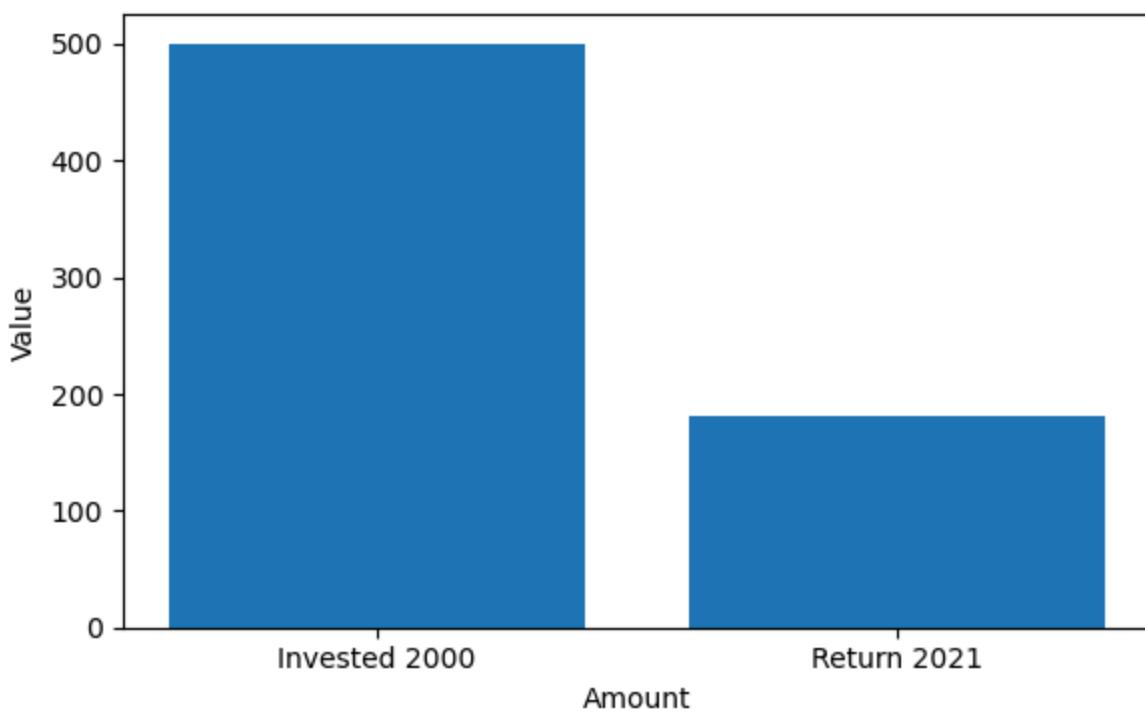
Invested Amount in 2000 vs Return Amount in 2021 - SBIN



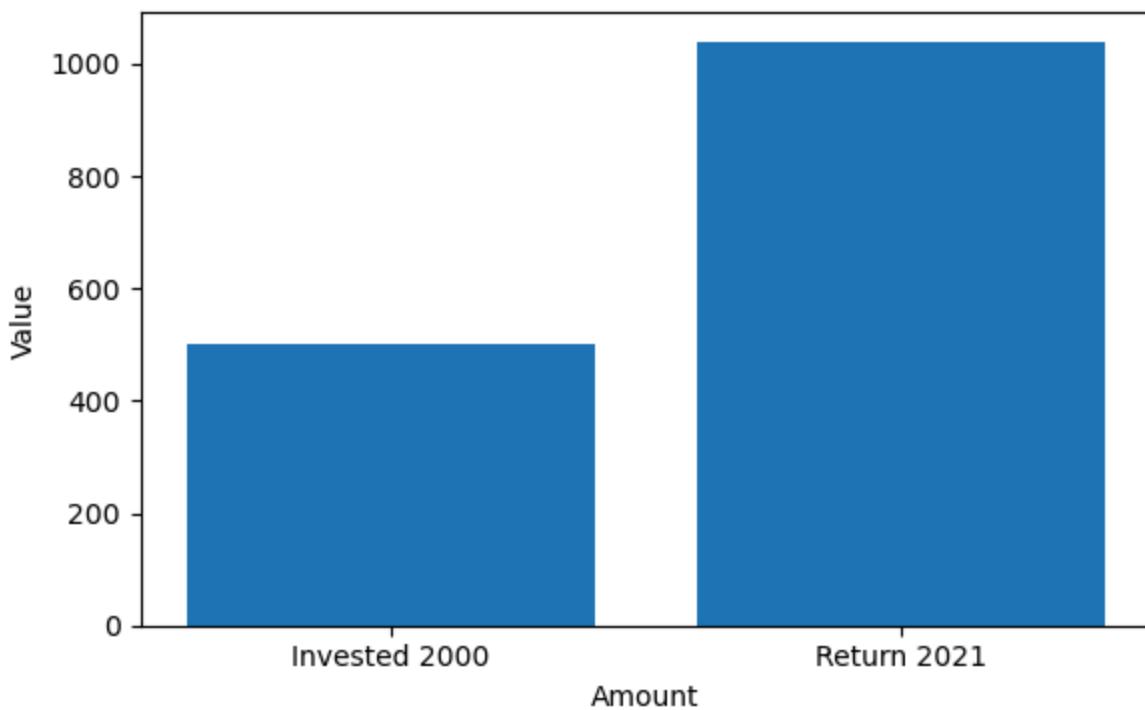
Invested Amount in 2000 vs Return Amount in 2021 - SHREECEM



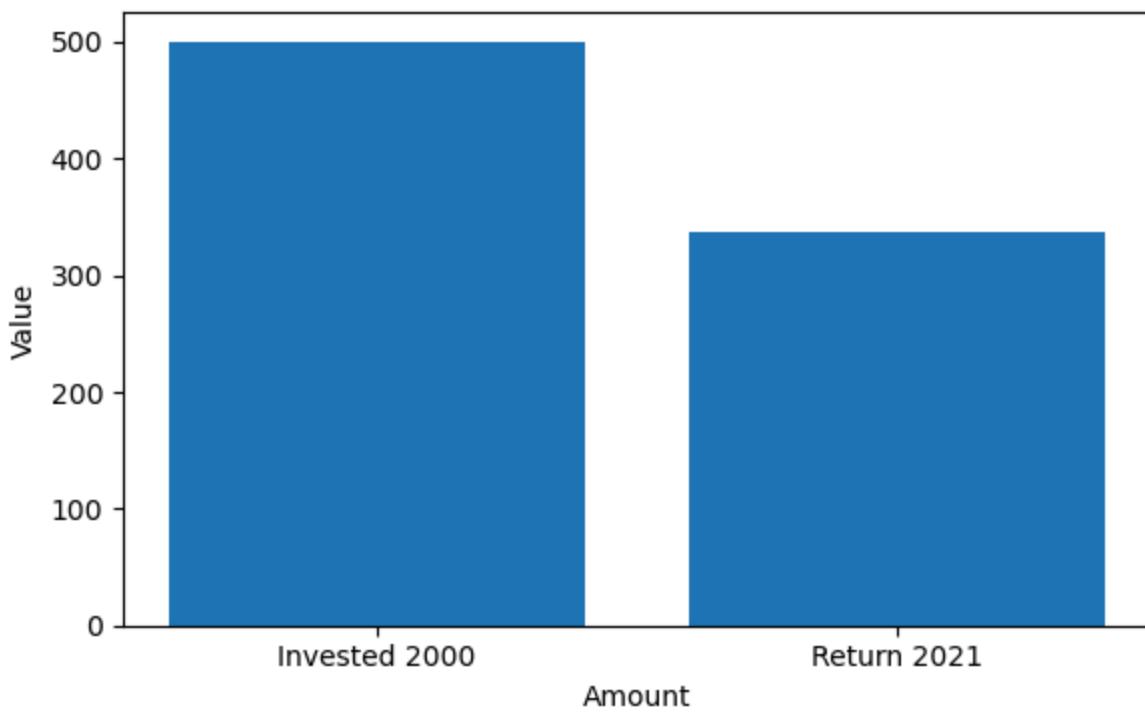
Invested Amount in 2000 vs Return Amount in 2021 - SUNPHARMA



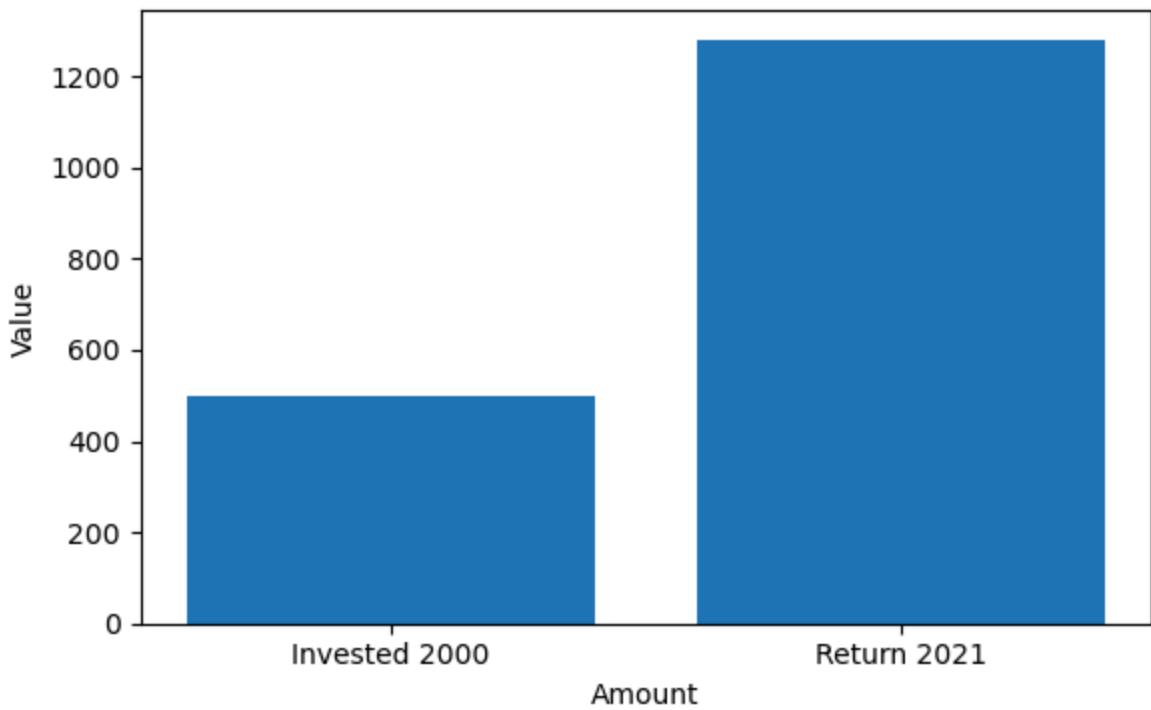
Invested Amount in 2000 vs Return Amount in 2021 - TELCO



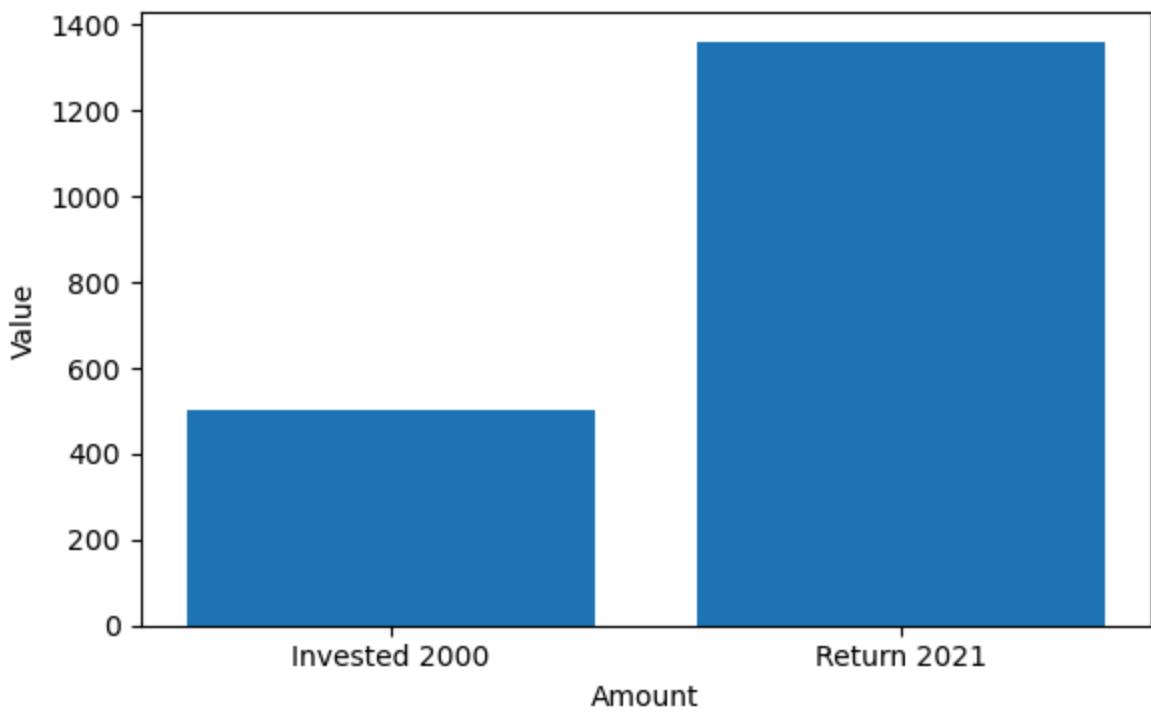
Invested Amount in 2000 vs Return Amount in 2021 - TATAMOTORS



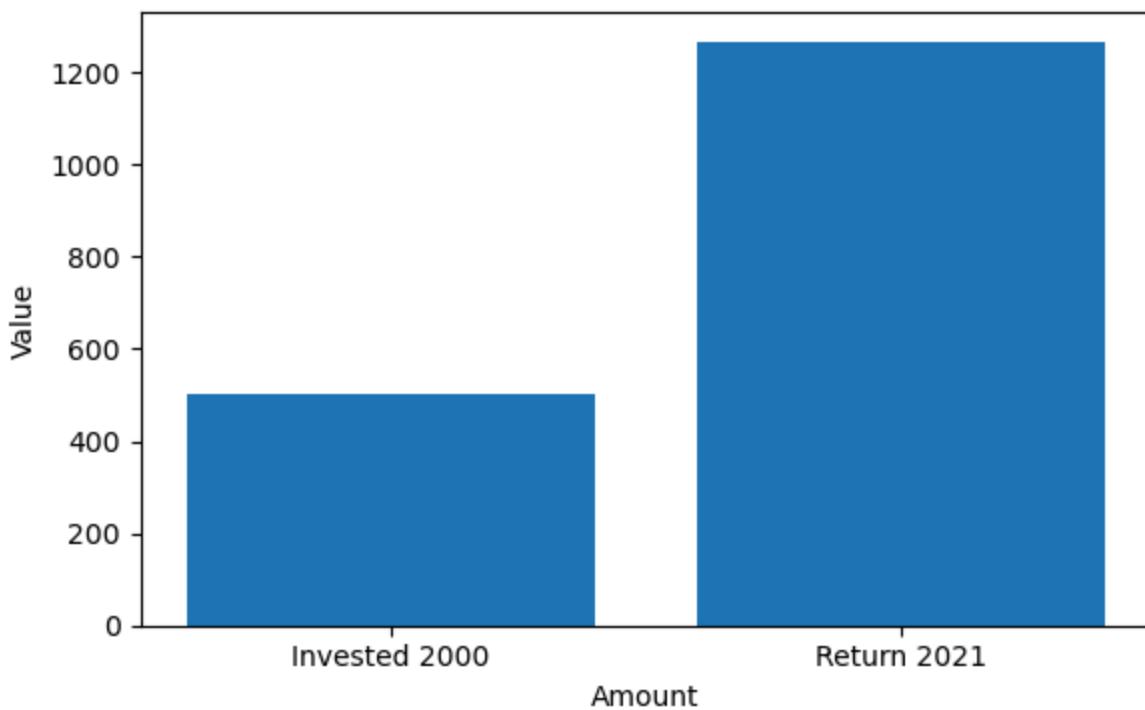
Invested Amount in 2000 vs Return Amount in 2021 - TISCO



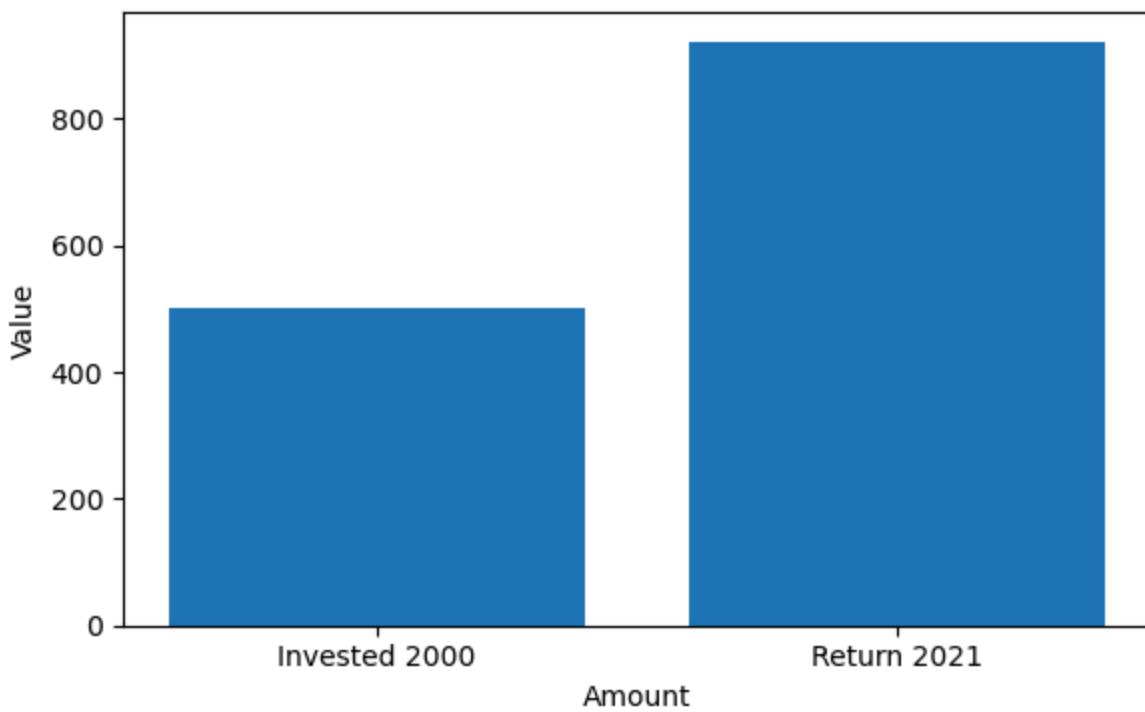
Invested Amount in 2000 vs Return Amount in 2021 - TATASTEEL



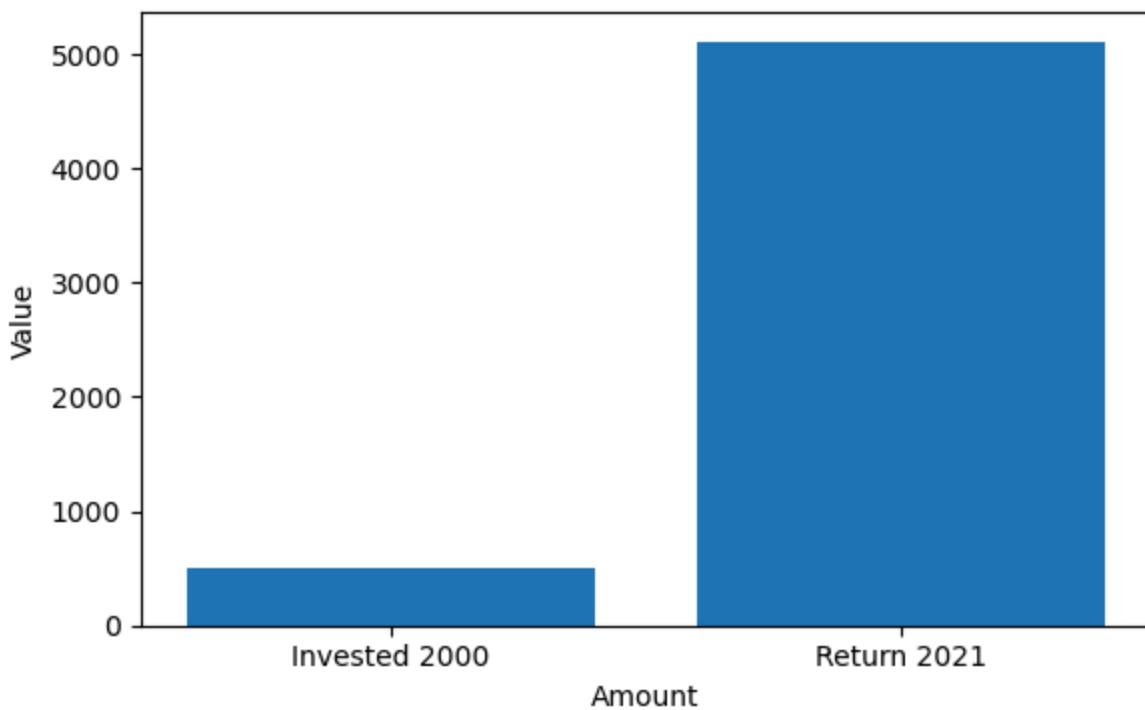
Invested Amount in 2000 vs Return Amount in 2021 - TCS



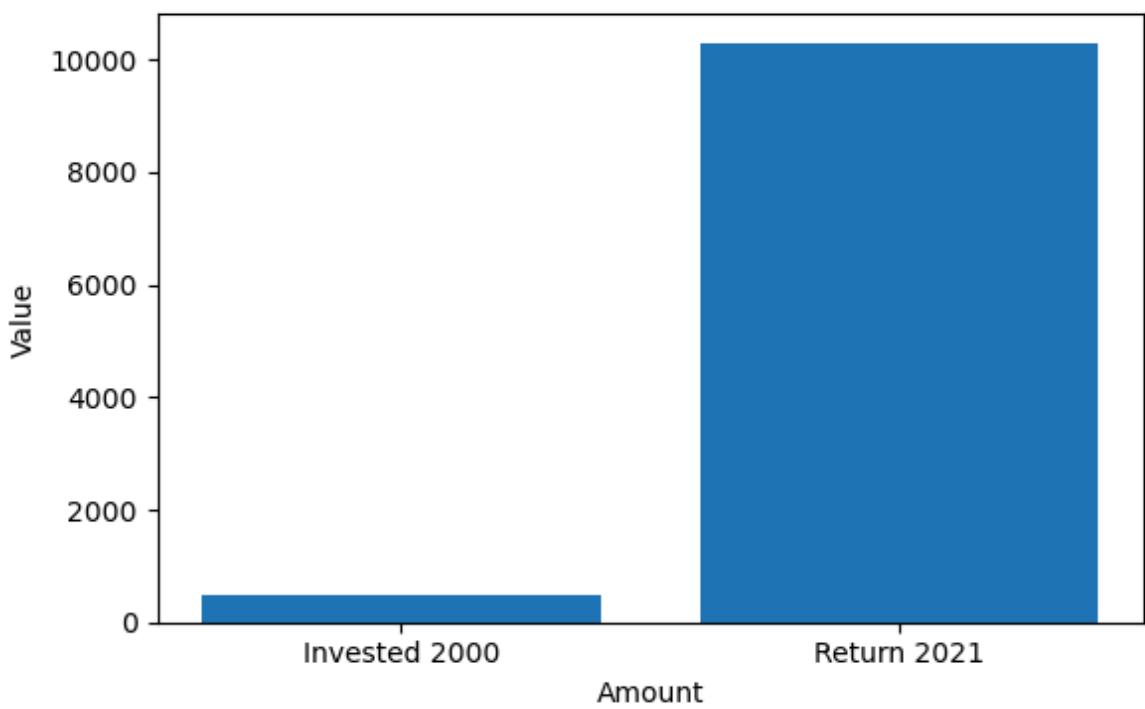
Invested Amount in 2000 vs Return Amount in 2021 - TECHM



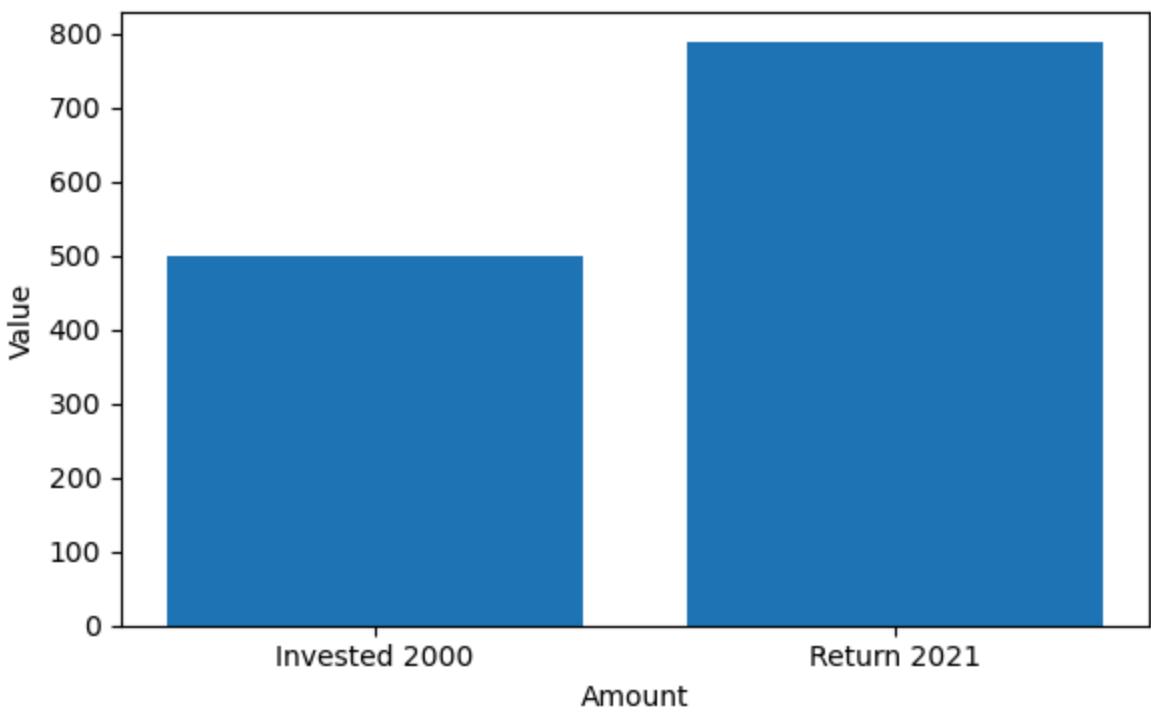
Invested Amount in 2000 vs Return Amount in 2021 - TITAN



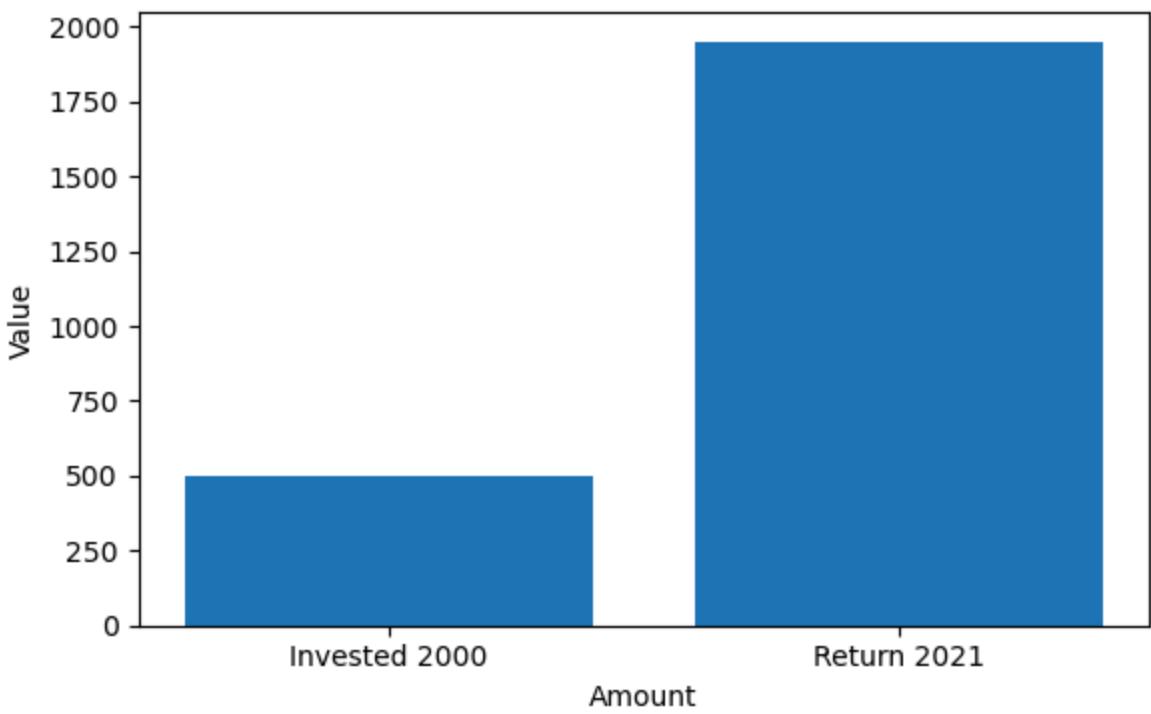
Invested Amount in 2000 vs Return Amount in 2021 - ULTRACEMCO



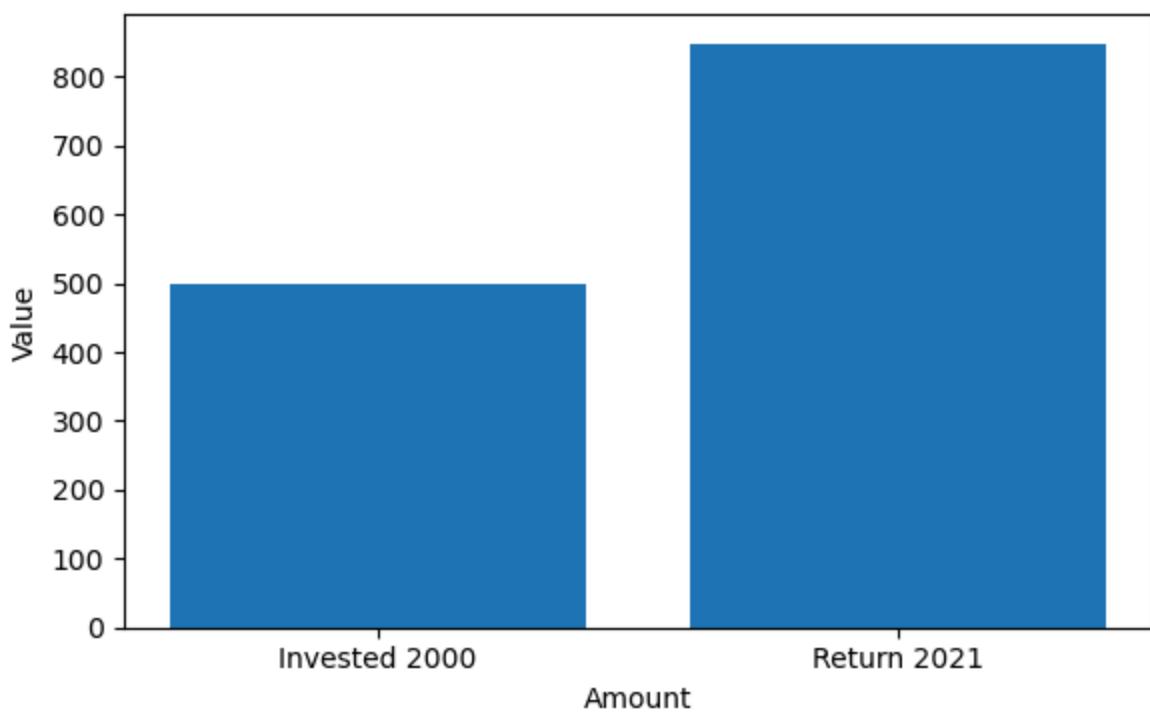
Invested Amount in 2000 vs Return Amount in 2021 - UNIPHOS



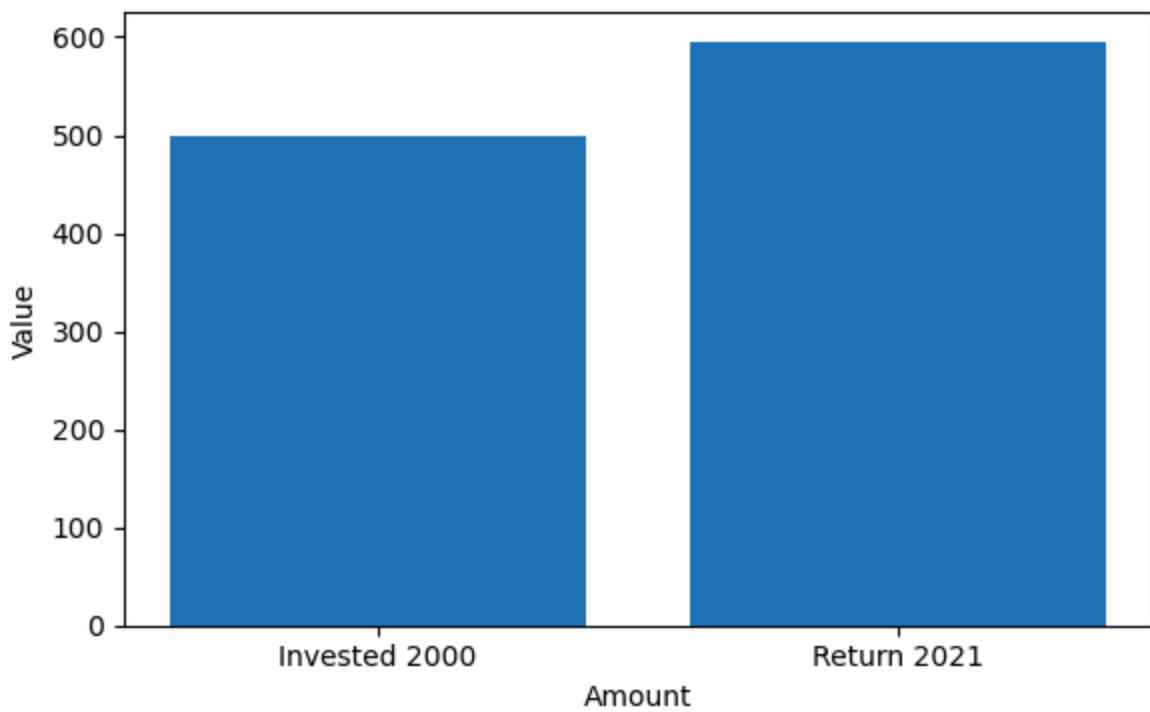
Invested Amount in 2000 vs Return Amount in 2021 - UPL



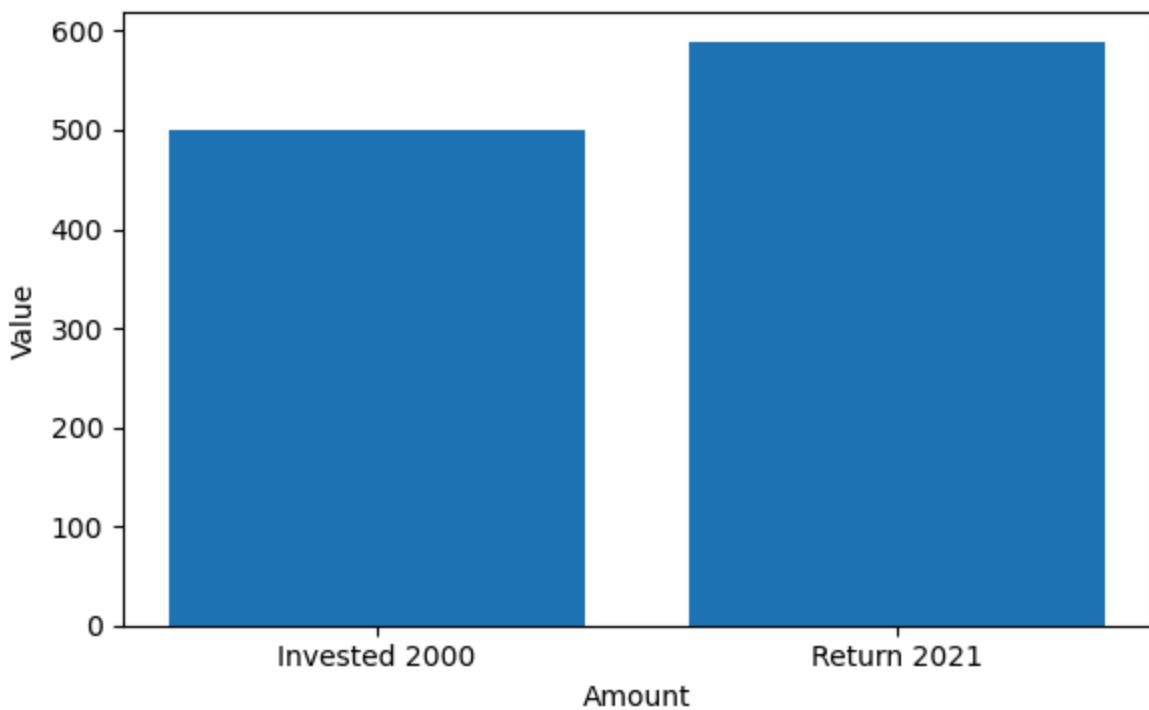
Invested Amount in 2000 vs Return Amount in 2021 - SESAGOA



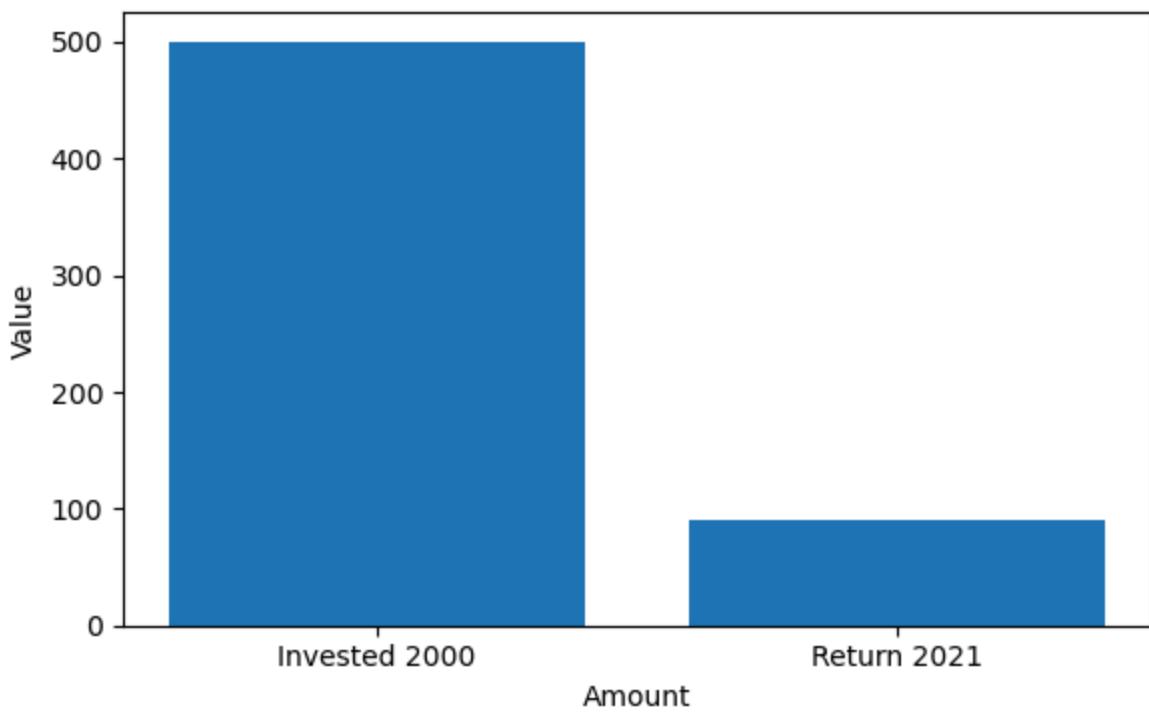
Invested Amount in 2000 vs Return Amount in 2021 - SSLT

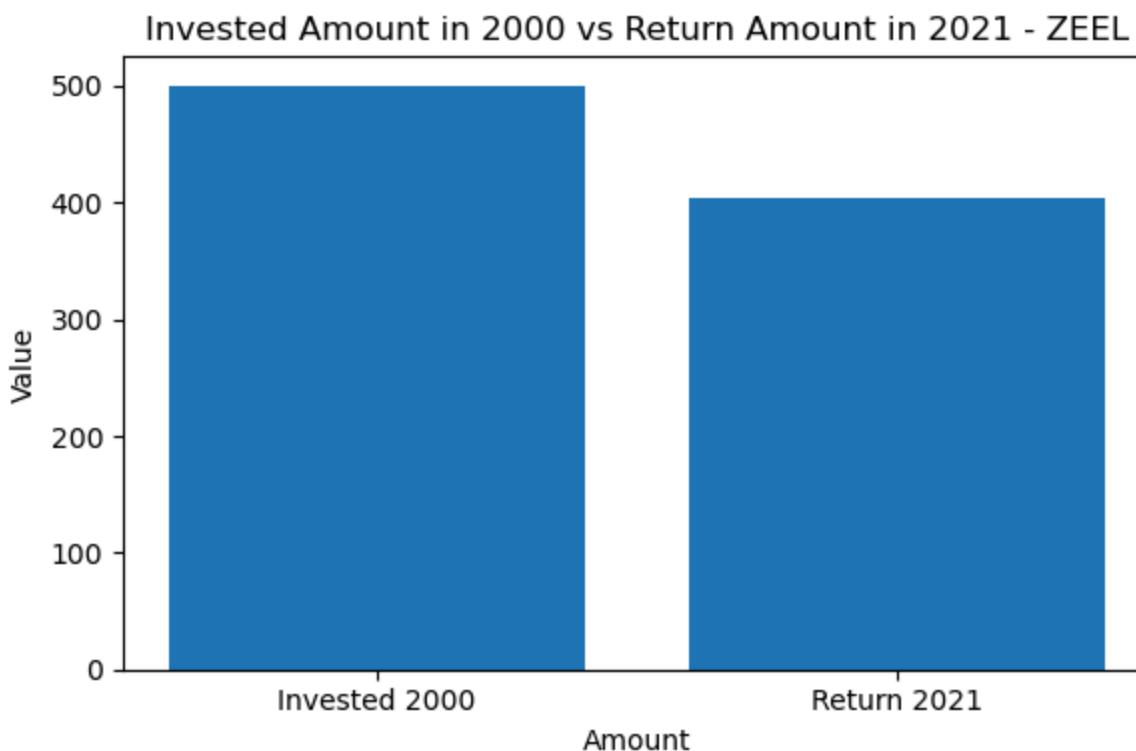
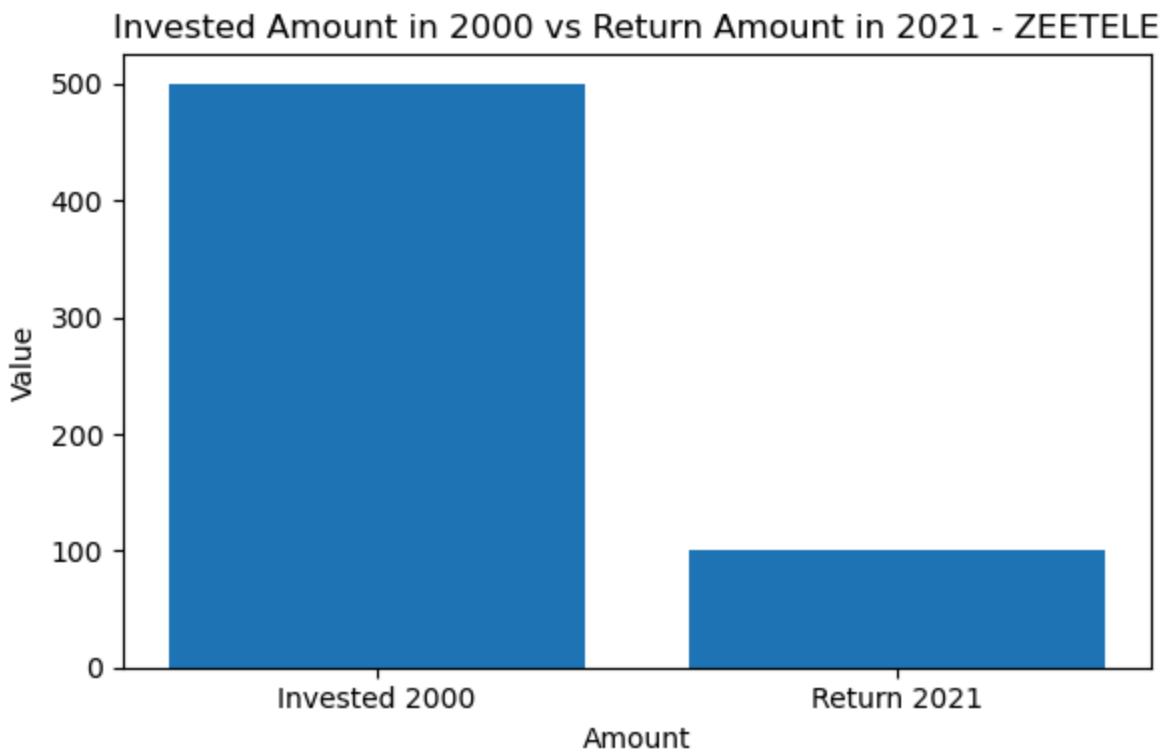


Invested Amount in 2000 vs Return Amount in 2021 - VEDL



Invested Amount in 2000 vs Return Amount in 2021 - WIPRO





```
In [22]: results_df['Price_Difference'] = results_df['Last_Close_2021'] - results_df['First_Open_2000']
max_row = results_df.loc[results_df['Price_Difference'].idxmax()]
print("Stock with maximum growth as on 2021:")
print(max_row)
```

```
Stock with maximum growth as on 2021:  
Symbol                      SHREECEM  
First_Open_2000                68.0  
Invested_amount_2000            500  
Last_Close_2021                27910.5  
Return_Amount_2021              205224.264706  
Net_Worth                     204724.264706  
Price_Difference               27842.5  
Name: 46, dtype: object
```

- Determining the stock with the highest return.

Calculating the present value of a portfolio evenly distributed across multiple stocks since 2000, starting with an initial investment of 64,000 INR, and assessing its current worth in 2021 to evaluate the overall performance of the investment.

```
In [23]: invested_amount_2000 = 1000
```

```
In [24]: unique_symbols = nifty_data_2['Symbol'].unique()  
results_df = pd.DataFrame(columns=['Symbol', 'First_Open_2000', 'Invested_amount_2000',  
for symbol in unique_symbols:  
    symbol_data = nifty_data_2[nifty_data_2['Symbol'] == symbol]  
    symbol_data = symbol_data.sort_values(by='Year')  
    first_open_value = symbol_data['Open'].first_valid_index()  
    first_open = symbol_data.loc[first_open_value, 'Open'] if first_open_value is not None else 0  
    last_close_value = symbol_data['Close'].last_valid_index()  
    last_close = symbol_data.loc[last_close_value, 'Close'] if last_close_value is not None else 0  
    return_amount_2021 = invested_amount_2000 * last_close / first_open if (first_open != 0 and last_close != 0) else 0  
    net = return_amount_2021 - invested_amount_2000  
    results_df = results_df.append({'Symbol': symbol, 'First_Open_2000': first_open, 'Invested_amount_2000': invested_amount_2000, 'Return_Amount_2021': return_amount_2021, 'Net_Worth': net})
```

```
C:\Users\devan\AppData\Local\Temp\ipykernel_16832\2321537900.py:12: FutureWarning: Th  
e frame.append method is deprecated and will be removed from pandas in a future versi  
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    results_df = results_df.append({'Symbol': symbol, 'First_Open_2000': first_open, 'In  
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```

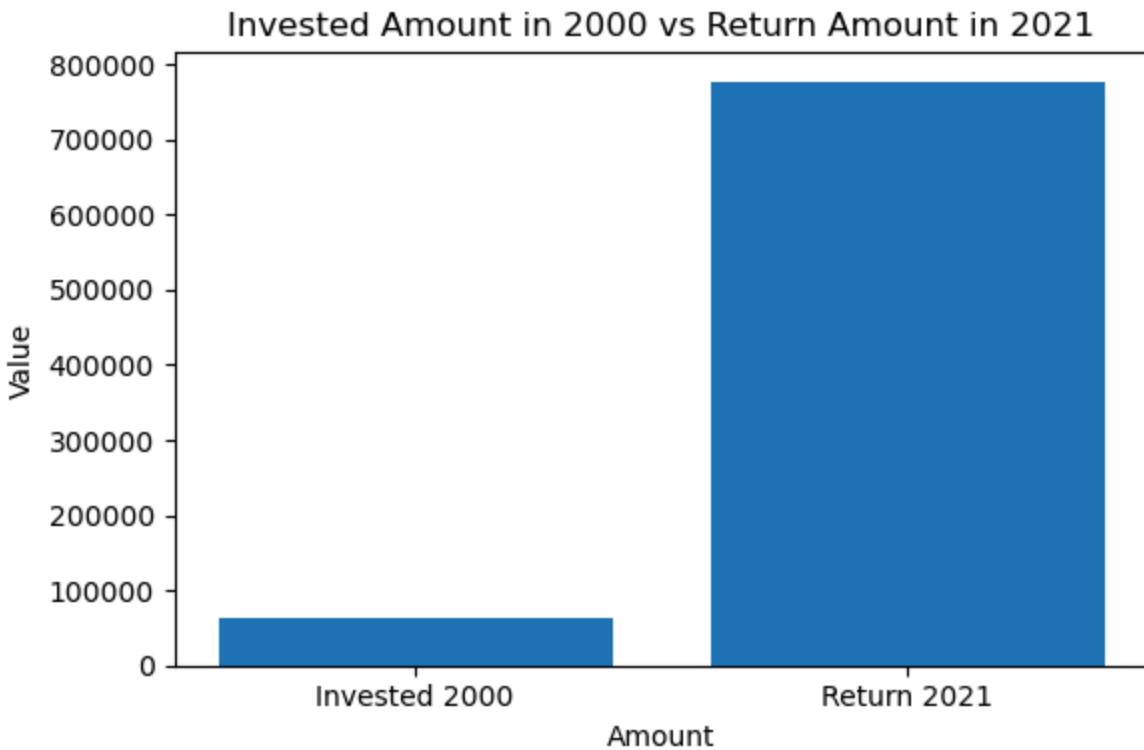
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vested_amount_2000':invested_amount_2000 , 'Last_Close_2021': last_close, 'Return_Amou  
nt_2021': return_amount_2021,'Net_Worth':net}, ignore_index=True)
```

In [25]: `results_df`

	Symbol	First_Open_2000	Invested_amount_2000	Last_Close_2021	Return_Amount_2021	
0	MUNDRAPORT	770.0	1000	135.50	175.974026	-
1	ADANIPORTS	137.1	1000	730.05	5324.945295	4
2	ASIANPAINT	370.0	1000	2536.40	6855.135135	5
3	UTIBANK	26.7	1000	597.50	22378.277154	21
4	AXISBANK	588.0	1000	714.90	1215.816327	-
...
59	SSLT	185.0	1000	220.15	1190.000000	-
60	VEDL	218.4	1000	257.25	1177.884615	-
61	WIPRO	2724.0	1000	492.75	180.892070	-
62	ZEETELE	1175.0	1000	238.35	202.851064	-
63	ZEEL	230.0	1000	185.60	806.956522	-

64 rows × 6 columns

In [26]: `plt.figure(figsize=(6, 4))
plt.bar(['Invested 2000', 'Return 2021'], [results_df['Invested_amount_2000'].sum(), r
plt.xlabel('Amount')
plt.ylabel('Value')
plt.title('Invested Amount in 2000 vs Return Amount in 2021')
plt.tight_layout()
plt.show()`



```
In [27]: results_df['Net_Worth'].sum()-results_df['Invested_amount_2000'].sum()
```

```
Out[27]: 648661.901070853
```

```
In [28]: percentage_value = round((results_df['Net_Worth'].sum() - results_df['Invested_amount_2000'].sum()) / results_df['Invested_amount_2000'].sum() * 100)
result_with_percentage = str(percentage_value) + '%'
result_with_percentage
```

```
Out[28]: '1013.53%'
```

- Profit percentage as on year 2021.

Conclusion

- The portfolio exhibited an exceptional growth of 1013.53% from its 2000 inception, translating an initial investment of 64000 INR into a substantial profit of 648661.90 INR by the end of 2021.
- In summary, diving into this dataset has been eye-opening. We've seen how stock prices and trading volumes vary across different companies in the Nifty 50 index, showing us how the market moves. Looking at correlations between stocks helped us understand how they relate, guiding us on how to spread investments for safety. Plus, simulating past investments gave us a glimpse into potential portfolio growth or decline. Altogether, this data is a goldmine for making smarter investment decisions.