Stock Market Price Trend Prediction Using Time Series Forecasting

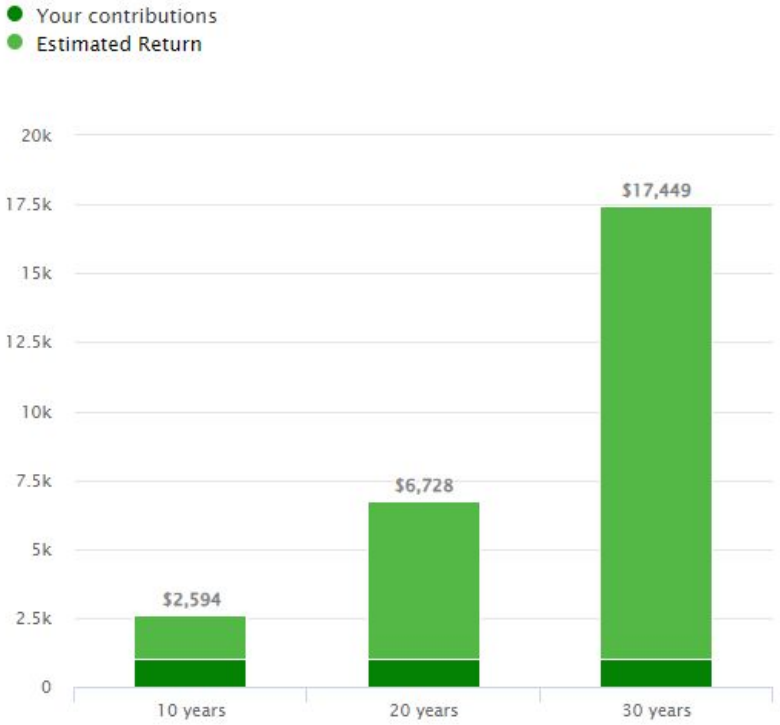
Santi Swain

STOCK MARKET

- Stock markets are where individual and institutional investors come together to buy and sell shares in a public venue. Nowadays these exchanges exist as electronic marketplaces.
- Supply and demand help determine the price for each security or the levels at which stock market participants — investors and traders — are willing to buy or sell.

SPDR S&P 500 ETF Trust (SPY)

- The SPY is one of the most popular funds that aims to track the S&P 500 Index, which comprises 500 large-cap U.S. stocks.
- SPY was the first index exchange-traded fund listed on U.S. exchanges.
- The SPDR S&P 500 ETF Trust has generated an average annual return of just under 10% since its inception (1993).
- Gives a holistic overview of how the economy is performing.

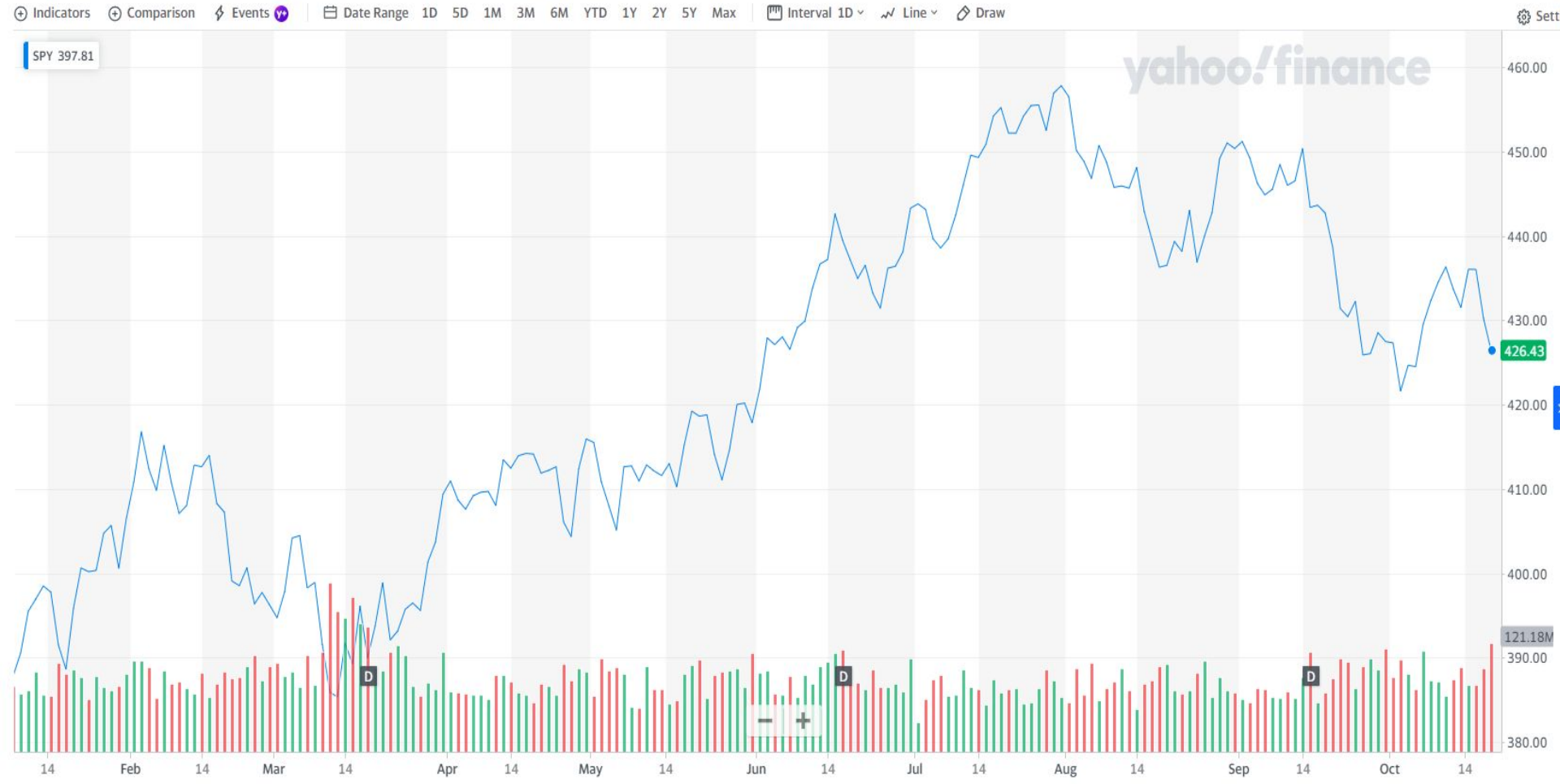


SPDR S&P 500 ETF Trust (SPY)

NYSEArca - Nasdaq Real Time Price. Currency in USD

426.43 -3.78 (-0.88%) At close: October 19 04:00PM EDT

425.78 -0.65 (-0.15%) After hours: Oct 19, 07:59PM EDT



PROBLEM STATEMENT

- Stock Market Unpredictability

Fair, slightly cooler tonight. Friday fair. Fresh southwest to west winds.

BROOKLYN DAILY EAGLE
And Complete Long Island News

LATE NEWS
WALL STREET 1:15 PRICES ★★

89th YEAR—No. 295. ★ NEW YORK CITY, THURSDAY, OCTOBER 24, 1929. ★ 32 PAGES THREE CENTS

WALL ST. IN PANIC AS STOCKS CRASH

Attempt Made to Kill Italy's Crown Prince

ASSASSIN CAUGHT IN BRUSSELS MOB; PRINCE UNHURT

Royal Suitor Was About to Lay Wreath on Unknown Soldiers' Tomb.

Princess, Deeply Moved, Falls Into Fiance's Arms and Kisses Him

Hollywood Fire Destroys Films Worth Millions

Consolidated Studios Are Swept by Flames Fatal to One—Master Pictures Burned Include Many New Talkie Productions.

ATTEMPT MADE ON LIFE

Crown Prince Humbert.

FEAR 52 PERISHED IN LAKE MICHIGAN; FERRY IS MISSING

Wreckage Picked Up Indicates Craft Went Down With All Aboard.

PIECE OF PLANE LIKE DITEMAN'S IS FOUND AT SEA

Black and Orange Wreckage Indicates Daring Flier Went to Death.

High Duty Group Gave $700,000 to Coolidge Drive

Grundy Agrees Rates Went Up Due to His Activities as Propagandist. Favors More Lobbying to 'Carry Out Voters' Wish.'

By HENRY SUYDAM.

FOR MORE LOBBYISTS

JOSEPH R. GRUNDY

STOCKS CRASH IN RUSH TO SELL; BILLIONS LOST

Morgan, Mitchell Buying Stocks in Effort to Check Rush to Unload.

PREDICTING THE FUTURE

- Using past data prices to predict future trends.
- Time Series Model

The **ARIMA** (Autoregressive Integrated Moving Average) model is a handy tool for analyzing and predicting sequential data.

IT COMBINES THREE IMPORTANT ELEMENTS:

AR — AutoRegressive (AR) for looking at past observations

I — Differencing (I or Integrated) for handling changes in data patterns

MA — Moving average (MA) for considering error terms

QUANT INSTI

ALL ABOUT THE DATA

Source:

SPDR S&P 500 ETF Trust (SPY)
NYSEArca - Nasdaq Real Time Price. Currency in USD

Columns: Date, Open, High, Low, Close, Adj Close, and Volume

Entries: 7,731 entries

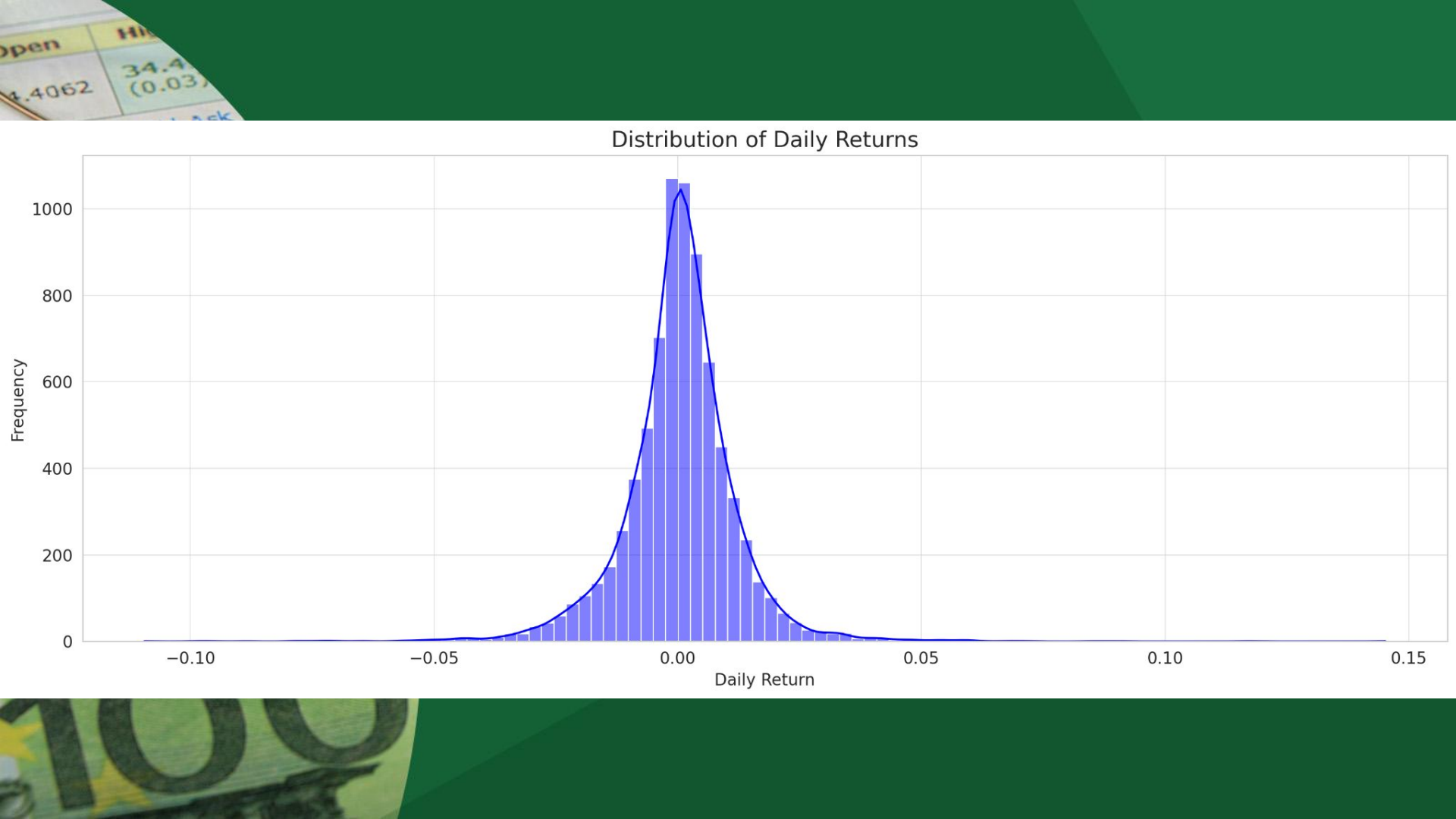
Timespan: January 29, 1993, to October 11, ‘23

CLEANING . . .

What CLEANING?!

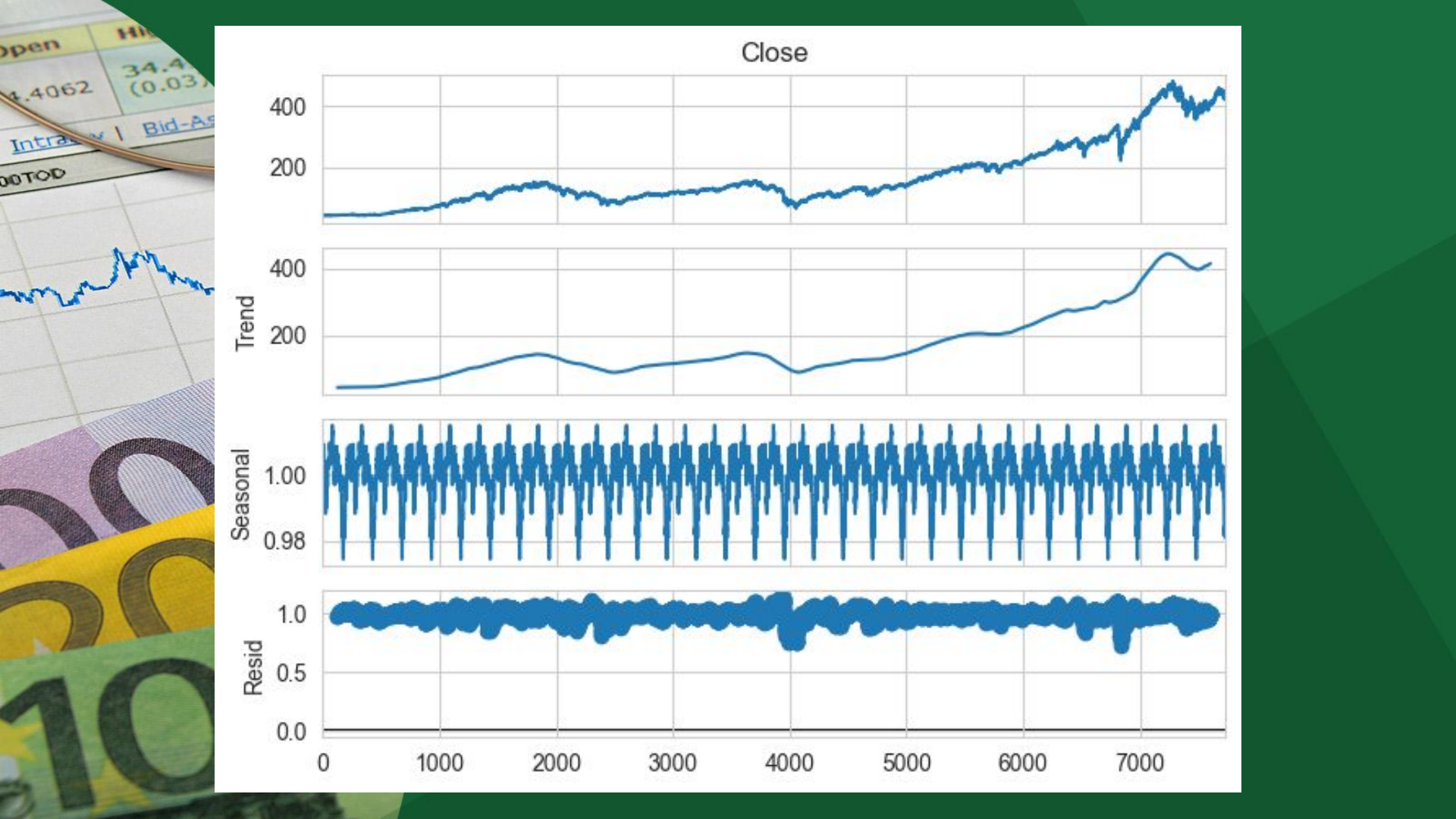
- 0 Duplicates
- Sorted in Ascending order by date.
- All dates are unique.

Let’s EXPLORE


Distribution of Daily Returns
Frequency
1000
800
600
400
200
0
−0.10
−0.05
0.00
0.05
0.10
0.15
Daily Return

Correlation Analysis

	Open	High	Low	Close	Volume	Prev_Close
Open	1.000000	0.999935	0.999917	0.999857	0.091242	0.999914
High	0.999935	1.000000	0.999865	0.999912	0.093744	0.999877
Low	0.999917	0.999865	1.000000	0.999921	0.087788	0.999834
Close	0.999857	0.999912	0.999921	1.000000	0.090429	0.999767
Volume	0.091242	0.093744	0.087788	0.090429	1.000000	0.092132
Prev_Close	0.999914	0.999877	0.999834	0.999767	0.092132	1.000000


Close
400
200
Trend
400
200
Seasonal
1.00
0.98
Resid
1.0
0.5
0.0
0
1000
2000
3000
4000
5000
6000
7000

NEXT Steps

- Splitting the data into training and testing sets.
- Training the ARIMA model.
- Evaluating its performance.

THANK YOU

DISCLAIMER:

- NOT FINANCIAL ADVICE.
- NOT A FINANCIAL ADVISOR

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