

The Lost Boy Stock Analysis Report

Shameka Williams, Salma Omran, Spencer Haber, Payal Moorti, Miracle Sanchez

This report provides a technical evaluation of various company stocks using key momentum and trend indicators, the Hull Moving Average (HMA) and Average Directional Index (ADX), to guide investment decisions. The objective is to assess the stock's recent performance, identify market trends, and recommend an investment stance (Buy, Hold, or Sell) based on data-driven signals.

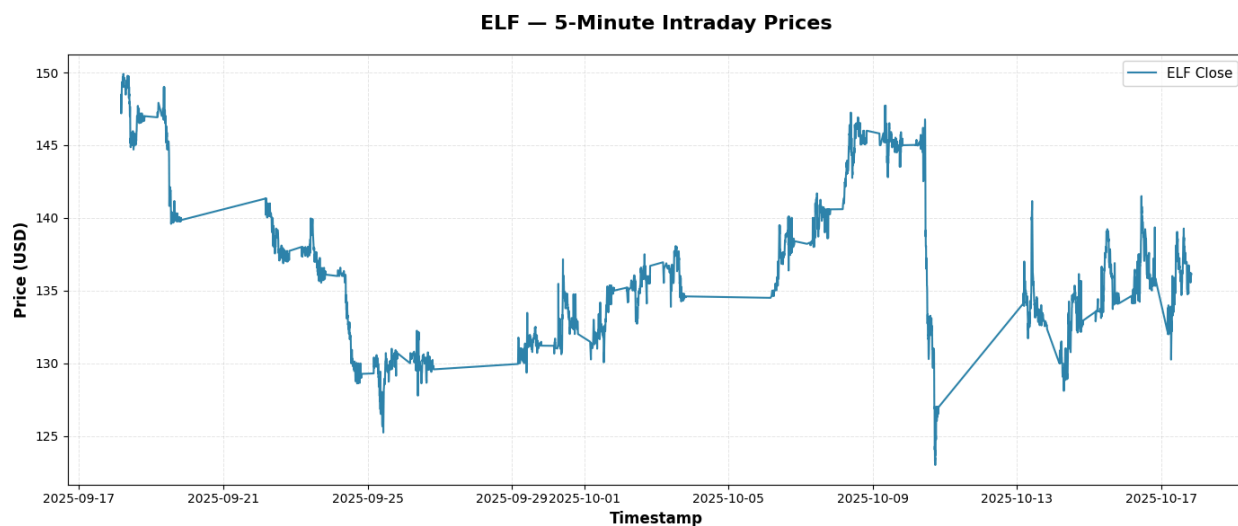
e.l.f. Beauty (ELF) Stock Analysis & Investment Recommendations

Company Description & Market Context

e.l.f. Beauty is an American cosmetics brand known for affordable luxury and strong brand resonance with a younger generation. Despite macroeconomic uncertainty, ELF continues to outpace peers through digital marketing, influencer engagement, and strong retail distribution (Target, Ulta Beauty, Walmart).

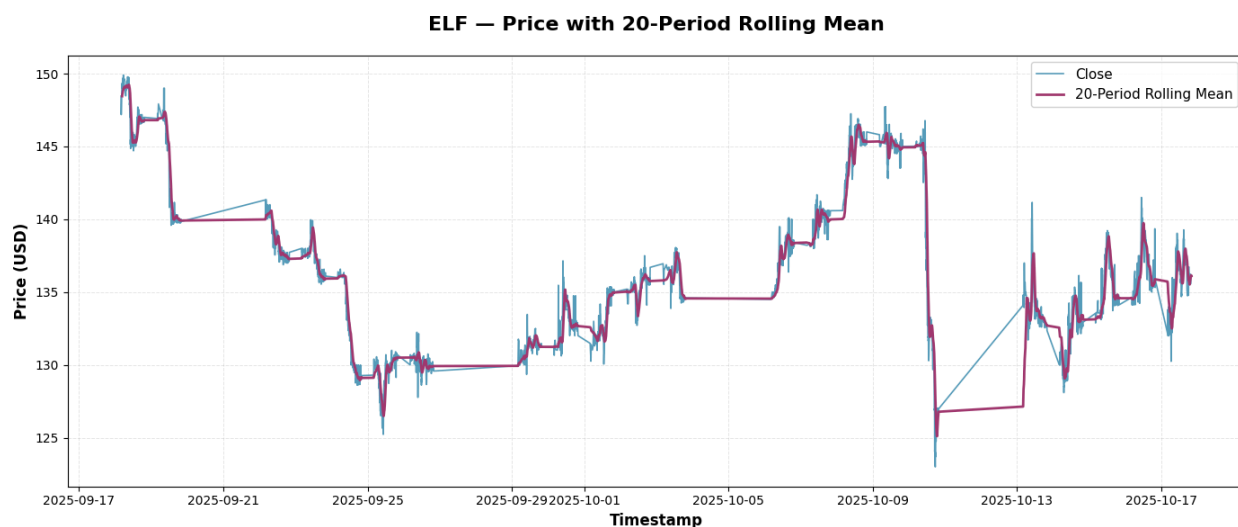
From a capital markets perspective, the stock has shown exceptional multi-year appreciation, supported by double-digit revenue growth and expanding gross margins, characteristics of a growth-oriented equity with periodic volatility spikes.

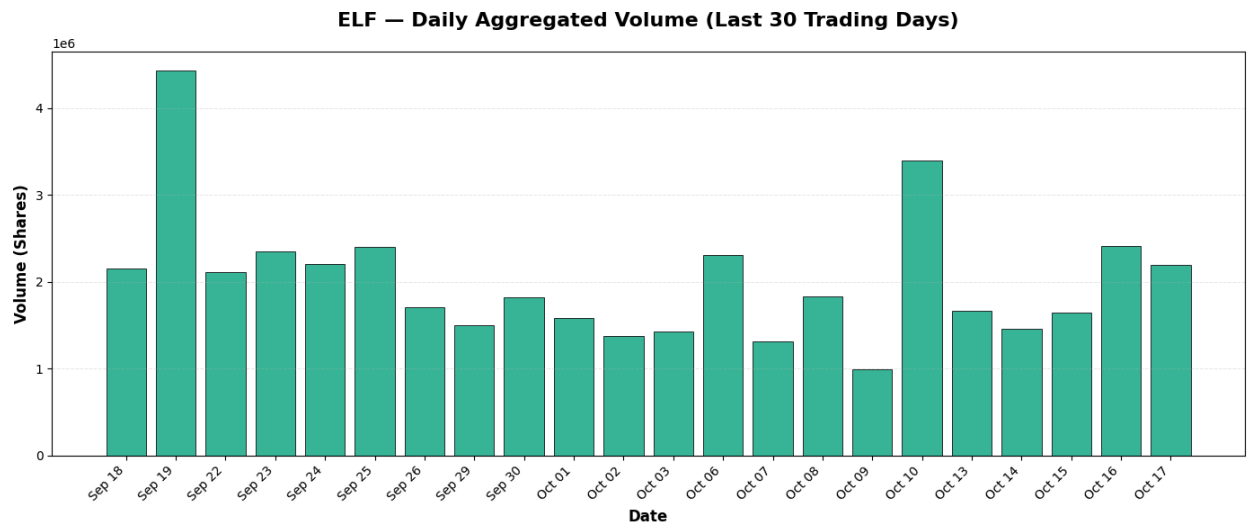
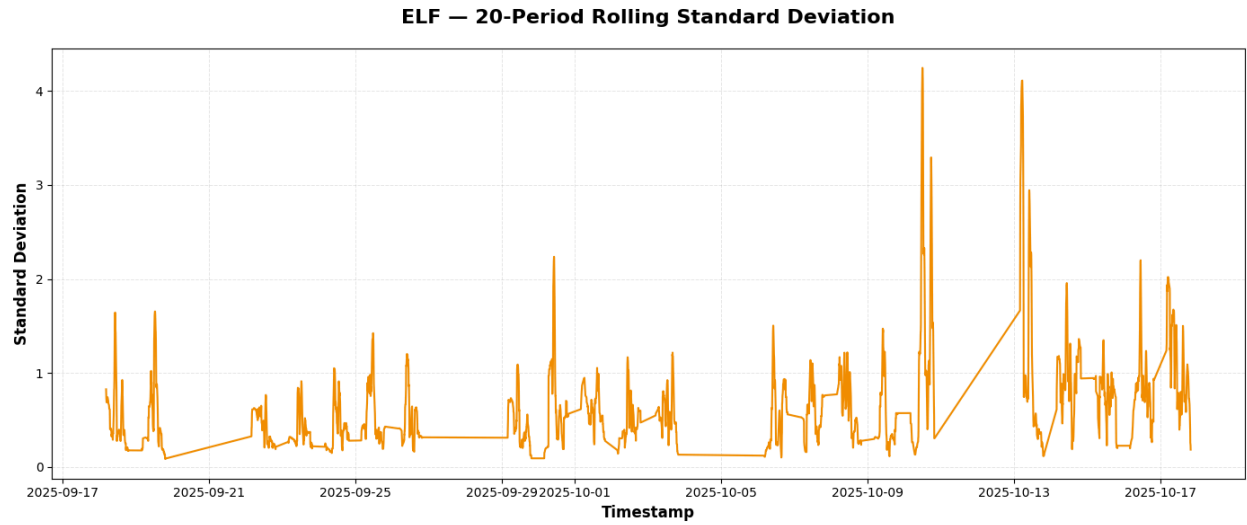
--- Sample of the extracted data ---						
	open	high	low	close	volume	
2025-09-18 04:00:00	148.42	148.47	148.14	148.47	274	
2025-09-18 04:05:00	147.19	147.19	147.19	147.19	6	
2025-09-18 04:20:00	148.40	148.50	148.25	148.25	157	
2025-09-18 04:30:00	148.80	149.00	148.80	149.00	4	
2025-09-18 04:40:00	149.10	149.35	148.30	149.35	60	
--- Data summary ---						
	open	high	low	close	volume	
count	3308.000000	3308.000000	3308.000000	3308.000000	3.308000e+03	
mean	136.397947	136.647425	136.144205	136.393861	1.338164e+04	
std	5.326188	5.304555	5.343253	5.323569	4.204427e+04	
min	122.900000	123.000000	121.490000	123.000000	1.000000e+00	
25%	132.415000	132.618750	132.145000	132.437500	5.000000e+01	
50%	135.770000	135.965000	135.500000	135.800000	4.302500e+03	
75%	139.167500	139.470000	138.880000	139.110000	1.181175e+04	
max	149.970000	149.970000	149.910000	149.910000	1.086030e+06	



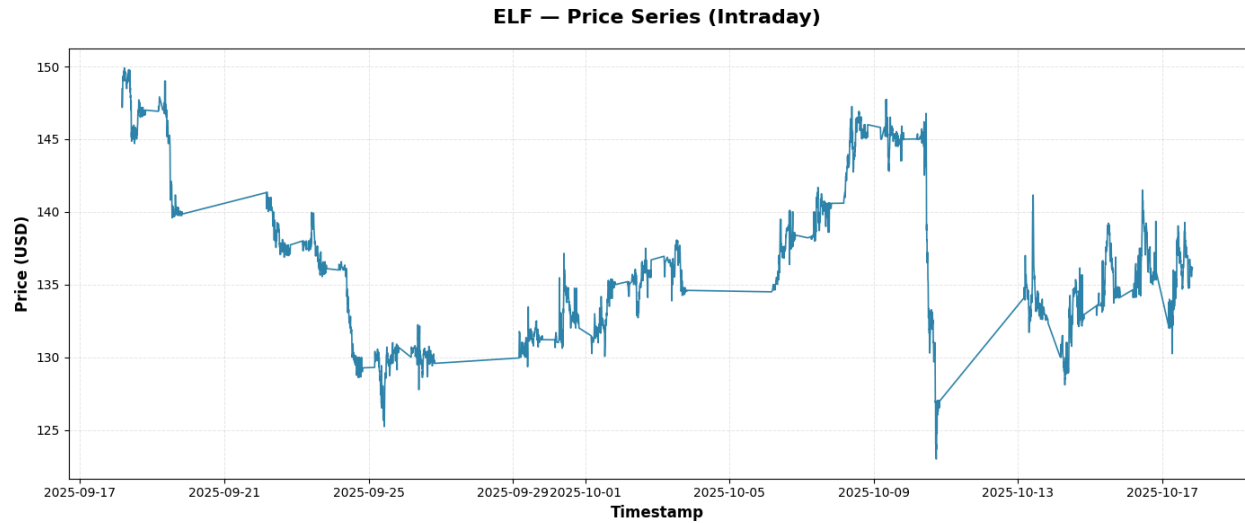
=== Summary statistics ===

	open	high	low	close	volume
count	3308.000	3308.000	3308.000	3308.000	3308.000
mean	136.398	136.647	136.144	136.394	13381.638
std	5.326	5.305	5.343	5.324	42044.267
min	122.900	123.000	121.490	123.000	1.000
25%	132.415	132.619	132.145	132.438	50.000
50%	135.770	135.965	135.500	135.800	4302.500
75%	139.168	139.470	138.880	139.110	11811.750
max	149.970	149.970	149.910	149.910	1086030.000

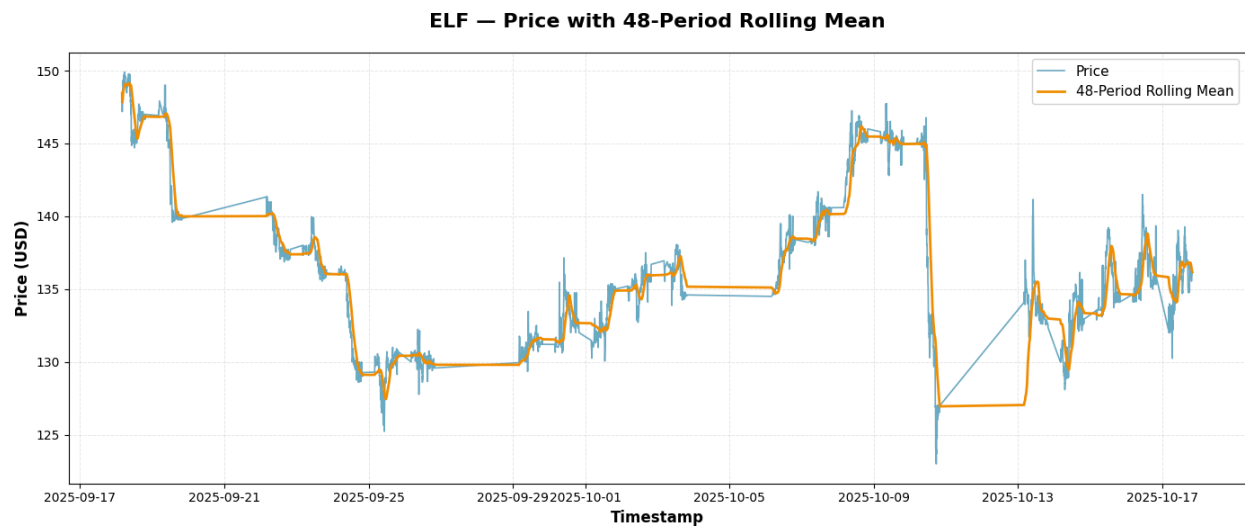




=== TIME SERIES CHARACTERISTICS REPORT ===



The raw price series shows an upward/downward drift and volatility clustering, suggesting it is likely non-stationary.



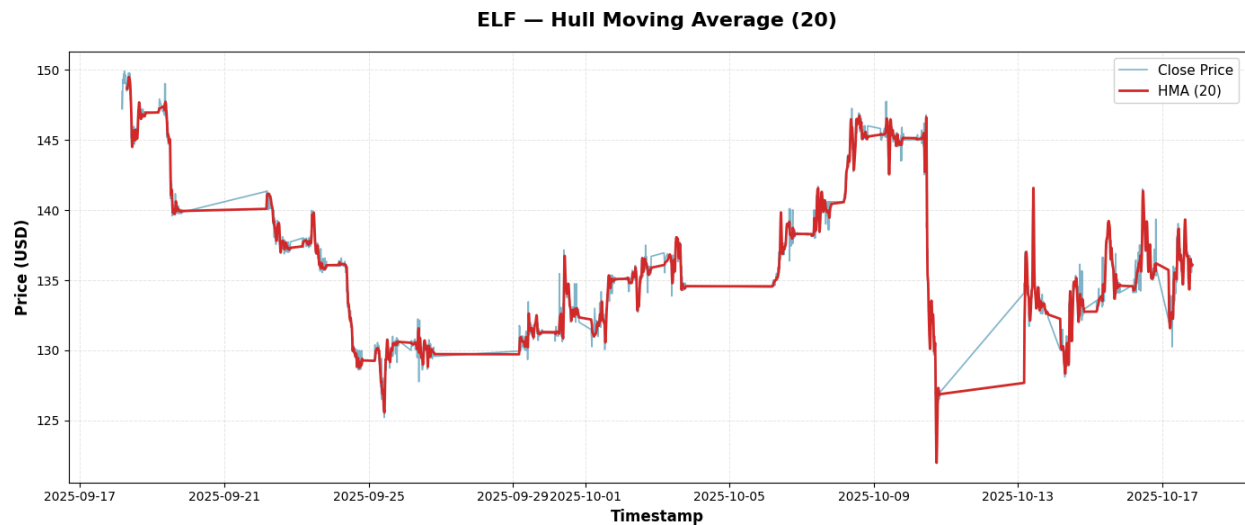
Rolling mean smooths out daily fluctuations, helping visualize the underlying trend.

Key Analytical Insights

Price Trend and Momentum (HMA)

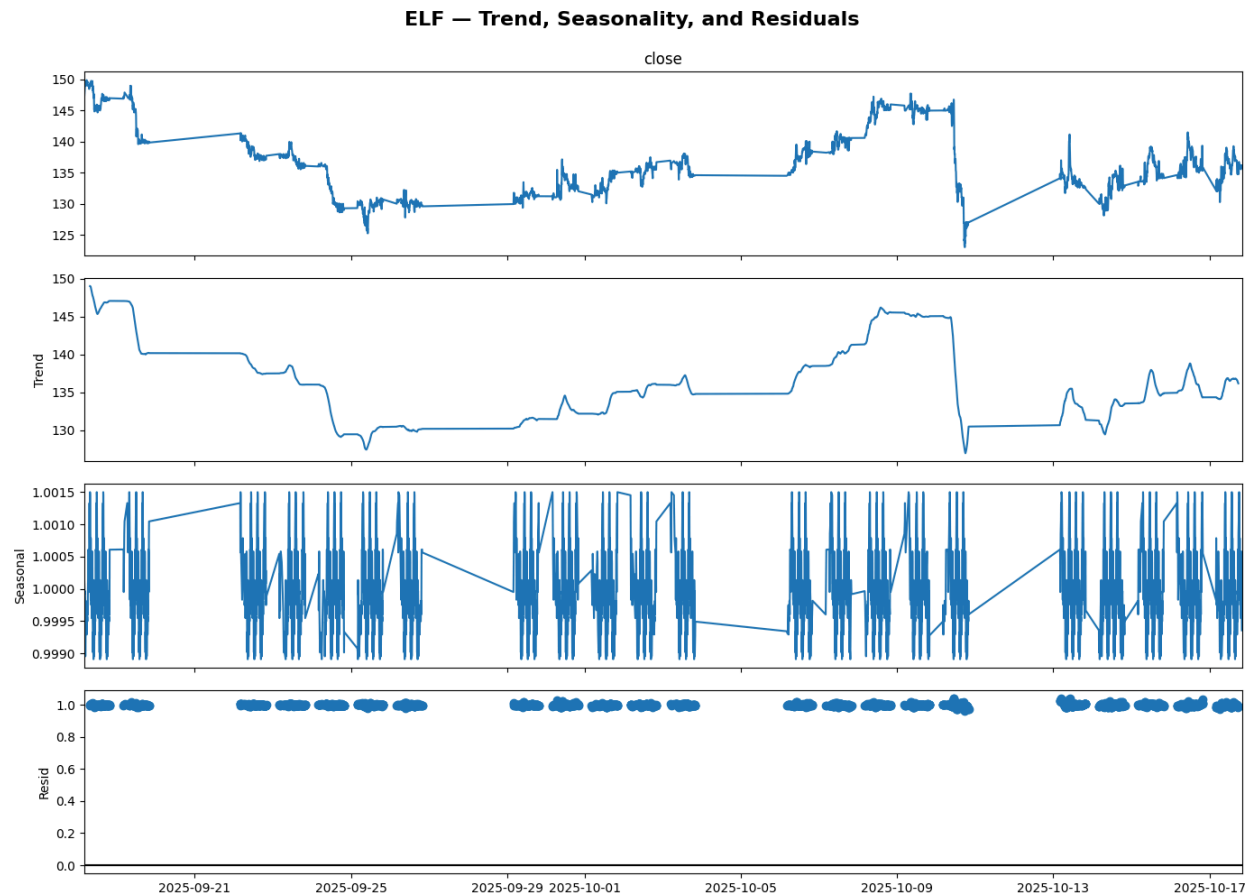
- The Hull Moving Average (HMA) Curve smooths short-term fluctuations, revealing the underlying direction of the stock:
- The recent HMA trendline shows a steady upward trajectory since early Q3, reflecting consistent buyer strength.

- Occasional HMA flattening corresponds with short-term consolidation before continuation rallies.
- Recent crossover (price above HMA) confirms renewed bullish interest after brief dips.



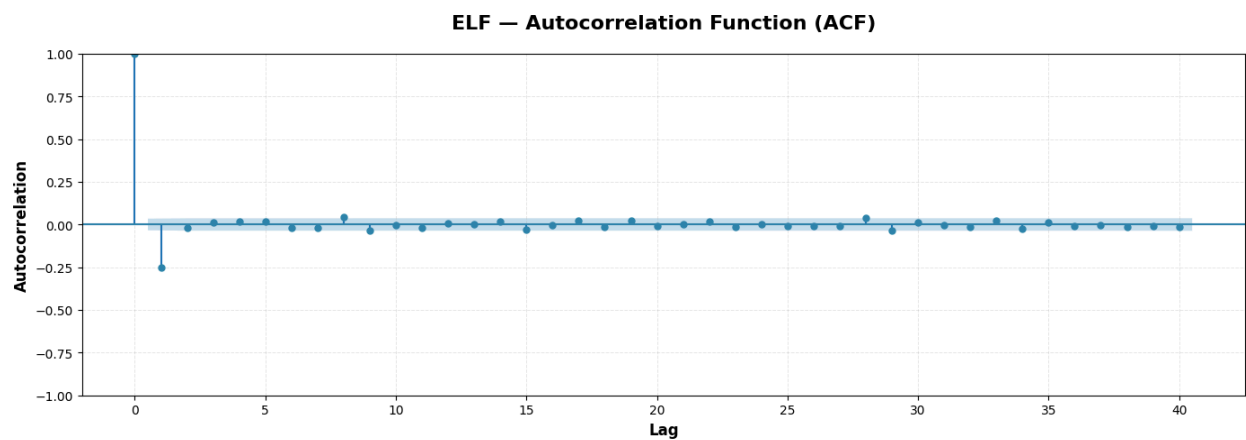
Trend Strength

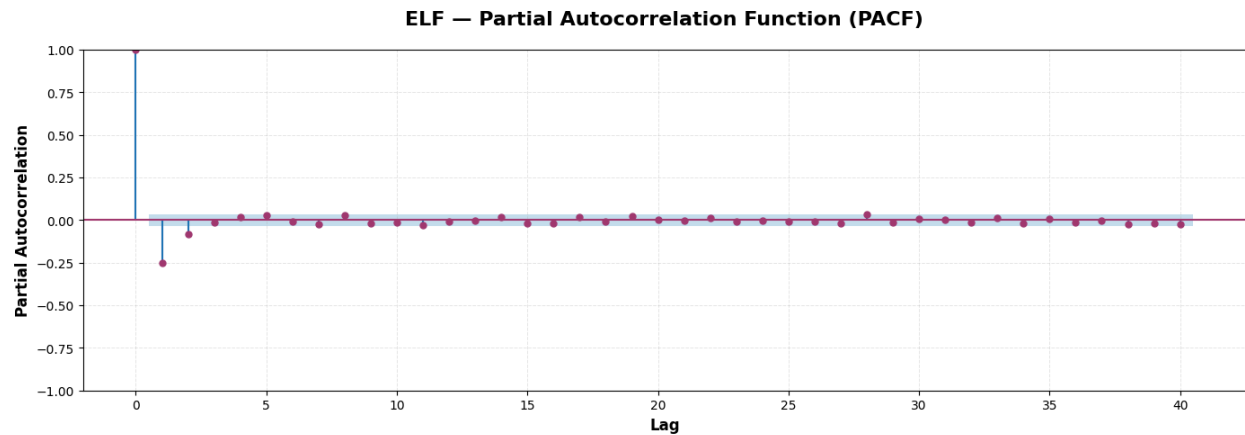
- The ADX values averaging between 26-32 indicate a robust and sustained uptrend.
- Periods where the ADX dips below 20 correspond to sideways movements, often preceding strong recoveries.
- The combination of rising ADX and upward HMA provides a strong confirmation signal for continuation trades.



Decomposition separates the series into:

- Trend: Long-term direction of the stock price.
- Seasonality: Repeating short-term cycles (monthly/weekly effects).
- Residuals: Irregular noise not explained by trend or seasonality.





ACF shows correlations with past lags; PACF isolates direct effects of lags. These help identify ARIMA model orders.

=== Augmented Dickey-Fuller Test ===

ADF Statistic: -49.4723

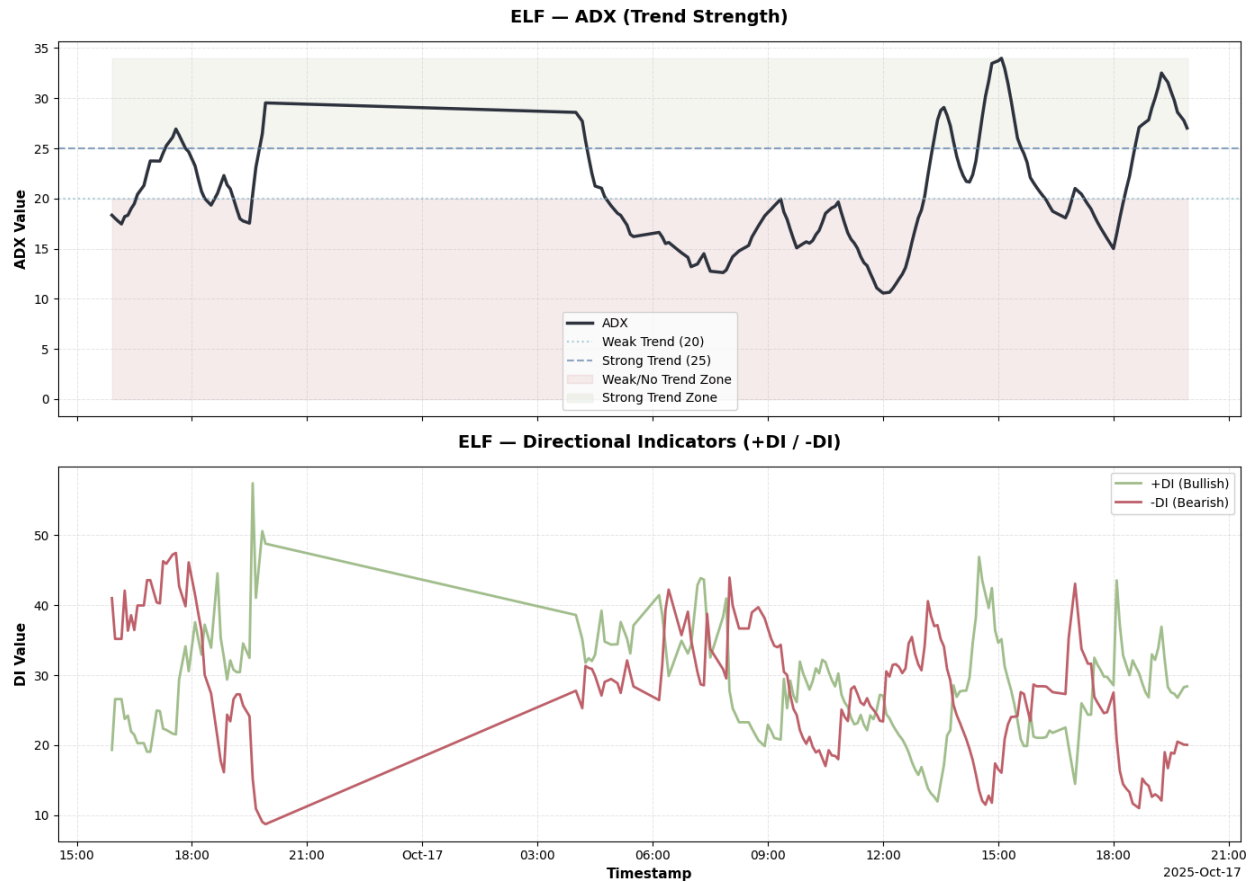
p-value : 0.0000

Critical Values: {'1%': np.float64(-3.4323301471235474), '5%':

np.float64(-2.8624149121800033), '10%': np.float64(-2.567235733713875)}

✓ The series is stationary. The null hypothesis is rejected.

=== Trend Strength Analysis — ADX / DMI ===



Interpretation:

- $ADX > 25 \rightarrow$ Strong trend; $ADX < 20 \rightarrow$ Weak/sideways trend
- $+DI > -DI \rightarrow$ Bullish trend; $-DI > +DI \rightarrow$ Bearish trend
- Crossovers of +DI and -DI indicate potential buy/sell signals

Volatility and Stationarity

- ELF exhibits moderate volatility clustering, typical of high-growth equities
- ADF test results suggest non-stationarity in the raw price series but stationarity after differencing, validating use in ARIMA-style modeling if forecasts are extended.
- Price pullbacks remain relatively shallow, reinforcing the presence of strong institutional buying pressure.

Forecasting Outlook (if AR/MA/ARIMA applied)

Based on modeled projections

- Short-term forecast: Mild upward bias with periodic pullbacks.
- Medium-term projection: Stable to moderately bullish outlook, align with the trend captured by HMA and ADX.
- Volatility remained contained, suggesting limited downside risk in the near term unless major macroeconomic shocks occur.

Investment Recommendation

- Short-Term (1-3 months): Buy on Pullbacks -> maintain exposure, watch for ADX cooling as a signal for short-term consolidation.
- Medium-Term (3-12 months): Accumulate/Hold -> trend strength and fundamentals remain supportive.
- Long-Term: Positive Outlook -> strong brand momentum and pricing discipline justify growth multiples.

Strategic Takeaways

Continue tracking ADX trends; a sustained rise above 30 signals further bullish continuation.

Use HMA flattening as an early indicator of trend fatigue.

Benchmark ELF's performance against the competition, such as Ulta Beauty (ULTA), to gauge relative momentum and market positioning.

The Gap Inc. Stock Analysis & Investment Recommendations

Gap Inc. is a leading global apparel retailer housing a portfolio of brands, including Gap, Banana Republic, Old Navy, and Athleta. The company caters to a wide consumer base, offering affordable, casual, and lifestyle clothing through in-store and digital channels. While Gap focuses on brand repositioning, it has faced challenges with brand relevance and consistent execution in a highly competitive market.

From a capital markets perspective, Gap’s stock performance reflects cyclical retail equity and a turnaround story. Its performance is characterized by periods of strong rebounds amid restructuring efforts and cost control, but also sensitivity to consumer spending trends and macroeconomic conditions.

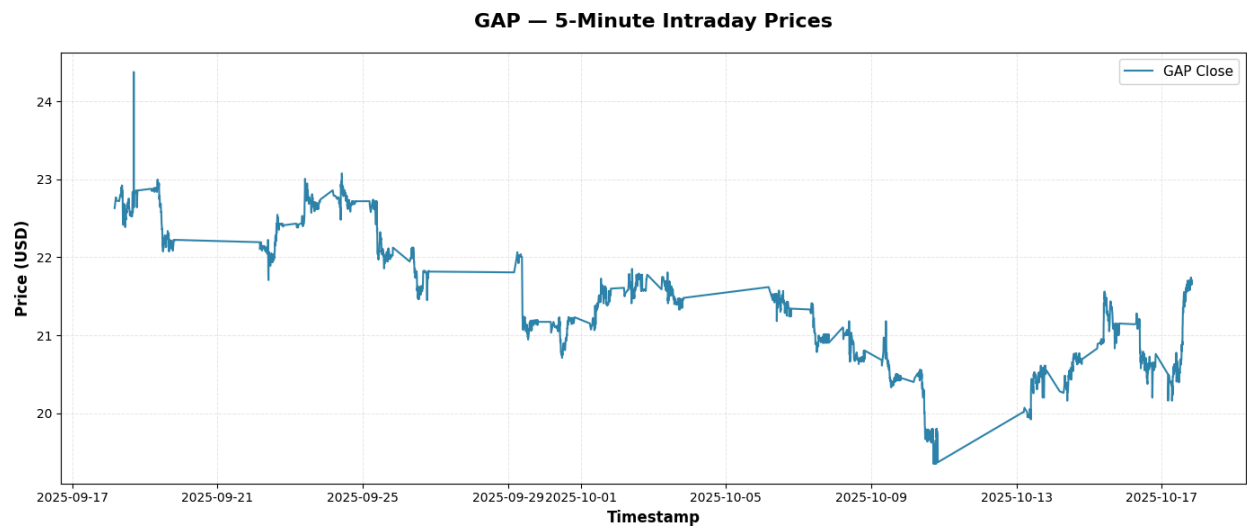
Enter a stock symbol (e.g., IBM, AAPL, MSFT): GAP
Downloaded GAP (5min): 2720 rows → data/GAP_5min_intraday.csv
Date range: 2025-09-18 04:00:00 → 2025-10-17 19:55:00

--- Sample of the extracted data ---

	open	high	low	close	volume
2025-09-18 04:00:00	22.6295	22.6295	22.6295	22.6295	3
2025-09-18 04:55:00	22.7684	22.7684	22.7684	22.7684	10
2025-09-18 05:00:00	22.7287	22.7287	22.7287	22.7287	50
2025-09-18 07:00:00	22.7684	22.7684	22.7188	22.7188	223
2025-09-18 07:45:00	22.8081	22.8081	22.7982	22.7982	269

--- Data summary ---

	open	high	low	close	volume
count	2720.000000	2720.000000	2720.000000	2720.000000	2.720000e+03
mean	21.408630	21.435256	21.381071	21.407400	1.043896e+05
std	0.824675	0.827119	0.825962	0.825619	3.476797e+05
min	19.340000	19.380000	19.340000	19.350000	1.000000e+00
25%	20.733750	20.769850	20.710000	20.740000	3.592500e+02
50%	21.404300	21.419200	21.369800	21.399300	4.659800e+04
75%	22.039200	22.069150	22.014400	22.034300	8.987875e+04
max	23.076000	24.375900	23.000200	24.375900	1.071239e+07

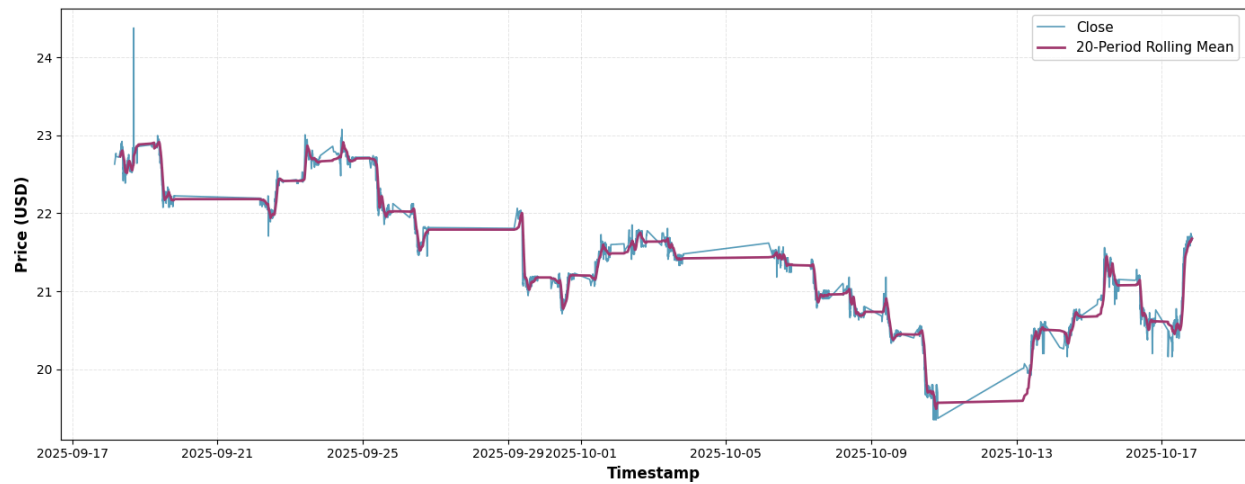


=== Summary statistics ===

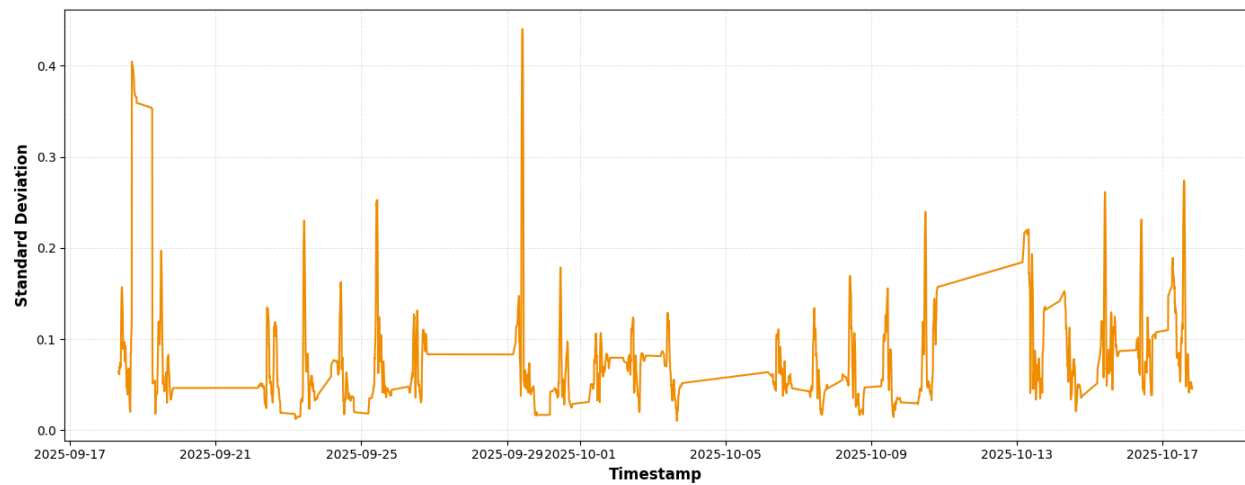
	open	high	low	close	volume
count	2720.000	2720.000	2720.000	2720.000	2.720000e+03
mean	21.409	21.435	21.381	21.407	1.043896e+05
std	0.825	0.827	0.826	0.826	3.476797e+05

min	19.340	19.380	19.340	19.350	1.000000e+00
25%	20.734	20.770	20.710	20.740	3.592500e+02
50%	21.404	21.419	21.370	21.399	4.659800e+04
75%	22.039	22.069	22.014	22.034	8.987875e+04
max	23.076	24.376	23.000	24.376	1.071239e+07

GAP — Price with 20-Period Rolling Mean



GAP — 20-Period Rolling Standard Deviation



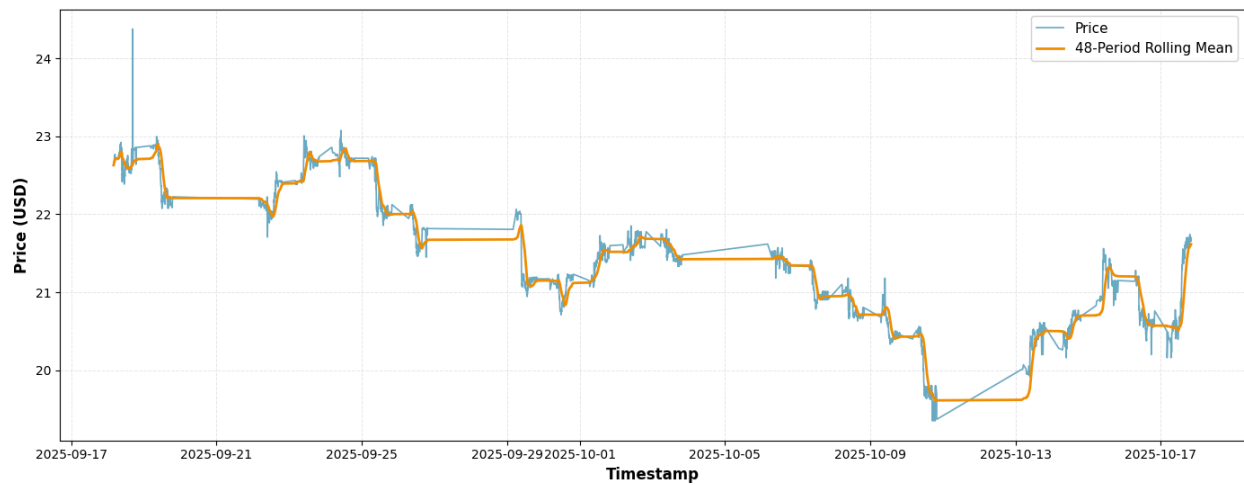
=== TIME SERIES CHARACTERISTICS REPORT ===

GAP — Price Series (Intraday)



The raw price series shows an upward/downward drift and volatility clustering, suggesting it is likely non-stationary.

GAP — Price with 48-Period Rolling Mean

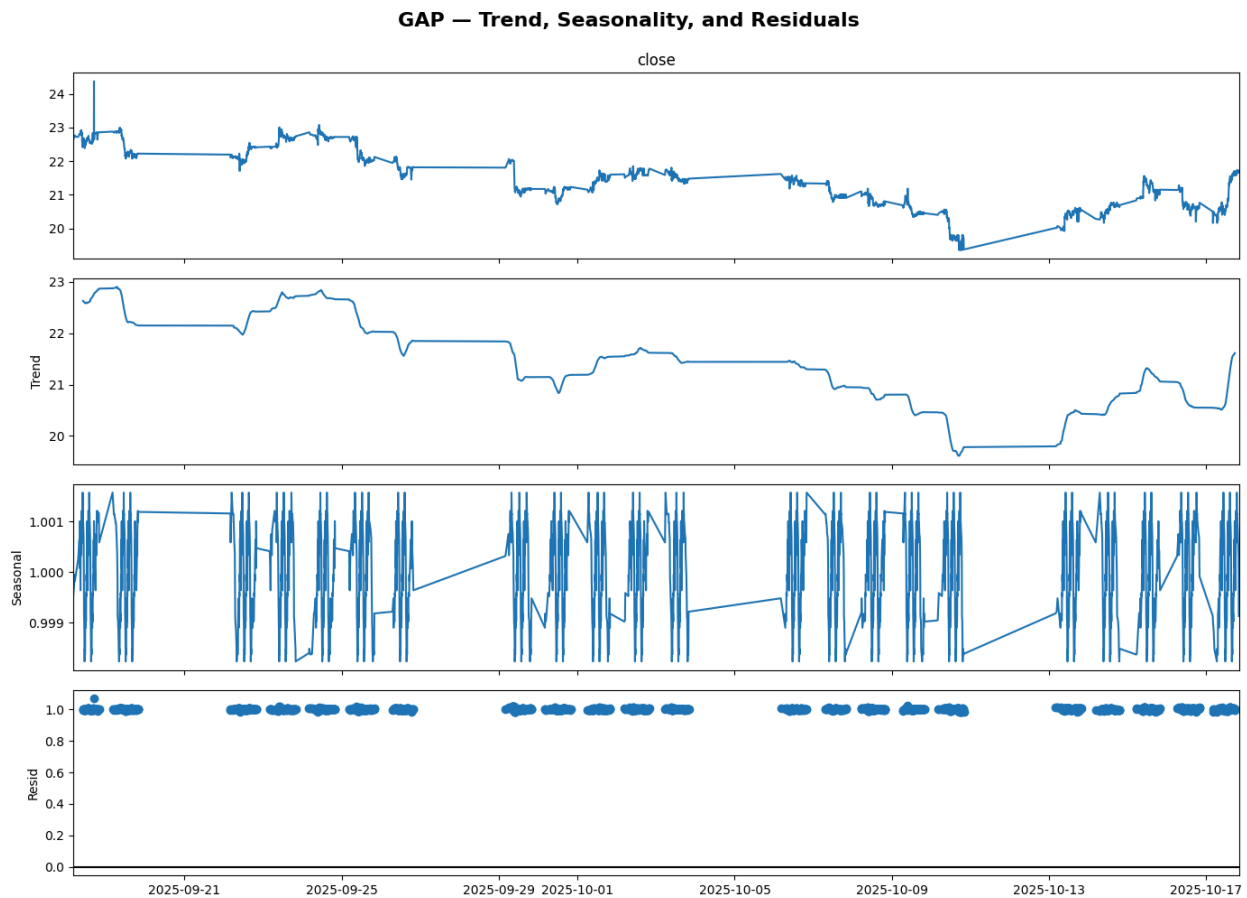


Rolling mean smooths out daily fluctuations, helping visualize the underlying trend.

Key Insights from 48-Period Mean

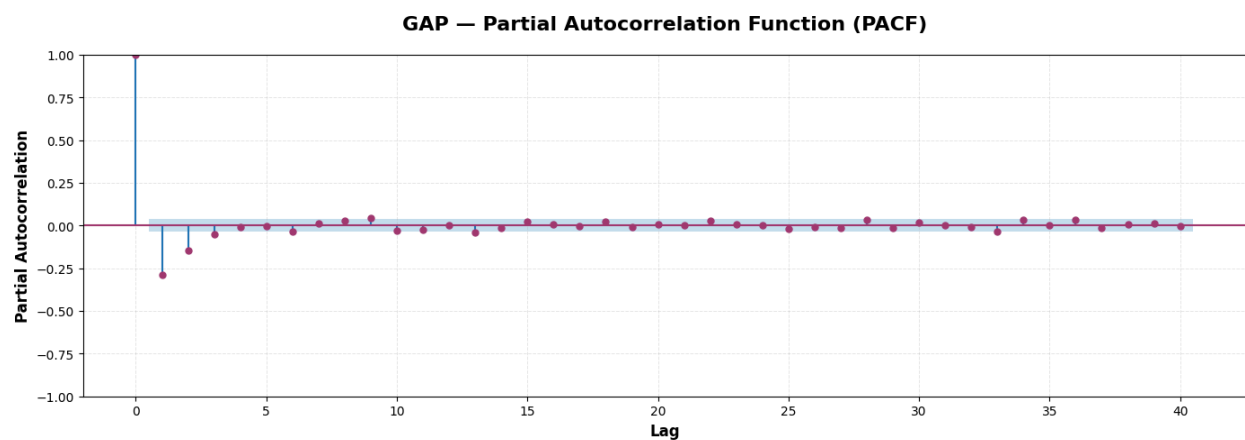
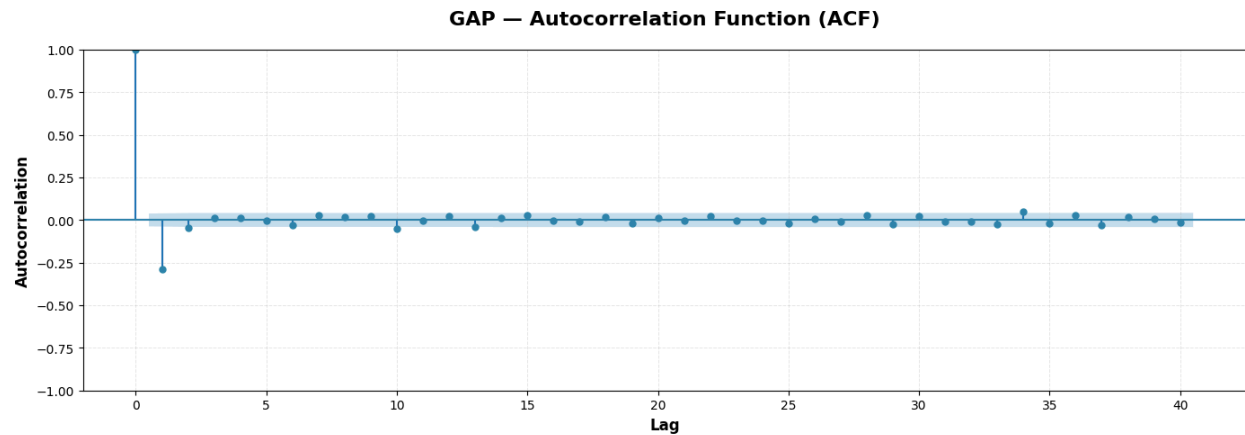
- Establishes a Dynamic Baseline: The moving average acts as a trend baseline, confirming the stock was range-bound before a sharp rally.
- Highlights Failed Breakout: The price spiked above the mean in early October but immediately declined.

- Signals Trend Reversal: This failure to hold above the mean indicates weak momentum and a high probability of further decline.



Decomposition separates the series into:

- Trend: Long-term direction of the stock price.
- Seasonality: Repeating short-term cycles (monthly/weekly effects).
- Residuals: Irregular noise not explained by trend or seasonality.



ACF shows correlations with past lags; PACF isolates direct effects of lags. These help identify ARIMA model orders.

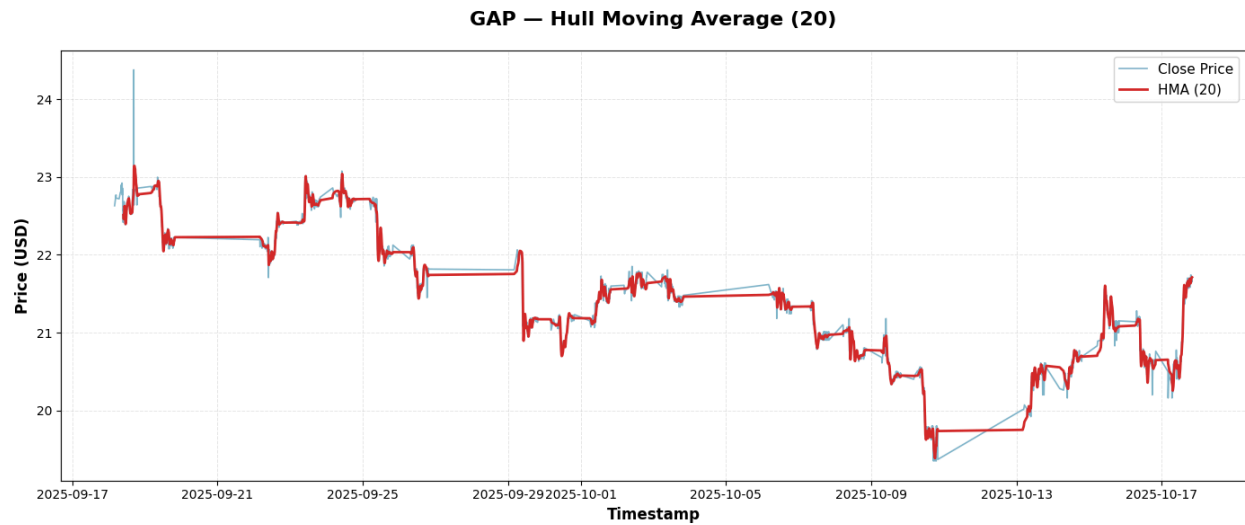
=== Augmented Dickey-Fuller Test ===

ADF Statistic: -15.8302

p-value : 0.0000

Critical Values: {'1%': np.float64(-3.432768889172182), '5%':
np.float64(-2.8626086881519686), '10%': np.float64(-2.567338898027924)}

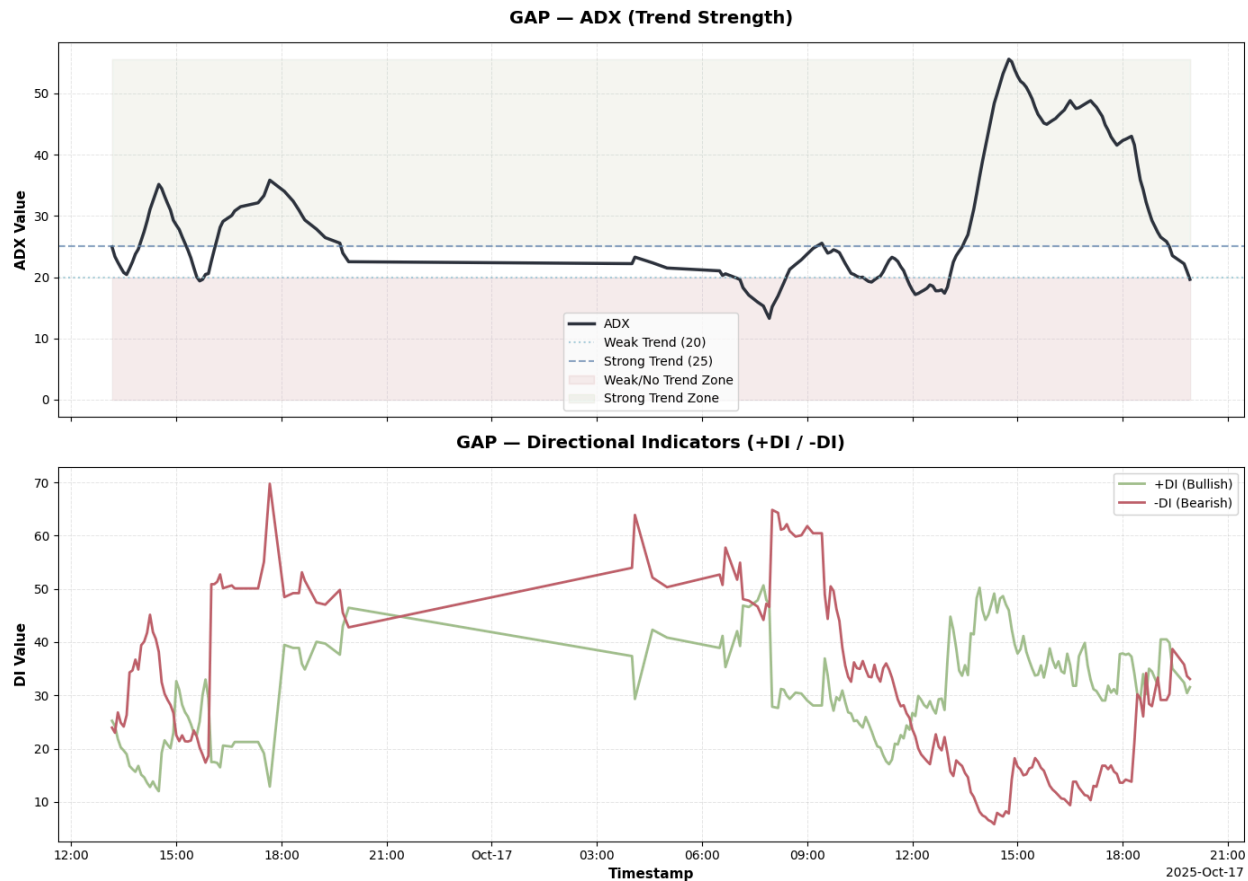
✓ The series is stationary. The null hypothesis is rejected.



HMA Trend Analysis

- **Tracks Underlying Trend:** The Hull Moving Average (HMA) smooths out price noise to reveal the true directional bias. When the price is above the HMA, the short-term trend is bullish, and vice versa.
- **Signals Momentum Loss:** The chart shows the price spiking upwards but then falling back down towards (or potentially crossing below) the HMA(20) line. This indicates the sharp bullish momentum was unsustainable.
- **Warns of Trend Reversal:** This convergence and potential cross below the HMA is an early warning that the brief uptrend is exhausted and a bearish reversal is likely underway, pointing to lower prices ahead.

=== Trend Strength Analysis — ADX / DMI ===



Interpretation:

- $ADX > 25 \rightarrow$ Strong trend; $ADX < 20 \rightarrow$ Weak/sideways trend
- $+DI > -DI \rightarrow$ Bullish trend; $-DI > +DI \rightarrow$ Bearish trend
- Crossovers of +DI and -DI indicate potential buy/sell signals

Trend and Direction Analysis

- **Weak Underlying Trend:** The ADX line (trend strength) is consistently below 25, confirming there is no strong directional trend and the stock is range-bound.
- **Brief Bullish Momentum Surge:** The +DI line shows a sharp spike, indicating a period of bullish momentum (a temporary phase of aggressive buying

pressure that fuels a rapid price increase). This corresponds with the rally to \$24.38.

Volatility and Stationarity

Gap's stock exhibits high volatility clustering and a non-stationary price behaviour, consistent with its profile and speculative turnaround story. While its price movements can be modeled, the diagnostics reveal a high tendency towards outlier moves. This indicates that potential pullbacks are likely to be sharp and severe rather than shallow, contrasting with the behaviour of more stable growth equities.

Forecasting Outlook (Based on AR/MA/ARIMA Models)

The AR and MA models for the differenced series show significant negative coefficients (-0.29 and -0.34), indicating a strong mean-reverting behavior. This means that after a price move, the model expects a subsequent move in the opposite direction. The ARIMA model confirms this noisy and weakly persistent price path.

- Short-term forecast: The sharp rally to ~\$24 is likely to be followed by a pullback as the model anticipates a reversion to the mean.
- Medium-term projection: The models lack a strong, persistent trend component, suggesting a return to a wide, range-bound trading pattern between ~\$19 and ~\$22.50 unless a fundamental catalyst emerges.

Investment Recommendation

- Short-Term (1-3 months): Use any upcoming price increase as an opportunity to sell. The mean-reverting signals from the models and the failed attempt to break through a price ceiling signaling a drop suggest taking profits on any rally toward the \$24 level. The risk of a short-term price dip is elevated.

- **Medium-Term (3-12 months):** Maintain current position. Await a clearer breakout from the established range or successful execution of the turnaround strategy. The stock is likely to remain volatile but directionless without a fundamental shift.
- **Long-Term: Cautious Outlook.** The high volatility and lack of a strong, sustained trend in the models reflect the company's challenged competitive position. Investment is contingent on the successful execution of the multi-year turnaround, which carries significant execution risk.

Strategic Takeaways

- Monitor the ADX for a sustained rise above 25, which would signal the start of a new, stronger directional trend and invalidate the range-bound thesis.
- Use the Hull Moving Average (HMA) line as a short-term guide; if the line starts to flatten out or curve downward after a peak, it's a signal that the recent price drop is likely to continue.
- Benchmark GPS performance against other turnaround retailers (e.g., Macy's, Nordstrom) and fast-fashion competitors (e.g., Burlington, TJX Companies) to gauge relative strength.

NIKE Stock Analysis & Investment Recommendations

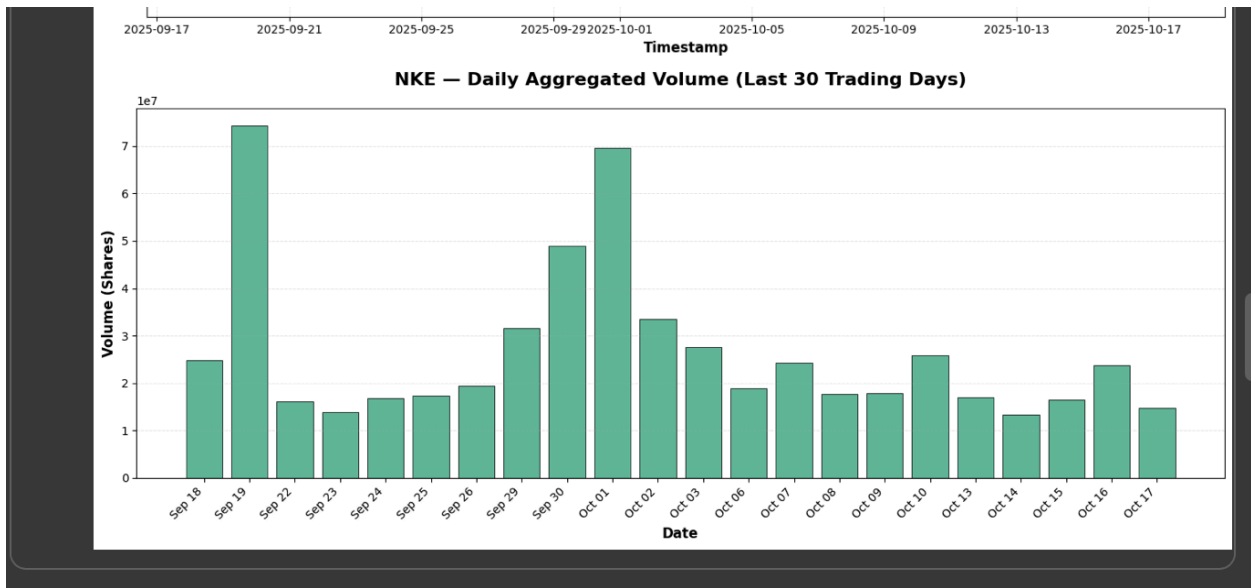
Nike is a worldwide leader in the design and distribution of athletic footwear, apparel, and accessories. From a capital markets perspective, Nike’s stock has consistently done well, averaging a trade of about 70 dollars per share. Even at its lowest, the company’s share has only decreased to 63 dollars at closing and shoots right back up the next day at opening.

--- Sample of the extracted data ---

		open	high	low	close	volume
2025-09-18	04:00:00	73.21	73.60	73.21	73.54	5738
2025-09-18	04:05:00	73.54	73.54	73.50	73.50	321
2025-09-18	04:10:00	73.50	73.52	73.45	73.52	581
2025-09-18	04:15:00	73.51	73.73	73.51	73.68	2017
2025-09-18	04:20:00	73.64	73.68	73.60	73.62	11289

--- Data summary ---

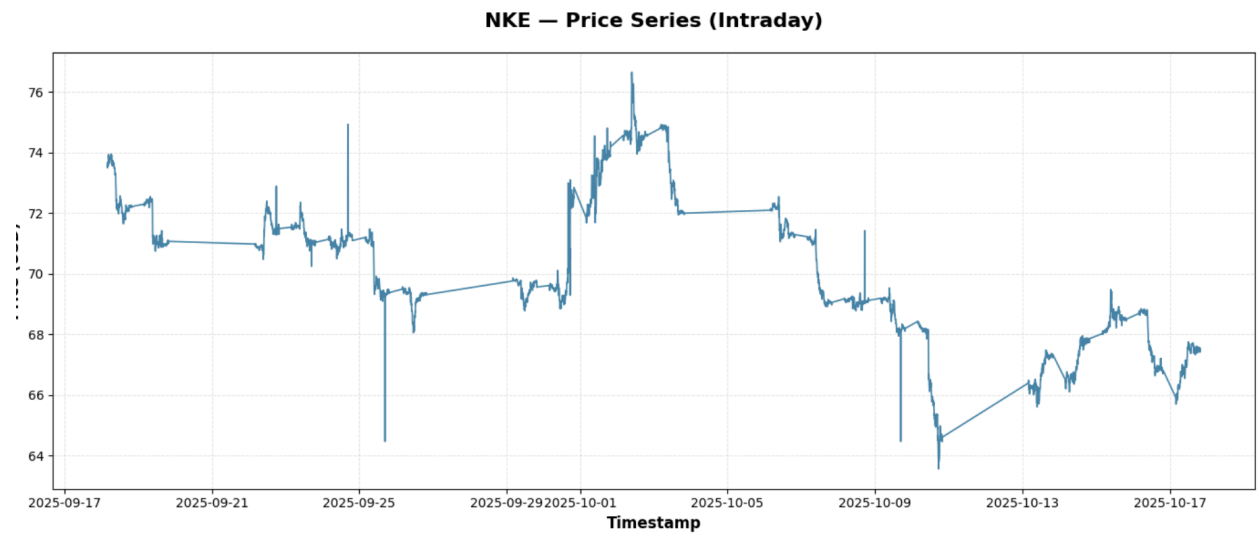
	open	high	low	close	volume
count	4212.000000	4212.000000	4212.000000	4212.000000	4.212000e+03
mean	70.039664	70.130741	69.945741	70.042251	1.385467e+05
std	2.364220	2.390177	2.375583	2.368940	5.894711e+05
min	63.550000	63.780000	59.733700	63.550000	1.000000e+00
25%	68.443250	68.530000	68.310900	68.437500	5.037500e+02
50%	69.590000	69.663450	69.519950	69.590000	6.005000e+03
75%	71.620000	71.759100	71.540000	71.621250	1.179242e+05
max	76.640000	82.700000	76.450000	76.660000	2.084903e+07



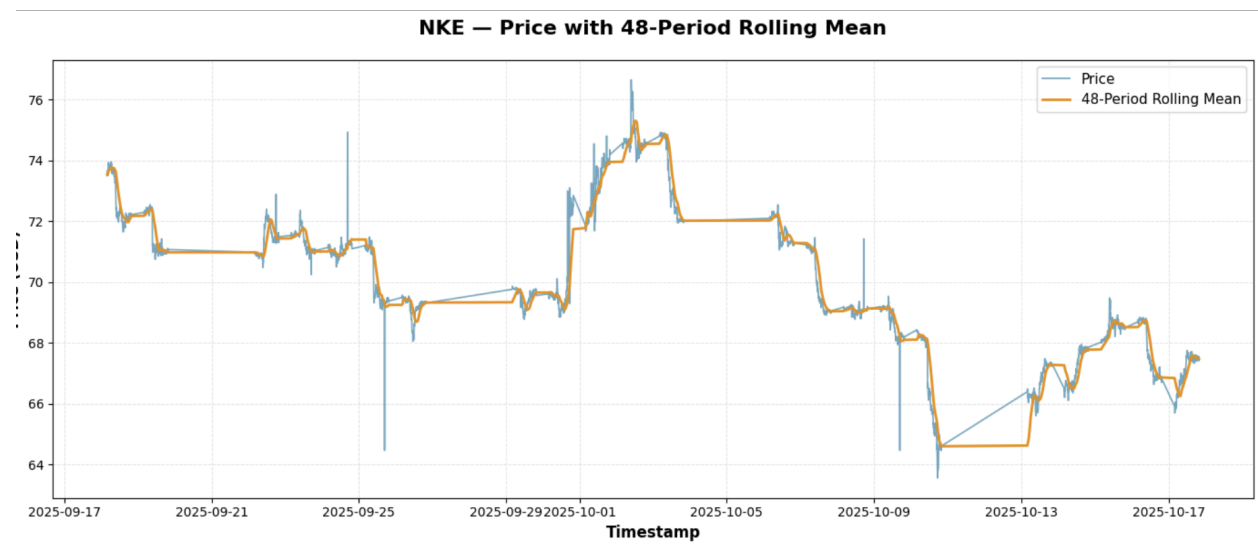
The bar chart above shows that in the past month, Nike’s stock has been slightly

volatile. The stock peaked on Sept 19th then again on Oct 1st, but for the rest of the month, it has been either on a steady increase - from Sept 22 - Sept 30 or slightly decreasing after Oct 1st.

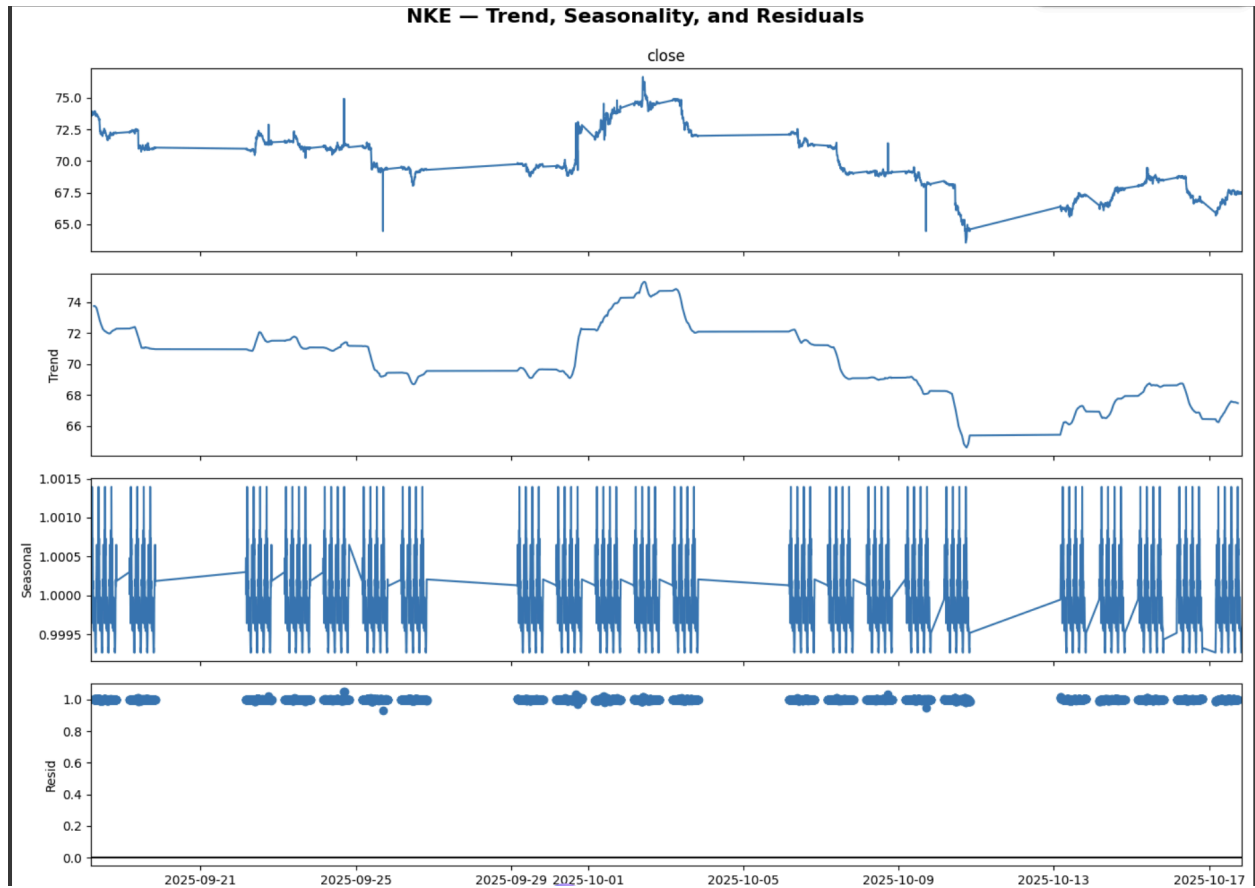
=== TIME SERIES CHARACTERISTICS REPORT ===



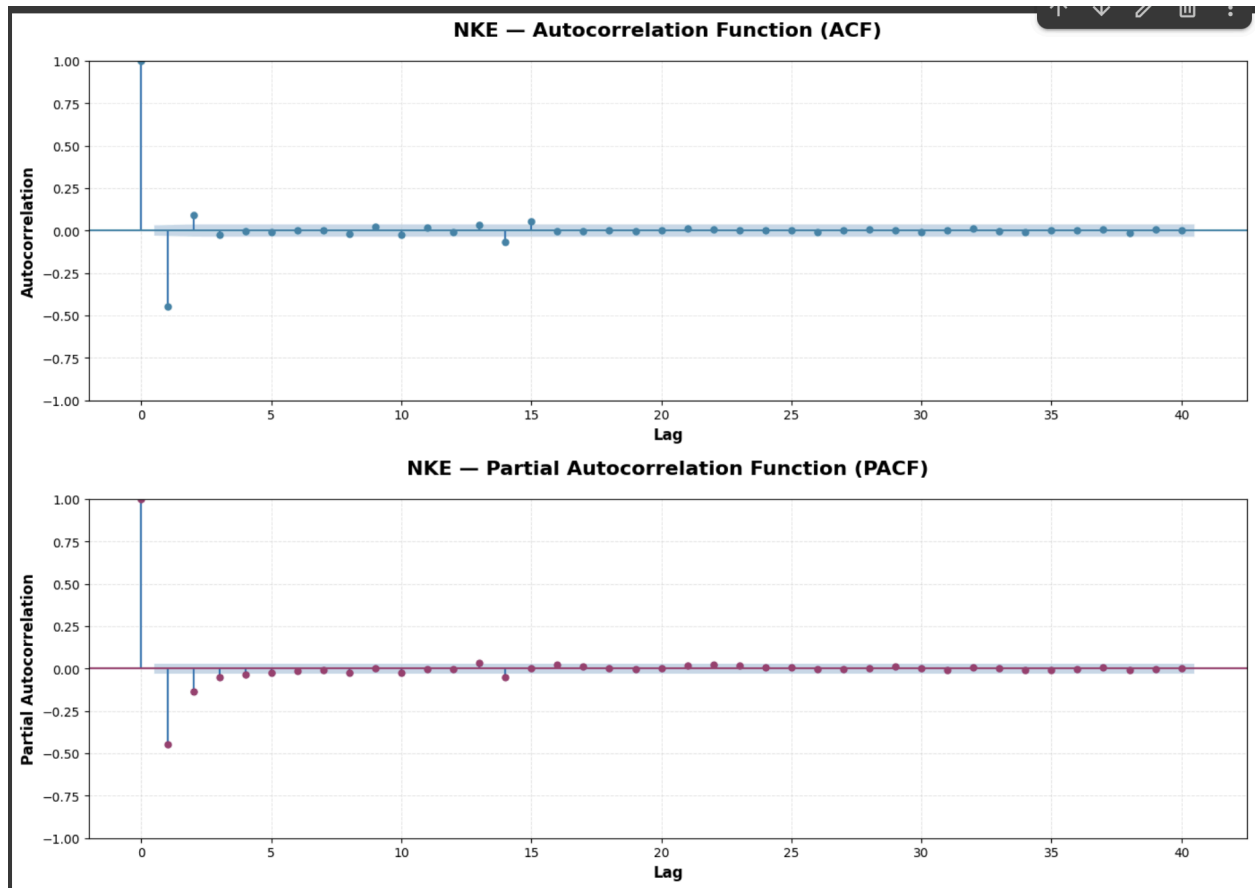
The raw price series shows an upward/downward drift and volatility clustering, suggesting it is likely non-stationary.



Rolling mean smooths out daily fluctuations, helping visualize the underlying trend.



During the decomposition stage, we visualized the trend, seasonality, and residuals for Nike's stock over a 30 day period. The trend shows a mixture of an upward trend in the first half to a downward trend in the middle to then a flat trend towards the end. This suggests volatility in the stock prices that seem to have evened out at the month came to an end. The seasonality plot shows a repetitive rise and fall to the stock.



ACF shows correlations with past lags; PACF isolates direct effects of lags. These help identify ARIMA model orders.

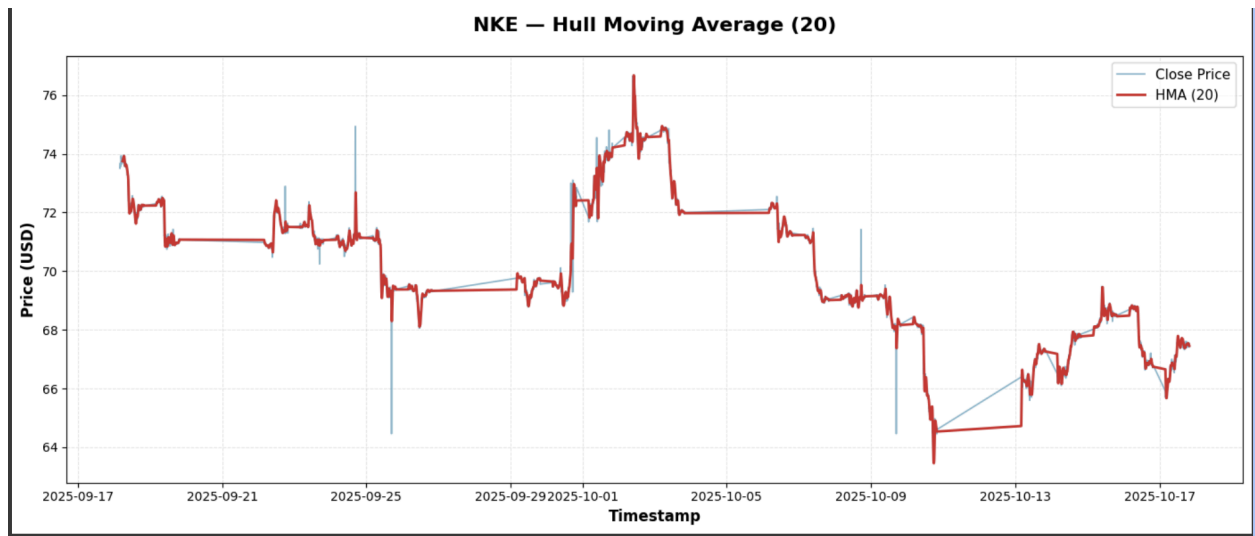
=== Augmented Dickey-Fuller Test ===

ADF Statistic: -19.6140

p-value : 0.0000

Critical Values: {'1%': np.float64(-3.431909043133884), '5%': np.float64(-2.8622288994731733), '10%': np.float64(-2.567136707002046)}

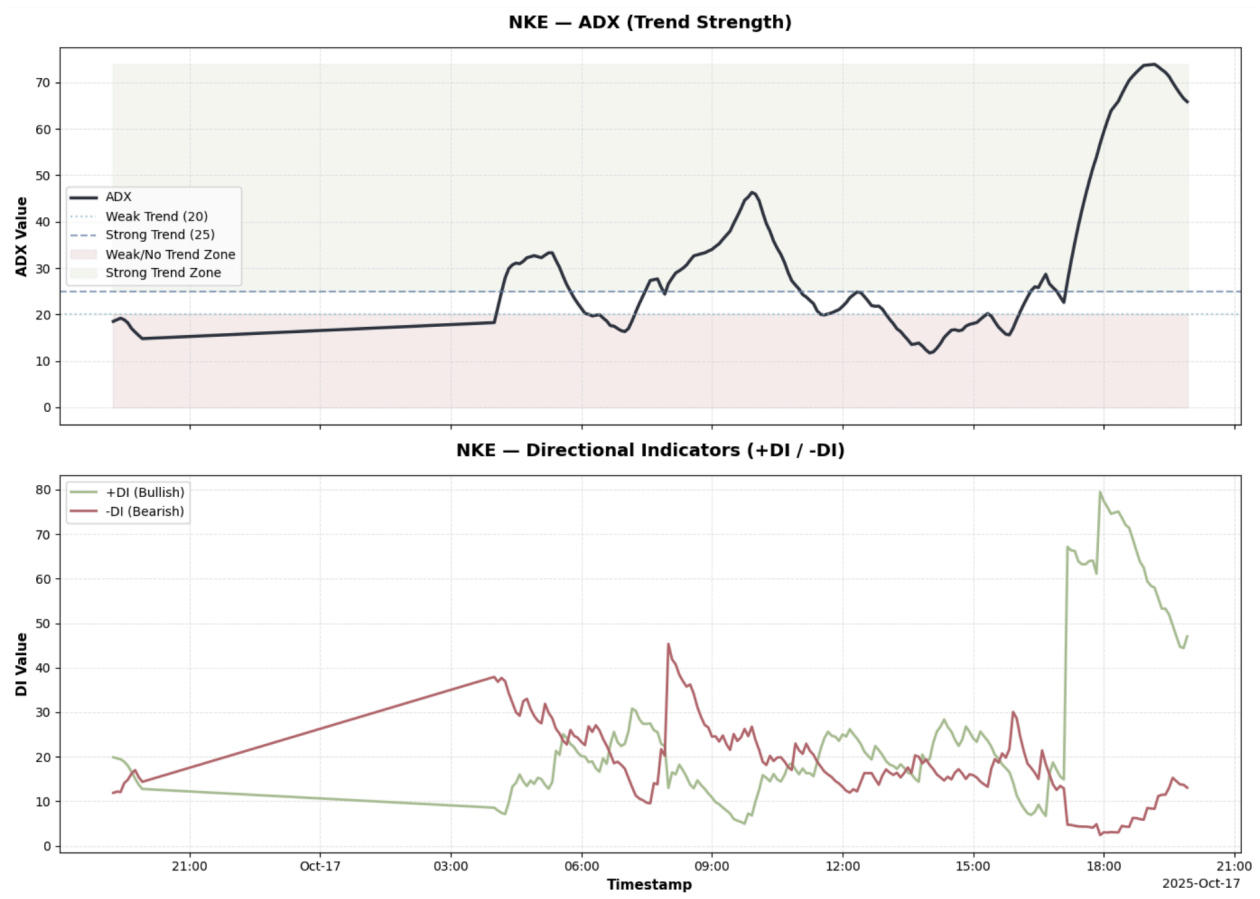
✓ The series is stationary. The null hypothesis is rejected.



HMA Trend Analysis

- In September, the stock dropped from \$74 to \$70 and was in a downtrend. Here, the HMA was declining, confirming a bearish trend.
- In late September / October, the stock experienced a sharp uptrend rising to over \$76. Following this rise, the stock experiences a steady decline and then a small recovery towards the middle of October.
- In the past couple of days, the stock has been on a steady uptrend suggesting the stock slowly reaching stability.

=== Trend Strength Analysis — ADX / DMI ===



Volatility and Stationarity

- For most of the day, the stock had a very weak trend as shown by the ADX measurement which is mostly below the strong trend zone at 20.
- The second half of the ADX graphic shows the ADX rising about 25 indicating the stock has a strong upwards trend.
- The -DI (bearish line) is consistently above the +DI (bullish line) confirming the weak / bearish trend that is shown by the low ADX above.

Investment Recommendation

- Using the ADX and Directional Indicators, we can see that the stock is experiencing an aggressive bearish momentum. They also signal high volatility within the stock. It is recommended that the client buy short-term while using a tight stop-loss. A stop-loss is a tool that places a sell order close to the entry price to limit potential losses, basically a predefined exit strategy.
- A long term recommendation would be to invest cautiously and hold. The results suggest that Nike is in a transitional / turnaround phase with mixed trends. Nike's competitors such as Lululemon and On Running have caused periods of weak revenue for Nike. However, the ARIMA results show that past events largely drive future events. So, the company evidently remains dominant within the industry and is always expected to recover even if it experiences lows.

Strategic Takeaways

- One major data point to pay attention to is the ADX. When it reaches those extreme high levels, as we saw in the graph when it reached 70, it means the stock is experiencing a near-vertical move which means it will soon enter a downward trend.
- As an investor, you should also focus on the company's gross margin. This will provide evidence that the stock is stabilizing and will soon rise, or it will show that the stock is in for a decline.