

# Alignment of Amazon Stock Trends with Global Market Indices and Indices Changes During Key Economic Events.

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## 1 Introduction

During significant global events, stock trends often mirror the broader economic environment, offering a glimpse into market resilience and interconnectedness. This report looks at the relationship between Amazon's stock performance and global stock market indices from 2010 to 2020 and during the COVID-19 pandemic (2020–2021). By examining daily stock data and key economic trends, the study uncovers patterns, correlations, and variations in price movements. The analysis sheds light on how closely Amazon's stock trends align with broader market behaviors, revealing its role in the global economy and response to shared economic pressures. By analyzing all the visualization and data, we try to answer the following question:

- Do Amazon stock trends align with global stock and market indices during key economic events?

## 2 Data Used

### 2.1 Amazon Stock (US stock market 2010-2020)

- Data Table: 1

Date	Open	High	Low	Close	Volume	SD20	Upper_Band	Lower_Band	S_Closet
2010-10-18	165	165.19	161.82	161.56	6311300	3.7782967913329584	164.38359358266592	149.3024064173141	164.64
2010-10-19	168.68	162.8	157	158.67	7525000	3.581162213052113	164.24232442610423	150.2176755738958	161.56
2010-10-20	158.78	159.87	156.57	158.67	5790400	3.2714242834129523	164.12484856682593	151.83915141311741	158.67
2010-10-21	162.67	166.13	161.29	164.97	13482500	3.4655304143276795	165.11906082865536	151.25693917134467	158.67
2010-10-22	162.45	170.17	162.27	169.13	16318400	4.217293469812701	167.0425869396254	150.1734130603746	164.97
2010-10-25	171.57	171.99	168.32	169	6530900	4.816101883216568	168.72170360643315	149.45729639356688	169.13
2010-10-26	167.57	171	167.5	169.95	4689600	5.395058752911489	170.39211750582302	148.81188249417704	169
2010-10-27	168.91	169.75	166.54	167.51	5721800	5.673386253283463	171.37477250656696	148.68122749343308	169.95
2010-10-28	168.31	168.49	165.05	166.84	4684400	5.823594567293375	172.16418913458676	148.86981086541329	167.51
2010-10-29	165.8	168.5	164.81	165.23	4998500	5.682903353596132	172.45880670719228	149.7271932280775	166.84

Figure 1: Amazon US stock data sqlite data table

- URL: <https://www.kaggle.com/datasets/nikhilkohli/us-stock-market-data-60-extra-select=AMZN.csv>
- Description: This data set contains Amazon US stock data for 2010 to 2020. The closing price of the stock was adjusted for dividends, splits in the stock, and new offerings of stock, providing a more accurate representation of the stock's performance over time.
- Data Structure: This dataset is also in tabular format, it contains total 2474 number of records with lot of potential features for our analysis.
- Data Quality: This dataset is complete, with no missing values, and all columns appear consistent. The data ranges look reasonable based on summary statistics, indicating it's ready for financial analysis.

## 2.2 Global stock(2008-2023)

- Data Table: 2

Ticker	Date	Open	High	Low	Close	Adj Close	Volume
*NYA	2008-08-01	8438.7099609375	8452.009765625	8356.4296875	8379.150390625	8379.150390625	4684870000
*IXIC	2008-08-01	2326.830078125	2328.949951171875	2286.409912109375	2310.9599609375	2310.9599609375	2312140000
*FTSE	2008-08-01	5411.89990234375	5411.89990234375	5321.2998046875	5354.7001953125	5354.7001953125	1341947000
*NSEI	2008-08-01	4331.60009765625	4422.9501953125	4235.7001953125	4413.5498046875	4413.5498046875	0
*BSESEN	2008-08-01	14064.259765625	14682.330078125	14032.8701171875	14656.6904296875	14656.6904296875	40200
*N225	2008-08-01	13276.5703125	13294.169921875	13039.2099609375	13094.58984375	13094.58984375	135000000
000001.SS	2008-08-01	2751.02001953125	2830.763916015625	2721.951904296875	2801.81689453125	2801.81689453125	49200
*N100	2008-08-01	753	757.4099731445312	744.2100219726562	747.1400146484375	747.1400146484375	308081600
*DJI	2008-08-01	11379.8896484375	11425.73046875	11267.0498046875	11326.3203125	11326.3203125	189700000
*GSPC	2008-08-01	1269.4200439453125	1270.52001953125	1254.5400390625	1260.31005859375	1260.31005859375	4684870000
GC=F	2008-08-01	904.9000244140624	916.0999755859376	902.0999755859376	909	909	1834
CL=F	2008-08-01	124.05999755859376	128.60000610351562	122.0999984741211	125.0999984741211	125.0999984741211	277311

Figure 2: Global stock data sqlite data table

- URL: <https://www.kaggle.com/datasets/pavankrishnanarne/global-stock-market-20>
- Description: This data contains the most popular and busy stock markets world-wide, like the New York Stock Exchange, NASDAQ, Bombay Stock Exchange, Shanghai Stock Exchange, and more.
- Data Structure: Data set has individual year data separation, and I merged all the data in one dataset and found 40756 rows and 9 columns.
- Data Quality: The dataset has few null values, and I cleaned it all through the data pipeline and in analyses. Summary statistics reveal wide price and volume ranges, but potential outliers (e.g., negative prices) warrant further validation to ensure data accuracy.

## 2.3 Data License:

Three datasets are dedicated to the public domain under the Creative Commons Public Domain Dedication (CC0 1.0 Universal License). This license allows for unrestricted use, sharing, modification, and distribution of the dataset for any purpose, including commercial use, without requiring permission or attribution. To comply with the spirit of the license, all rules and conditions are written on the Creative Commons website, ensuring that others can understand the terms of use. This approach promotes transparency and encourages responsible use of public domain resources.

## 3 Analysis

Data was cleaned and examined using Python tools like pandas, matplotlib, and numpy in order to see whether Amazon's stock patterns coincide with the global stock market, including any economic event. Data from worldwide stock indices and Amazon's close prices were filtered, and `pd.to_numeric` was used to handle numerical irregularities. The daily averages of the global indexes were computed after they were rotated to produce a structured presentation. The global index data by date was combined with the stock prices of Amazon, and a dual-axis plot was created using matplotlib to graphically compare trends.

### 3.1 Amazon and Global indices (close price):

Amazon's stock prices showed a noticeable increasing tendency, especially from 2016 onward, according to the data, demonstrating steady development and endurance in the face of major economic catastrophes. Global stock indices, on the other hand,

showed greater volatility with notable swings, albeit continuing their generally upward trajectory, particularly after 2017. This implies that Amazon's stock performance shows a greater and more steady upward trajectory, even though its trends coincide with those of global market indices during significant economic events. Greater market uncertainty brought on by regional and industry-specific issues is highlighted by the increased volatility in global indices. Amazon's flexibility and solid position in the global financial ecosystem are highlighted by its capacity to remain stable and outperform more general market conditions.

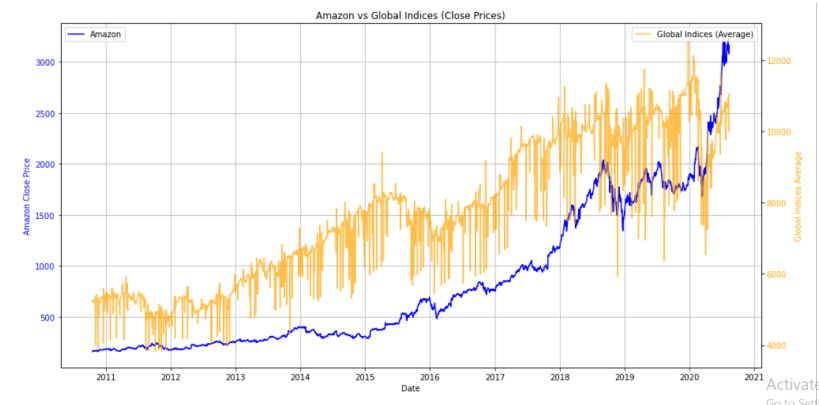


Figure 3: Comparison of Amazon's stock prices with the average of global stock market indices, showing growth and volatility trends (2010–2020)

### 3.2 Amazon and Global indices (Covid 19 pandemic):

Amazon's stock prices showed a noticeable increasing tendency, especially from 2016 onward, according to the data, demonstrating steady development and endurance in the face of major economic catastrophes. Global stock indices, on the other hand, showed greater volatility with notable swings, albeit continuing their generally upward trajectory, particularly after 2017. This implies that Amazon's stock performance shows a greater and more steady upward trajectory, even though its trends coincide with those of global market indices during significant economic events. Greater market uncertainty brought on by regional and industry-specific issues is highlighted by the increased volatility in global indices.

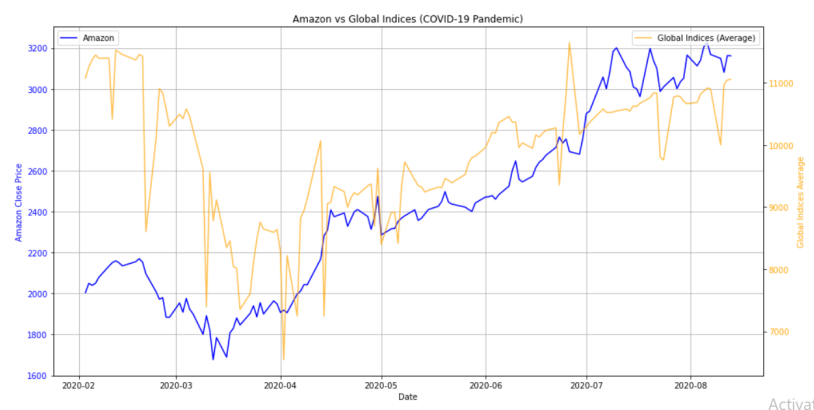


Figure 4: Amazon's stock prices and the average of worldwide indices throughout the COVID-19 pandemic are compared, revealing trends in volatility and recovery.

Amazon's flexibility and solid position in the global financial ecosystem are highlighted by its capacity to remain stable and outperform more general market conditions.

### 3.3 Correlation matrix: (Aamazon vs. Global stock indeces):

Amazon's stock prices closely mirror domestic market movements, as seen by their significant positive correlations with major U.S. indices such as the NASDAQ ( $\hat{IXIC}$ , 0.96) ( $\hat{IXIC}$ , 0.96), Dow Jones ( $\hat{DJI}$ , 0.92), and S&P 500 ( $\hat{GSPC}$ , 0.91). Amazon's global importance is demonstrated by its moderate correlations with global indices such as the FTSE 100 ( $\hat{FTSE}$ , 0.52) and the BSE Sensex ( $\hat{BSESN}$ , 0.87). However, weak or negative correlations with commodities like gold ( $GC=F$ , 0.06) and crude oil ( $CL=F$ , -0.59) imply that Amazon's success is more influenced by consumer and tech markets than by changes in commodity markets. Despite being less impacted by commodities, these results demonstrate Amazon's close linkages to stock markets.

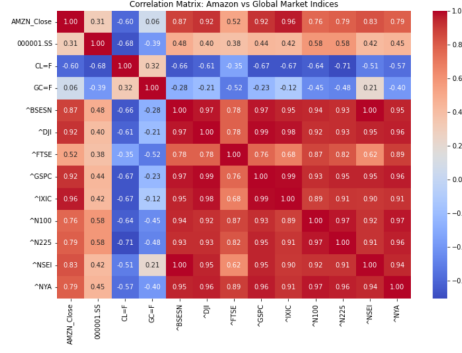


Figure 5: Correlation matrix chart

Correlation of Amazon with Global Market Indices:

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^IXIC      0.960948
^DJI       0.917003
^GSPC      0.915930
^BSESN     0.874697
^NSEI      0.828083
^NYA       0.793249
^N225      0.789687
^N100      0.760286
^FTSE      0.524182
000001.SS  0.311229
GC=F       0.060664
CL=F      -0.596601
Name: AMZN_Close, dtype: float64

```

Figure 6: Aamazon Correlation with othrrs stock market

## 4 Conclusion

To summarize, this analysis aimed to address the question: "Do Amazon stock trends align with global stock and market indices during key economic events?" The findings demonstrate a good alignment with local markets by demonstrating a substantial correlation between Amazon's stock moves and important U.S. indices like the NASDAQ (0.96), Dow Jones (0.92), and S&P 500 (0.91). Moderate correlations with global indices such as the BSE Sensex (0.87) and FTSE 100 (0.52) indicate a significant but less noticeable impact on global markets. However, Amazon's low reliance on commodity market dynamics is shown by weak or negative correlations with commodities such as gold (0.06) and crude oil (-0.59).

The results validate Amazon's congruence with global market indexes, especially during significant economic events, which partially addresses the concern. The observed variation in correlations, however, suggests that additional elements, like regional regulations, dynamics unique to a given business, and worldwide economic circumstances, might be important.

**Limitations:** The analysis is limited by the datasets' historical breadth and does not completely take into consideration outside factors like interruptions particular to a sector or changes in policy. The intricate interaction of market forces is oversimplified by assuming that Amazon's trends and global indexes are directly aligned. Furthermore, the breadth of insights may be constrained by the short time span and lack of sectoral or geographic breakdowns.

To provide a more thorough picture of Amazon's worldwide financial position and its interaction with market indices during significant economic events, future research should include larger datasets, longer periods, and additional variables, such as consumer behavior and economic growth trends.