جامعة مصر للمعلوماتية
EGYPT UNIVERSITY
OF INFORMATICS

Egypt University of Informatics
Computer and Information Systems
Data Analysis Course

USD/EGP Exchange Rates and Historical Events

[USD/EGP Exchange Rates and Historical Events]

Prepared For: **C-DE211_ Data Analysis,**
Instructor:Mohamed Taher,
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Introduction

The project aims to examine if there are noticeable changes in the yearly exchange rate data that align with key historical events, such as the Egyptian Revolution of 2011, interest rate adjustments after the adoption of the floating exchange rate system in 2016-2017, and economic policy shifts from 2016 to 2021. Using statistical methods and time-series analysis, we'll explore whether there are significant differences in the exchange rate during these periods.

Research Question :

The questions that we wanted to answer through our analysis:

1. . How did the distribution of USD/EGP exchange rates change around the time of the Egyptian Revolution of 2011?

2. How did the Egyptian Revolution of 2011 impact the price trend?

3. Was there a shift in the average USD/EGP exchange rate around the time of Interest Rate Adjustments Post Floating Exchange Rate Implementation (2016-2017)?

4. How did the Implementation of Post Floating Exchange Rate impact the price trend?

5. Was there a shift in the average USD/EGP exchange rate around the time of Economic Policy Changes (2016-2021)?

6. How did the Economic Policy Changes (2016-2021) impact the price trend?

7. How did the distribution of global exchange rates change during the COVID-19 pandemic compared to before and after?

8. How did the Global Pandemic COVID (2020-2022) impact the price trend?

Hypothesis:

-Null hypothesis (H0): The historical events have no significant negative impact on the Egyptian pound.

-Alternative hypothesis (H1):The historical events have a significant negative impact on the Egyptian pound.

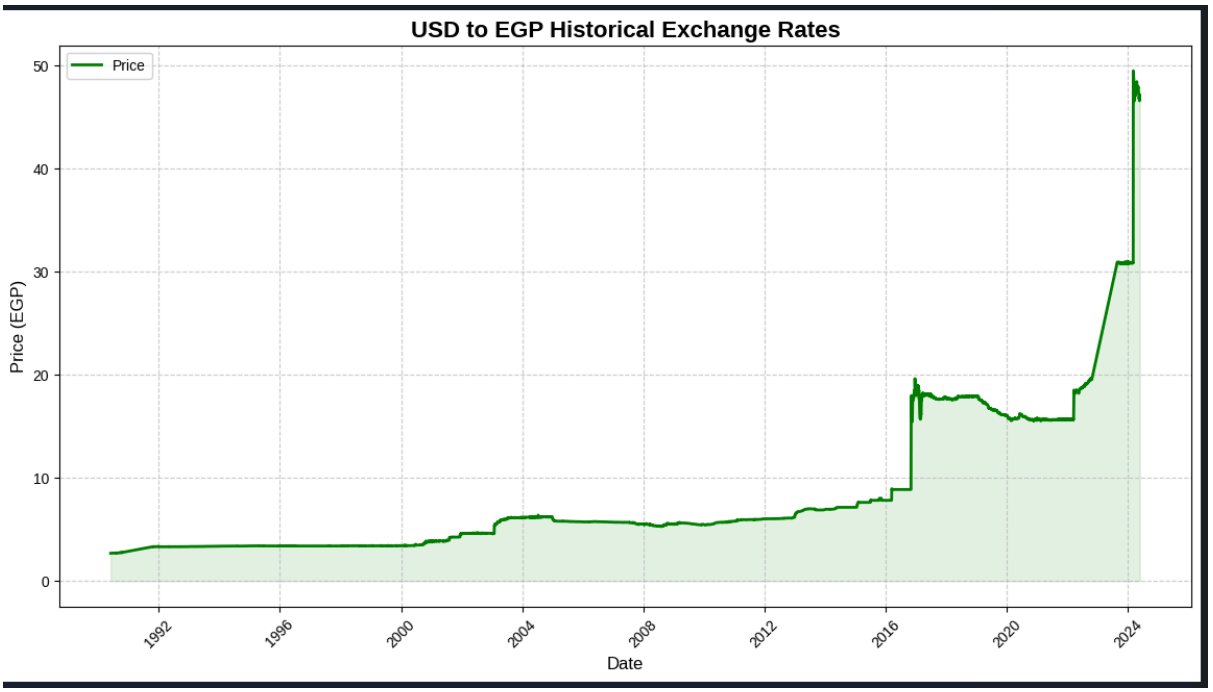
Methods:

- Loading the Dataset: after downloading the dataset, the first pre-processing technique we did was to load the dataset. This was done by the initial importing of python libraries such Pandas, Matplotlib, Seaborn, etc. The dataset was downloaded and named as a csv file and then loaded into Pandas data frame for cleaning and exploratory analysis.
- Understanding the Dataset: this was done by knowing the features each column stands for to avoid mistakes in data analysis and modelling.
- Dataset Cleaning: the dataset cleaning was done by writing python code that checked for any null value.

Analysis:

Visualization and Analysing :

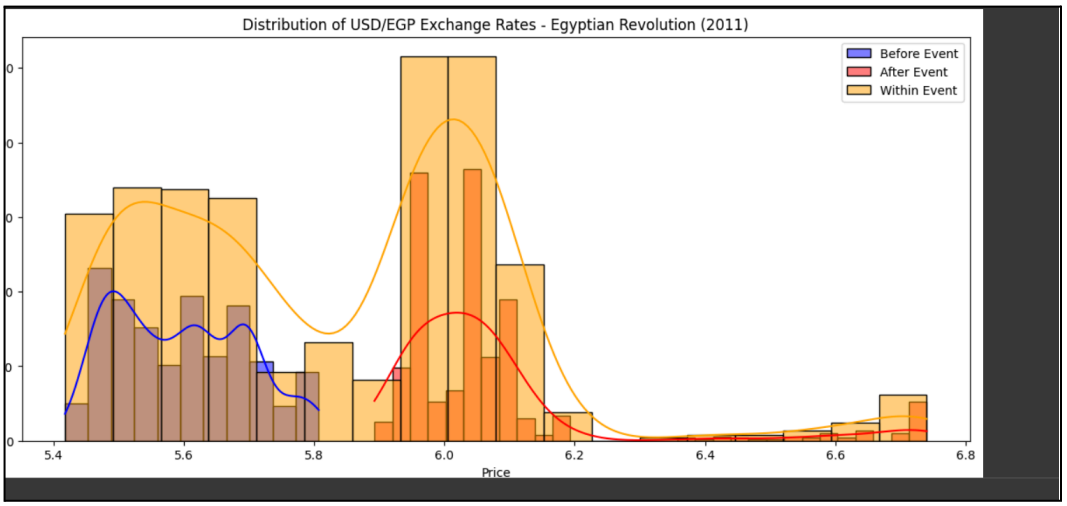
-Before attempting tony further visualization , we first explored the data to spot any noteworthy patterns or features.We started by visualizing time series plot showing the USD/EGP Historical Exchange Rates price over the period (1992-2024) :



The graph shows prices going up over time, hinting at a possible rise in inflation in Egypt.

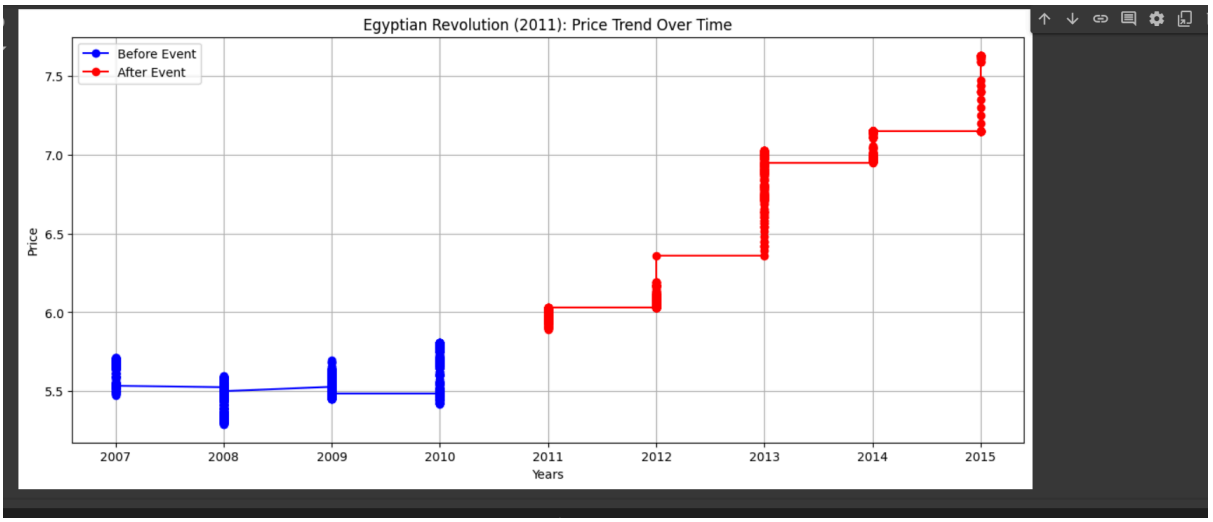
-Analysing and Visualization for Egyptian Revolution (2011):

-this graph shows the distribution of USD/EUR exchange rates before, during, and after the Egyptian Revolution of 2011



The distribution of USD/EUR exchange rates is skewed to the right before, during and after the Egyptian Revolution of 2011. This means there are more data points concentrated on the left side of the distribution (lower exchange rates) and a longer tail extending towards the right side (higher exchange rates).Moreover,The distribution during the revolution event appears to be wider than before or after the event, indicating greater volatility in exchange rates during that time.

The graph shows the price trend over time for Egyptian Revolution (2011) event Price in EGY



The line plot shows how prices changed before, during, and after the Egyptian Revolution in 2011. Before the revolution, prices slowly went up from 2007 to 2010. But in 2011, when the revolution happened, prices shot up quickly. This high price level continued into 2012 and 2013.So,the Egyptian Revolution (2011) appears to have coincided with a significant increase in prices in Egypt.

Before the event, spanning from 2009 to 2010, the exchange rate exhibited a relatively stable pattern, showing a slight upward trend over time. However, in the event year of 2011, there was a notable spike in the exchange rate, aligning with the timing of the revolution. Following the event, from 2012 to 2013, the exchange rate either sustained its elevated levels or continued to rise further after 2011.

```
Event: Egyptian Revolution (2011)
Standard Deviation before event: 0.1006410440443682
Standard Deviation after event: 0.18150027049179596
Mean before event: 5.594684520547945
Mean after event: 6.071613953488372
t-statistic: -62.12273353782879, p-value: 0.0
Reject the null hypothesis: The event has a nigative significant impact on the EGP.
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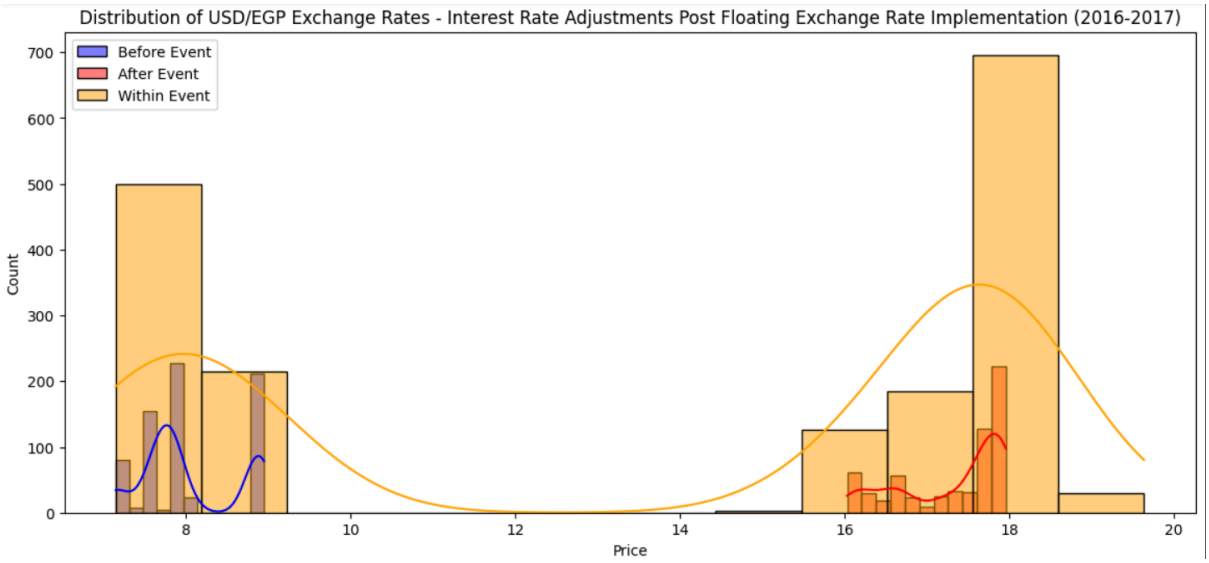
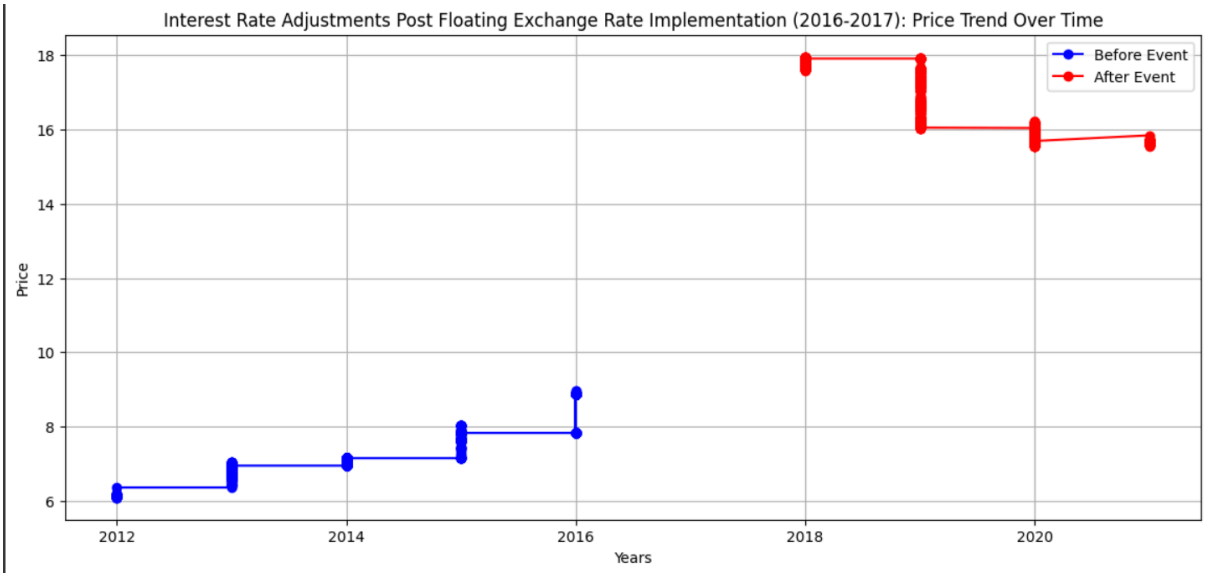
-Interest Rate Adjustments Post Floating Exchange Rate Implementation (2016-2017):

The distribution of USD/EGP exchange rates in Egypt from 2010 to 2017



The distribution of exchange rates after the event displays a right skew, indicating a higher frequency of occurrences with higher exchange rates, implying that more Egyptian Pounds were required to purchase one US Dollar. Before the event, the distribution appears to have been centred around a specific value, potentially ranging between 6 EGP and 7 EGP per USD, although it's challenging to determine conclusively due to the lower resolution of the graph during that period. Meanwhile, discerning the distribution during the event is complicated by the overlap of data points with both the "Before" and "After" sections, making it difficult to draw precise conclusions.



After the event (red line), there seems to be a noticeable change in the price trend, indicating a potential impact of the interest rate adjustments on the exchange rate. The fluctuations post-event appear to be more pronounced compared to the pre-event period, suggesting increased volatility in the exchange rate following the policy change.

Additionally,The number 18 is the highest interest rate value depicted on the graph which happens after the event.

Before the event, indicated by the blue line, the exchange rate might have been relatively stable or with a slight upward trend. After the event, represented by the green line, there appears to be a possible increase in the exchange rate, suggesting it could have taken more Egyptian Pounds (EGP) to buy one US Dollar (USD) following the interest rate adjustments and floating exchange rate implementation. Overall, the graph hints at a potential impact of the interest rate adjustments and floating exchange rate implementation on the USD/EGP exchange rate.

```
Event: Interest Rate Adjustments Post Floating Exchange Rate Implementation (2016-2017)
Standard Deviation before event: 0.5969053098610154
Standard Deviation after event: 0.6420127607602731
Mean before event: 8.024340084388184
Mean after event: 17.322917840375585
t-statistic: -274.6591387334357, p-value: 0.0
Reject the null hypothesis: The event has a nigative significant impact on the EGP.
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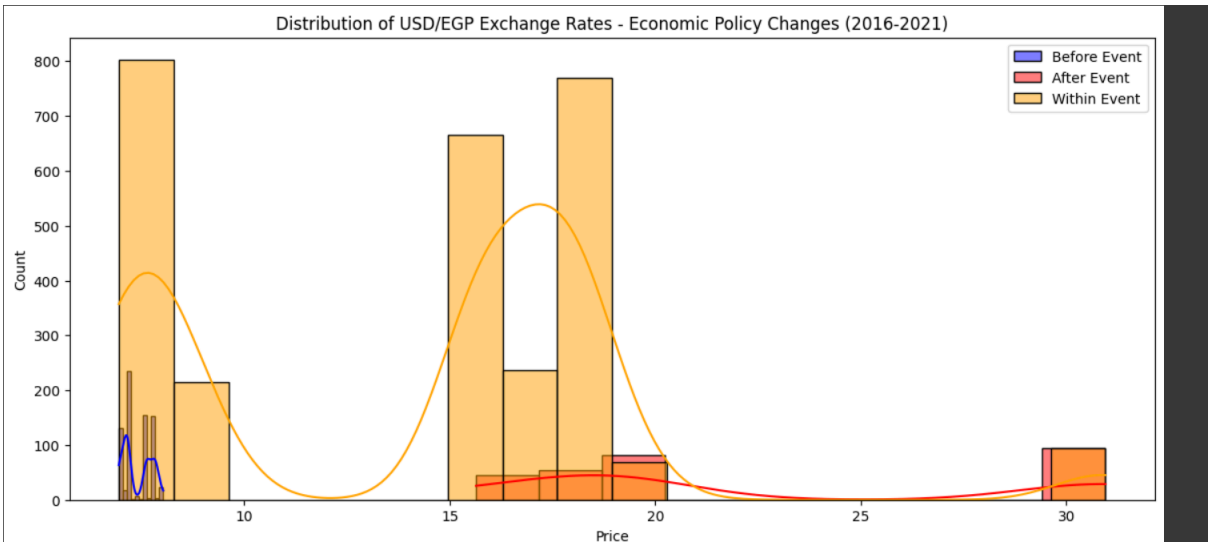
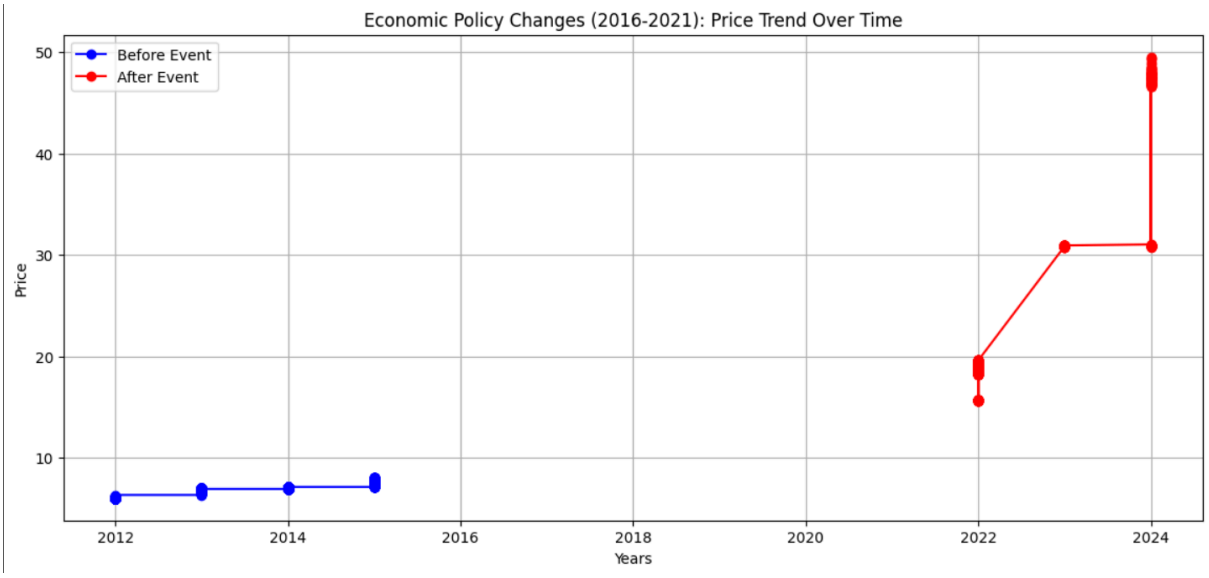
-Analysis of Economic Policy Changes (2016-2021):

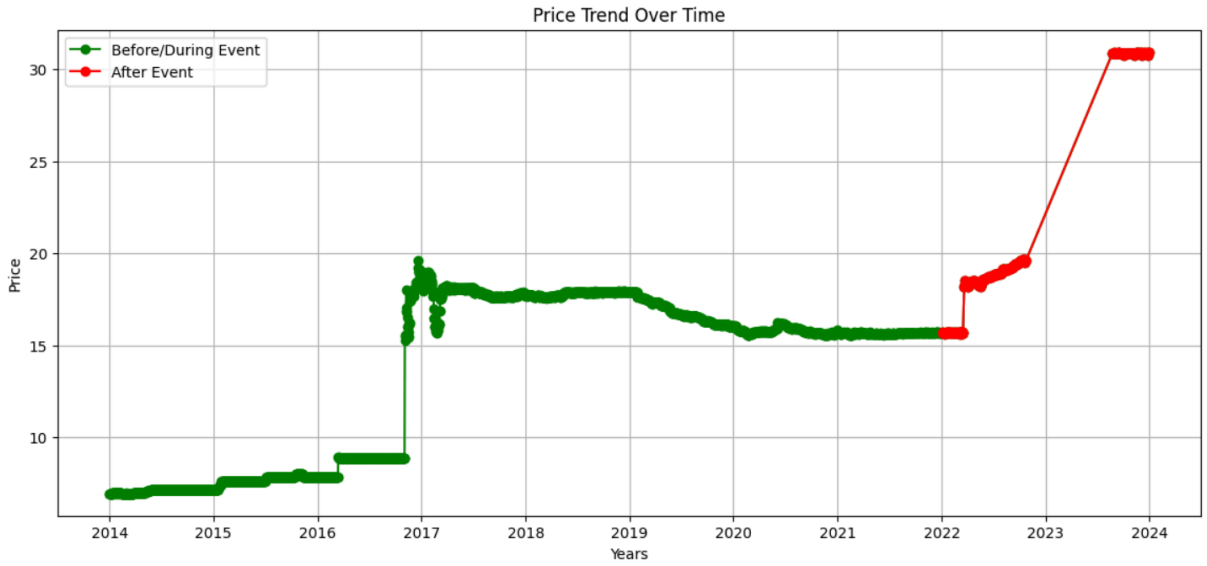


The distribution of exchange rates before the event appears skewed to the right, indicating more frequent occurrences of lower exchange rates (more EGP per USD).After the event, the distribution appears less skewed, suggesting a potentially wider range of exchange rates occurring. This shift in distribution hints at a possible change in the dynamics of USD/EGP exchange rates following the event.



The graph shows how prices changed before and after Economic Policy Changes from 2016 to 2021. Before the changes, prices stayed fairly steady with small ups and downs. After the changes, prices started jumping around more, which means the new policies had a big effect

on how much things cost.So the Economic Policy Changes from 2016 to 2021 had a mixed effect on prices. Before the changes, prices were relatively stable, indicating a somewhat positive situation. However, after the changes, prices became more volatile, suggesting a potentially negative impact on the economy.




```
Event: Economic Policy Changes (2016-2021)
Standard Deviation before event: 0.34552127494156926
Standard Deviation after event: 6.197052601980622
Mean before event: 7.398233150684932
Mean after event: 22.463964620938626
t-statistic: -40.43793106655457, p-value: 3.855425234494932e-118
Reject the null hypothesis: The event has a nigative significant impact on the EGP.
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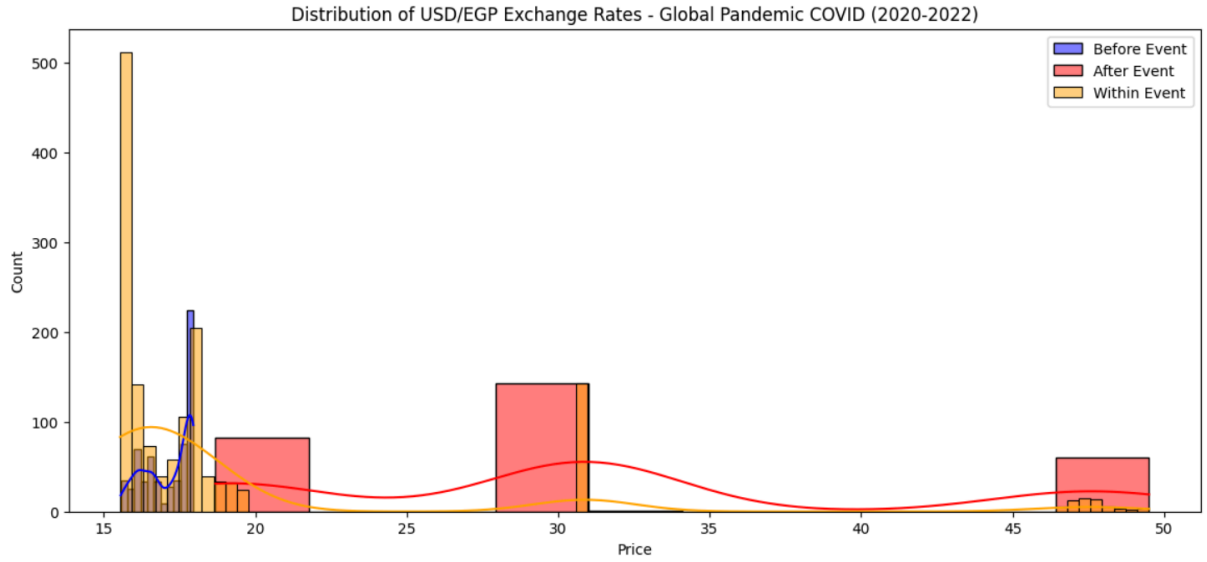
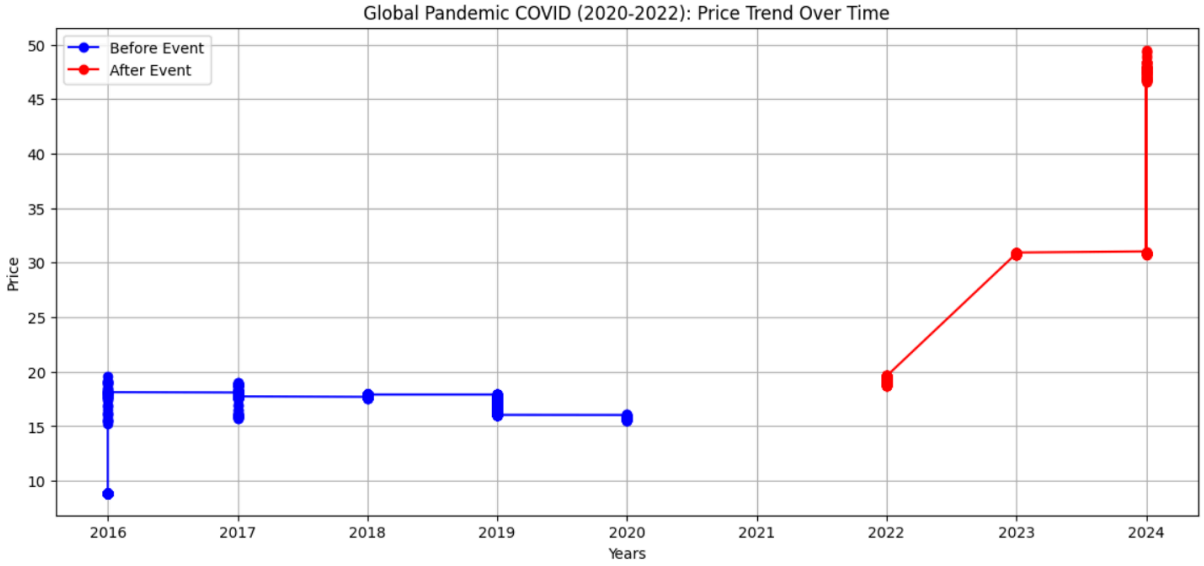
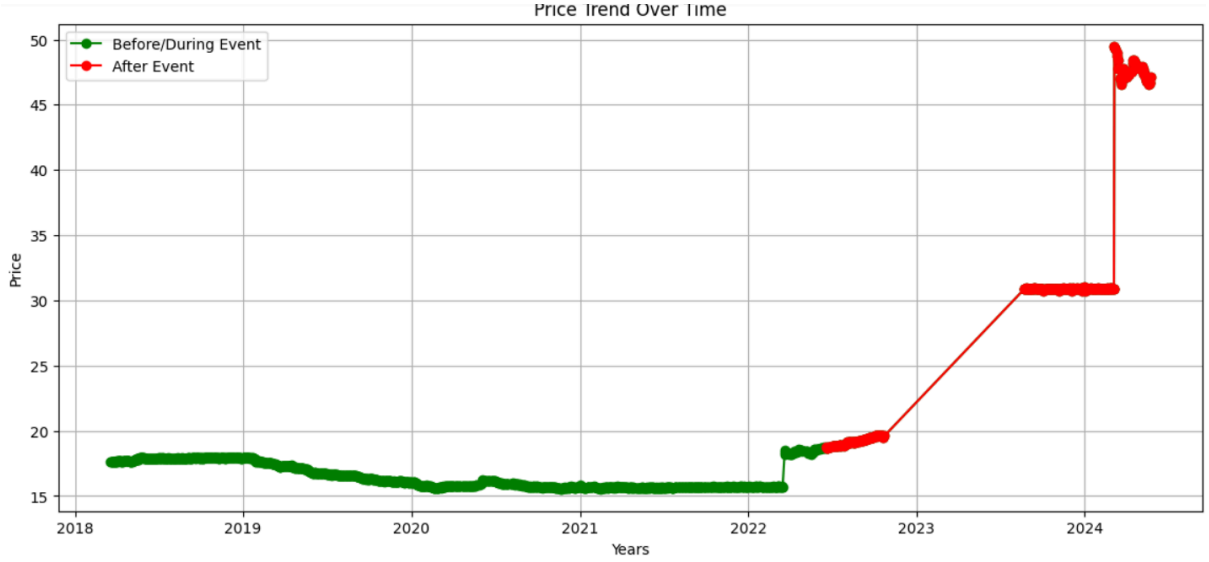
-Analysis of Global Pandemic (2020-2022):



Before the event, depicted by the blue distribution on the graph, there is a likelihood of a skew towards a specific exchange rate value. This suggests a clustering of data points around particular exchange rates, with a tail extending towards either lower or higher rates, depending on the direction of the skew. During the event, represented by the orange distribution, there is a possibility of a wider spread compared to both before and after distributions. This broader dispersion indicates increased volatility in exchange rates during the pandemic period, with more frequent fluctuations observed. As for the distribution after the event, symbolized by the red distribution, it's challenging to provide a definitive forecast without visualizing the graph. However, it could potentially exhibit a similar level of volatility as during the event, or possibly transition towards a new average exchange rate, depending on various economic factors.



Before the Global Pandemic COVID (2020-2022), the graph indicates a relatively stable or slightly fluctuating price trend, as shown by the blue line. However, during and after the pandemic period, represented by the red line, there seems to be a notable increase in prices.



```
Event: Global Pandemic (2020-2022)
Standard Deviation before event: 0.7872822757993758
Standard Deviation after event: 9.917476034355031
Mean before event: 17.11462575516693
Mean after event: 31.031063636363637
t-statistic: -23.69674168432421, p-value: 1.7263154429880524e-69
Reject the null hypothesis: The event has a nigative significant impact on the EGP.
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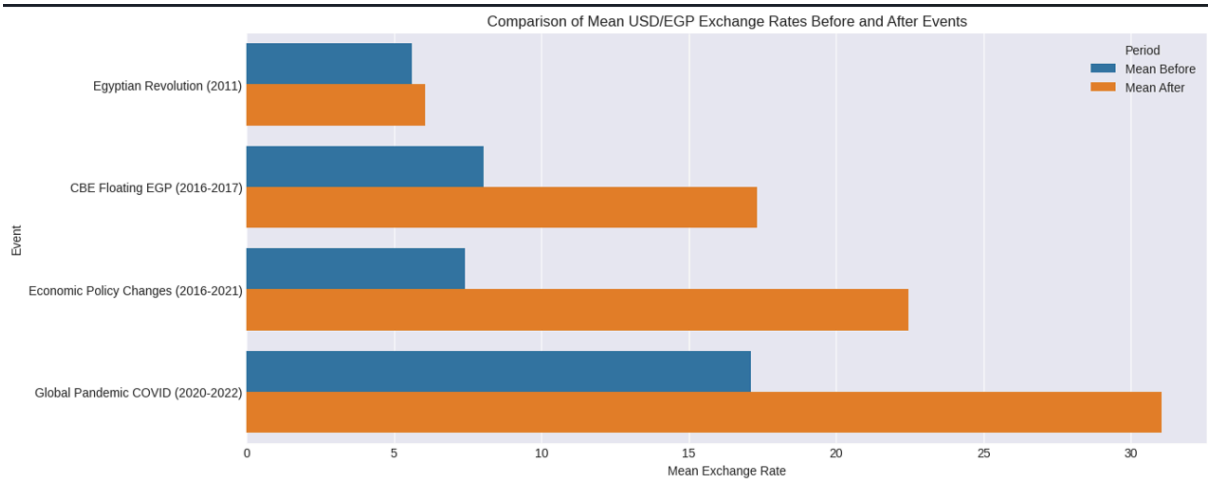
-Analysis of the Mean USD/EGP Exchange Rates Before and After Significant Events



Conclusion :

Through the analysis of various economic events and their impact on the USD/EGP exchange rate, several insights have been gleaned.

The Egyptian Revolution of 2011 resulted in a significant shift in exchange rates, indicating heightened volatility during and immediately after the event. Interest rate adjustments following the floating exchange rate implementation in 2016-2017 also led to noticeable fluctuations, with potential impacts on market stability. Economic policy changes between 2016 and 2021 influenced the exchange rate, resulting in both short-term and long-term effects, indicative of policy-driven market reactions. The global pandemic from 2020 to 2022 had a particularly pronounced negative impact, as evidenced by increased exchange rate volatility and a significant shift in mean exchange rates.

These findings underscore the intricate relationship between economic events and exchange rate dynamics, highlighting the need for robust policy frameworks and risk management strategies to mitigate the potential adverse effects on currency stability and market

confidence. Further analysis and proactive measures may be necessary to navigate future economic challenges effectively.

Any potential issues :

The potential Issue we faced was The Economic Complexity.Exchange rate movements are influenced by a myriad of economic, political, and social factors, many of which are interconnected and dynamic. The analysis may oversimplify the complexity of economic systems and fail to capture the full range of factors driving exchange rate fluctuations. Incorporating qualitative insights from economic experts or employing advanced econometric models could enhance the richness and depth of the analysis.

References:

-Mohieldin, Mahmoud, and Ahmed Kouchouk. "On Exchange Rate Policy: The Case of Egypt." Working Paper 0312.

-Mao, Wenhua. "Analysis on Changes in Exchange Rate of Egypt over Past Decades." In Proceedings of the 2022 7th International Conference on Financial Innovation and Economic Development (ICFIED 2022), Advances in Economics, Business and Management Research, volume 211.