**Historical Bitcoin Price Data:**

The following figure shows historical Bitcoin daily price data from July 2010 to April 2023. Bitcoin broke $20,000 for the first time on December 17, 2017. Towards the end of 2018 there was a decline in the price due to mining difficulties. As we approach to beginning of the pandemic, March 2020 bitcoin experienced a drop. The drop in Bitcoin's price was largely due to the global COVID-19 pandemic, which led to widespread uncertainty and panic among investors. As a result, many investors began to sell their investments, including Bitcoin, in order to raise cash and reduce their exposure to risky assets. Bitcoin broke $40,000 for the first time on January 7, 2021. The price increase was largely driven by growing institutional adoption and increased demand from retail investors. Bitcoin reached its all-time peak price of nearly $67,000 in April 2021. There were several factors that contributed to Bitcoin's peak price in April 2021, including: institutional adoption and stimulus measures due to Covid. In response to the COVID-19 pandemic, governments around the world implemented stimulus measures, such as fiscal stimulus and quantitative easing, which increased inflation concerns among investors. As a result, many investors turned to Bitcoin as a hedge against inflation.

**Historical Bitcoin Price Data 2017-2023:**

The plot summary above shows that the Bitcoin price remains relatively flat until around the year 2017, when volatility and price sharply increase. The reason for this price increase is still disputed, however it is important to note that the popularity of Bitcoin increased substantially around this time period. Therefore, we decided to use the data starting from around the year 2017. The graph shows the historical bitcoin price data between 2017 and 2023.

**BTC Daily Decomposition:**

This slide depicts BTC Daily time series Decomposition of daily bitcoin prices. This process requires breaking down the variable into deterministic trend component, deterministic seasonal component and a random component. For this we used “decompose“ function in R. As the data is so volatile and the seasonal variation in a time series data increases as the level of the series increases, we used multiplicative component model. As we can see, after the decomposition the data becomes relatively stationary.

**BTC Lagged correlations:**

This graph shows the correlation between the prices of Bitcoin with lagged versions of itself. As you can see, it is clear that all the data is highly correlated with itself for at least the first few lags. This plot is helpful, but we can’t conclude anything until we look at the autocorrelation (ACF) and partial autocorrelation (PACF) plots. Lagged correlations are often used in time series analysis and are useful for understanding the dynamic relationships between variables over time. They can help identify patterns and trends that might not be visible in the raw data. It's important to note that correlation does not imply causation, so a strong lagged correlation between two variables does not necessarily mean that one variable causes the other. It could be that there is a third variable that is causing both of them or it could be simply a coincidence.