Time Series Analysis

Modeling Heteroskedasticity: Case Study

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Exchange Rates Prediction: Exploratory Analysis

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About This Lesson

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Foreign Exchange Rates

Time Series Data:

- Daily exchange rates for U.S. dollar/ Euro (USD/EUR), U.S. dollar/ Brazilian Real (USD/BRL), U.S. dollar/ Chinese Yuan (USD/CNY)
- Time Period: 1/4/1993 to 9/29/2020
- Price, Open, High, Low, Change %

Objective

- Model and forecast daily fluctuations in exchange rates

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Exploratory Data Analysis

```
#Load data: USD/EUR data
    data=read.csv("USD_EUR_Historical_Data.csv",header=TRUE)
    names(data)[1]="Date"
    data$Date=as.POSIXct(as.character(data$Date),format='%d-%b-%y')
    data=xts(data[,2],data[,1])
    colnames(data)="rate"
#Exploratory analysis
    #Plot original exchange rates
        plot(data$rate,type='l',main='USD/EUR Exchange Rate',ylab="Exchange rate")
    #Differencing the series
        diff.rate=diff(data$rate); diff.rate <- diff.rate[!is.na(diff.rate)]
    #Plot differenced series
        plot(diff.rate,type='l',main='USD/EUR Exchange Rate Daily Changes',ylab="Difference")
```

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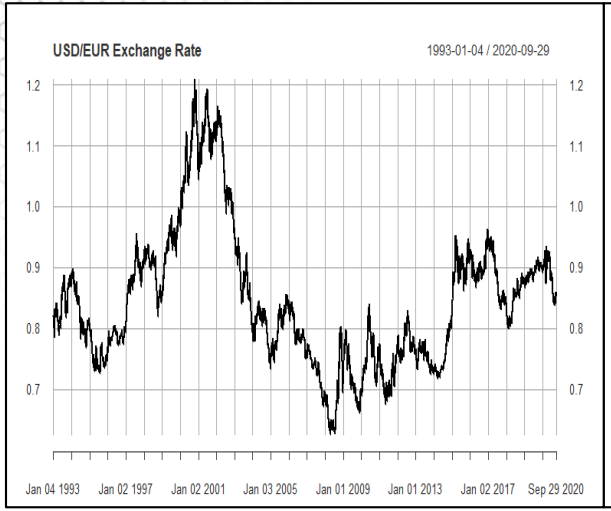
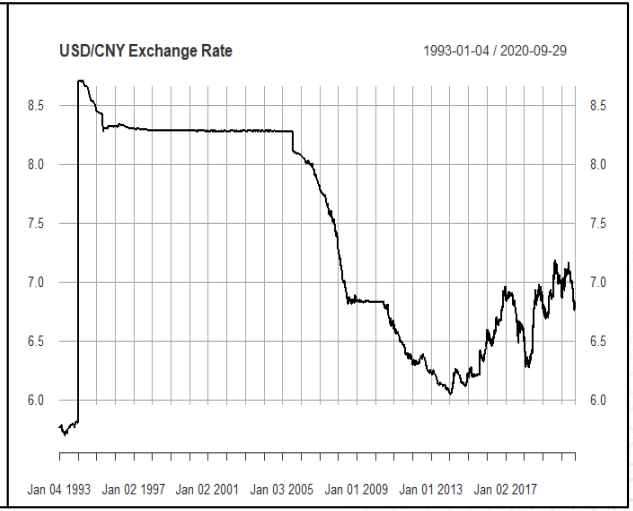
Time Series Plots





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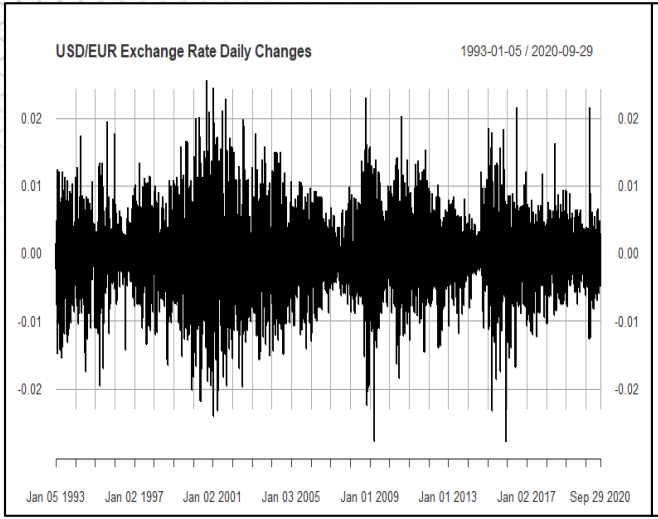
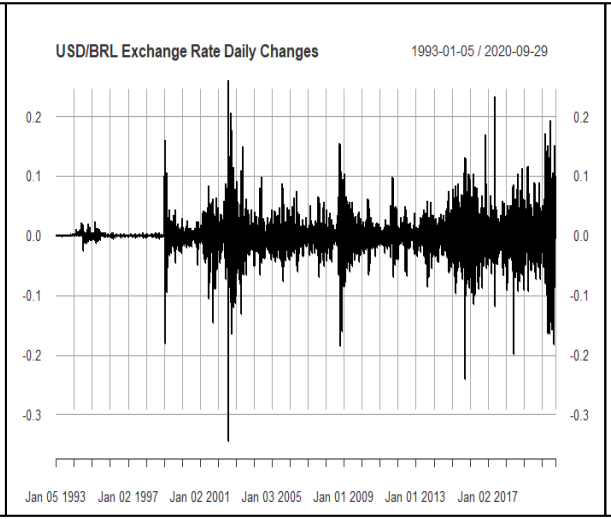
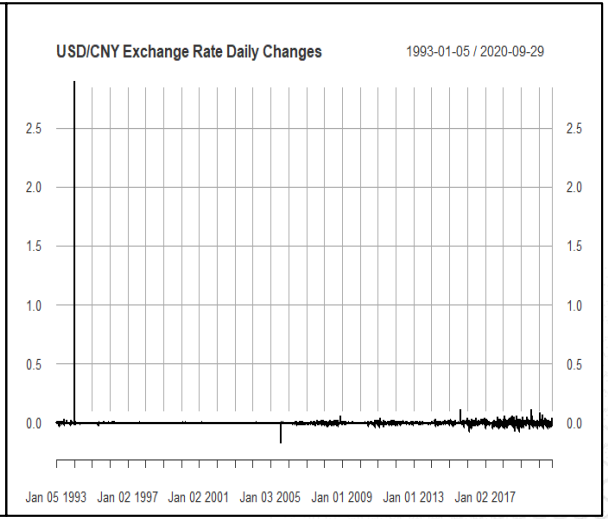
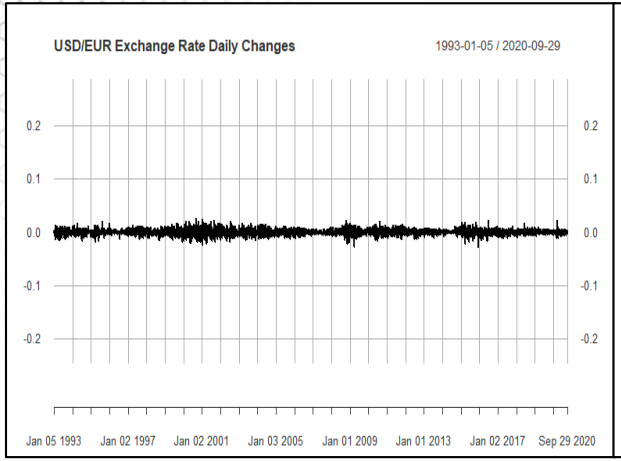
Differenced Time Series Plots

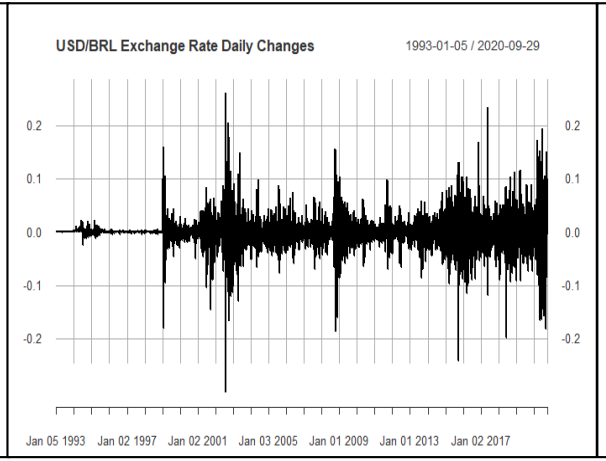


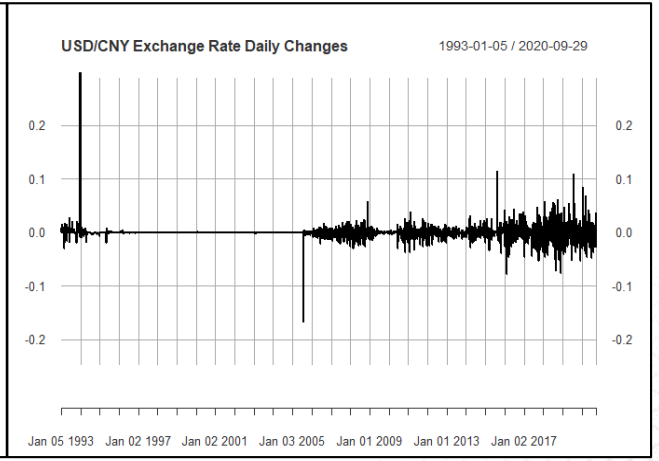




Differenced Time Series Plots (cont'd)







Y-axis rescaled to be same for all three plots

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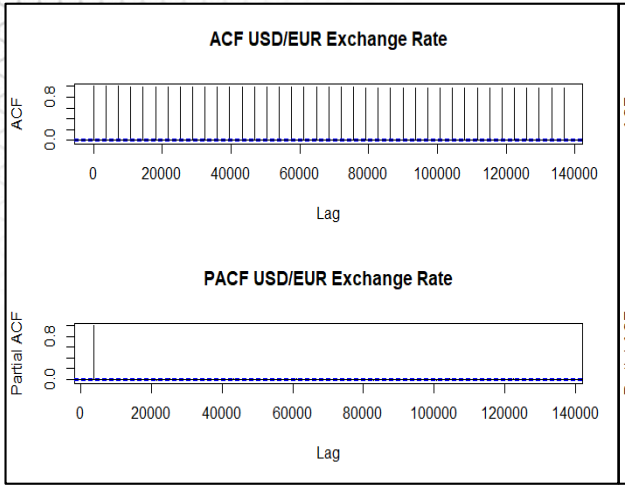
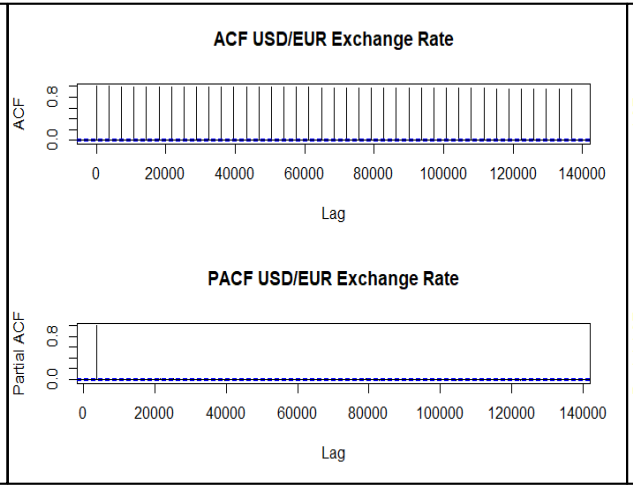
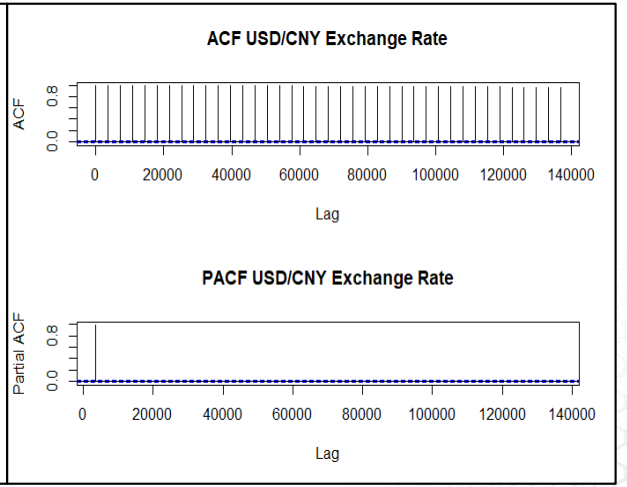
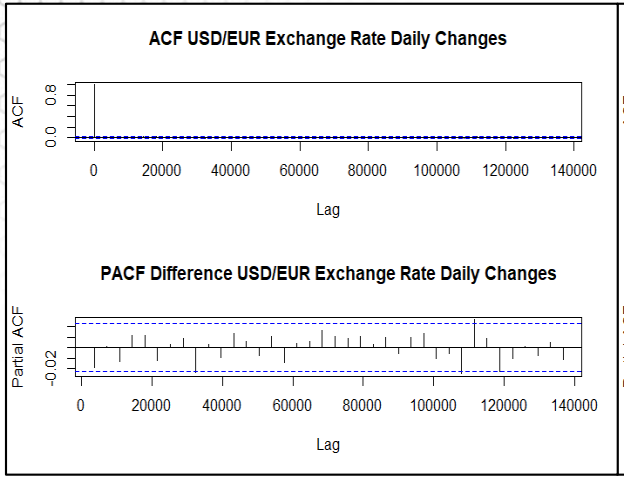
Time Series: ACF & PACF

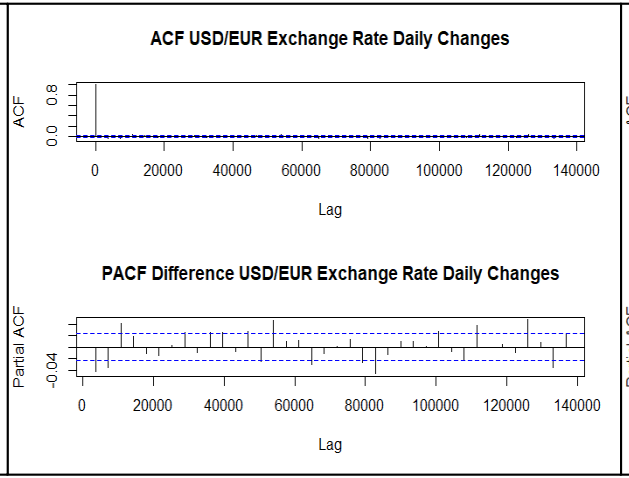


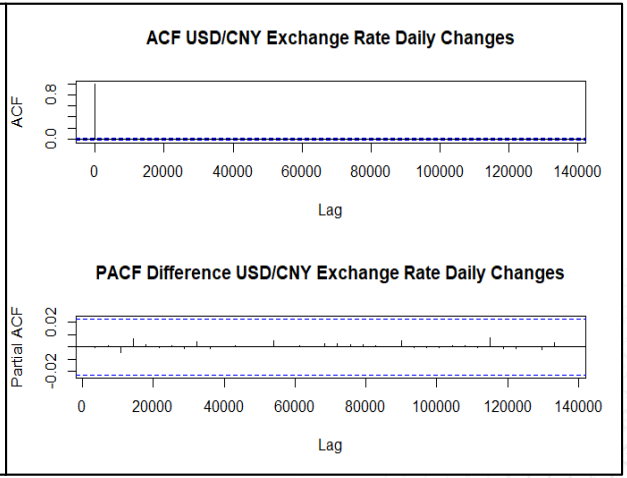




Differenced Time Series: ACF & PACF







Summary

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