

# STAT 478 Project

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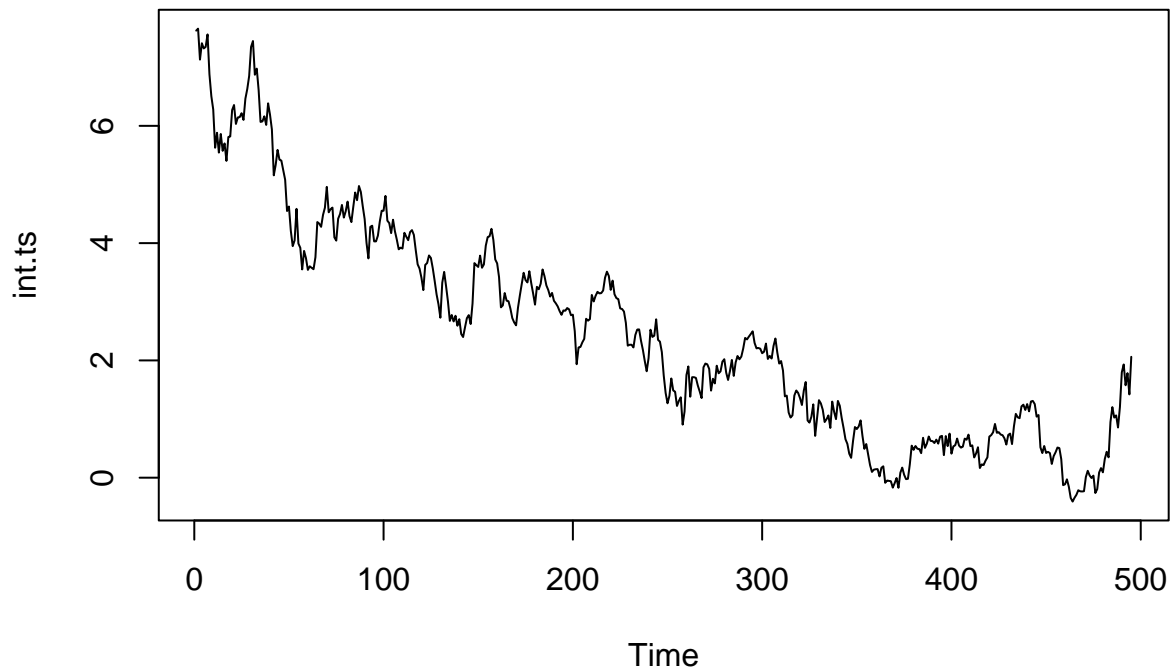
```
# check if `tidyr` package is installed; otherwise, install  
# and load if 'tidyr' is absent  
if (!require("tidyr")) install.packages("tidyr", repos = "https://cloud.r-project.org")  
  
# load libraries  
  
# rename  
library(dplyr)
```

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## Overview

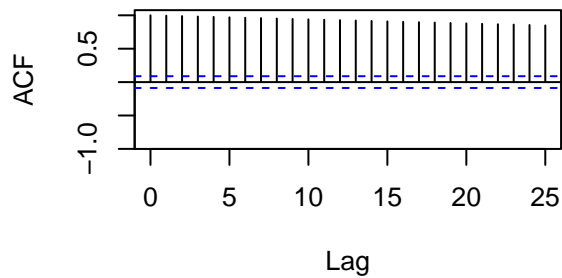
The 10-Year Real Interest Rate is a commonly used economic indicator that reflects the average annual return on investments adjusted for inflation over a 10-year period. The Fred STL dataset tracks the 10-Year Real Interest Rate in the United States, providing valuable insights into the state of the economy and the financial market. The 10-Year Real Interest Rate is an important indicator for investors, policymakers, and economists because it provides a measure of the real cost of borrowing and the expected return on investment. When the 10-Year Real Interest Rate is low, it can stimulate economic growth by making borrowing cheaper and encouraging investment. Conversely, when the 10-Year Real Interest Rate is high, it can restrict economic growth by increasing the cost of borrowing and reducing investment.

```
# read in data set  
int_rate <- read.csv("RIRA10Y.csv")  
  
# rename columns for easier data manipulation  
int_rate <- int_rate %>%  
  rename(INT_RATE_10Y = REAINTRATREARAT10Y)  
  
# convert date to type(date)  
int_rate <- int_rate %>%  
  mutate(DATE = as.Date(DATE, sep = "-", "%Y-%m-%d"))  
str(int_rate)  
  
## 'data.frame':   495 obs. of  2 variables:  
##  $ DATE          : Date, format: "1982-01-01" "1982-02-01" "1982-03-01" ...  
##  $ INT_RATE_10Y: num  7.62 7.66 7.13 7.41 7.32 ...  
  
int.ts <- ts(int_rate$INT_RATE_10Y)  
plot(int.ts)
```

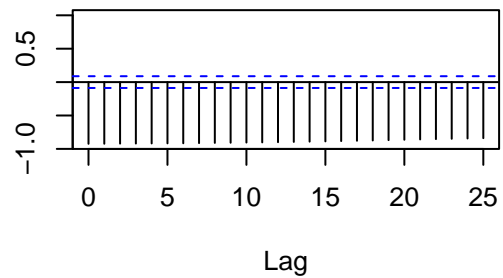


```
int_acf = acf(int_rate, lag.max = 25, type = "correlation", main = "ACF of Project Data")
```

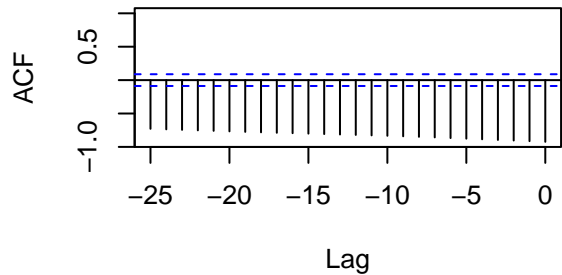
**ACF of Project Data**



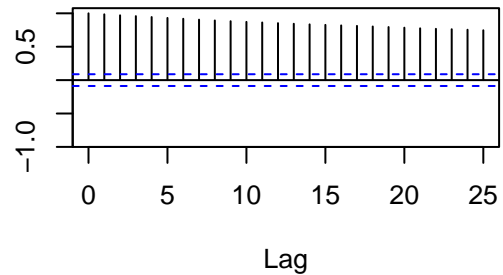
**ACF of Project Data**



**ACF of Project Data**



**ACF of Project Data**



Testing first change 1. Problem definition

2. Data description
3. Data Analysis
4. Model specification and fitting

5. Model validation and diagnostics
6. Forecasting