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Pregunta 19
Colab 22.7:
∞ Examen Final 22.7.ipynb

Github:
https://github.com/juantachnap/Series-de-tiempo

Grok:
https://grok.com/share/bGVnYWN5_df7fb3e9-457e-4abf-bf95-6f8ec556719d

Interpretaciones:
a.Plot the two time series in the same diagram. What do you see?
- La gráfica muestra cómo han cambiado las tasas de interés de los bonos del Tesoro de EE.UU. a 3 y 6 meses desde 1982 hasta 2008. Ambas líneas se mueven casi igual, pero la tasa a 6 meses suele ser un poco más alta. Se ven momentos donde las tasas suben y bajan mucho, especialmente en los años 80 y antes de 2008, cuando hubo una gran caída, probablemente por la crisis financiera. Esto indica cómo el mercado y la política económica han afectado los intereses de estos bonos a lo largo del tiempo.

b. Do a formal unit root analysis to find out if these time series are stationary.

```
Testing TB3M for stationarity (ADF Test):
ADF Statistic: -1.5392
p-value: 0.5140
Critical 1%: -3.4600
Critical 5%: -2.8746
Not Stationary

Testing TB6M for stationarity (ADF Test):
ADF Statistic: -3.7738
p-value: 0.0032
Critical 1%: -3.4589
Critical 5%: -2.8741
Stationary

Testing First Difference of TB3M for stationarity (ADF Test):
ADF Statistic: -5.5734
p-value: 0.0000
Critical 1%: -3.4600
Critical 5%: -2.8746
Stationary
```
-

c. Are the two time series cointegrated? How do you know? Show the necessary calculations.

```
Testing cointegration between TB3M and TB6M:
Cointegration Statistic: -4.7367, p-value: 0.0005
Critical values: [-3.94406143 -3.36247928 -3.06270268]
Cointegrated at 95% confidence
```
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d. What is the economic meaning of cointegration in the present context? If the two

series are not cointegrated, what are the economic implications?
and. If you want to estimate a VAR model, say, with four lags of each variable, do you have to use the first differences of the two series or can you do the analysis in levels of the two series? Justify your answer.

```
(d) Economic Meaning of Cointegration:
If TB3M and TB6M are cointegrated, it implies a stable long-run equilibrium relationship between the 3-month and 6-month Treasury bill rates. Economically,

(e) VAR Model with 4 Lags:
At least one series is non-stationary in levels. For a VAR model with 4 lags, you should use the first differences of the series (e.g., TB3M_diff and TB6M_d
```

```
VAR(4) Model Summary:
  Summary of Regression Results
==================================
Model:                         VAR
Method:                        OLS
Date:             Fri, 14, Mar, 2025
Time:                     18:09:11
--------------------------------------------------------------------------
No. of Equations:         2.00000     BIC:                     -6.53011
Nobs:                     229.000     HQIC:                    -6.69112
Log likelihood:           146.727     FPE:                  0.00111386
AIC:                     -6.80001     Det(Omega_mle):       0.00103121
--------------------------------------------------------------------------
Results for equation TB3M
===========================================================================
                 coefficient       std. error          t-stat           prob
--------------------------------------------------------------------------
const              -0.019220         0.019104          -1.006          0.314
L1.TB3M             0.945965         0.171816           5.506          0.000
L1.TB6M            -0.431363         0.165797          -2.602          0.009
L2.TB3M            -0.271516         0.178881          -1.518          0.129
L2.TB6M             0.112288         0.166918           0.673          0.501
L3.TB3M            -0.065886         0.176981          -0.372          0.710
L3.TB6M             0.150896         0.162251           0.930          0.352
L4.TB3M             0.202583         0.161937           1.251          0.211
L4.TB6M            -0.122669         0.156707          -0.783          0.434
===========================================================================

Results for equation TB6M
===========================================================================
                 coefficient       std. error          t-stat           prob
```