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% ========================== PC Tutorial 03 ============================
clear, clc
%% Part (a)
% ===== Import the dataset:
data = readtable("Exchange_Rates.xlsx"); % readtable
% ===== Construct a sequence of dates
dates = data.Dates;
% ===== Define variables
E_UK = data.E_UK;                    % Define the UK/US nominal exchange rate
E_CH = data.E_CH;                    % Define the CH/US nominal exchange rate
% ===== Plot nominal exchange rate
figure
subplot(2,1,1)
plot(dates,E_UK,'LineWidth',1.5);
title("nominal exchange rate between UK Pound and US dollar")
subplot(2,1,2)
plot(dates,E_CH,'LineWidth',1.5);
title("nominal exchange rate between Chinese Yuan and US dollar")
% ---------------------------------------------------------------------
%% Part (b)
% ===== Re-define the nominal exchange rate of CH/US from 2005Q3
CH_float = find(dates == datetime(2005,07,01));                  % Find date row
that initiates the managed float Chinese system
E_CH     = data.E_CH(CH_float:end,1);                  % Re-define the CH/US
nominal exchange rate
% ===== Compute ADF tests: adftest
var  = log(E_UK);                        % Set variable to compute unit root tests
lags = 8;                          % Maximum lag order
[h_AR,pVal_AR]   = adftest(var,"Model","AR","Lags",1:lags);            % ADF
without intercept and trend
[h_ARD,pVal_ARD] = adftest(var,"Model","ARD","Lags",1:lags);            % ADF with
intercept
[h_TS,pVal_TS]   = adftest(var,"Model","TS","Lags",1:lags);            % ADF with
intercept and trend

% ===| Display results:
results = table((1:lags)',pVal_AR',pVal_ARD',pVal_TS','VariableNames',["Lags",...
    "pval-AR","pval-ARD","pval-TS"]);
disp('Augmented Dickey-Fuller Tests (p-values)')
disp(results)
% ---------------------------------------------------------------------
%% Part (c)
RER_UK   = data.E_UK.*(data.CPI_US./data.CPI_UK);                          %
Define the UK/US real exchange rate
RER_CH   = E_CH.*(data.CPI_US(CH_float:end,1)./
data.CPI_CH(CH_float:end,1));                          % Define the CH/US real
exchange rate
% ===== Plot real exchange rates:
figure
subplot(2,1,1)
```

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plot(dates,RER_UK,'LineWidth',1.5);
title("real exchange rate between UK Pound and US dollar")
subplot(2,1,2)
plot(dates(CH_float:end,1),RER_CH,'LineWidth',1.5);
title("real exchange rate between Chinese Yuan and US dollar")
```