Mohamed Khidher University

Faculty of economics, Commercial   *Specialty: International Commerce & Finance*
and Management Sciences   *Module: Advanced Econometric*
Department of commerce   *Academic year 2023/2024*

Homework

Practical Questions

Suppose you want to study the effect of interest rate and inflation rate on economic growth. You have collected data on these variables covering a period of 40 years as shown in the table below.

- **Interest Rate (int)**: The annual interest rate (%).
- **Inflation Rate (Inf)**: The annual inflation rate (%).
- **Economic Growth (GDP)**: The annual GDP growth rate (%).

1/ Write down the equations that provide the relationship between the variables under the study.

2/ Run a multiple regression using Excel software. (Provide screenshots or outputs of your results).

3/ Based on the regression outputs:

  i) Interpret the relationship between interest rate, inflation rate and economic growth.
  iii) Evaluate the overall fit of the model using R^2 and the F-statistic.

 4/ Using the output of the multiple regression model:
 a) Test for heteroskedasticity in the residuals. Explain the test results.
 b) Check for multicollinearity between. How do you interpret the findings?
 c) check for serial correlation. What does the results suggest?

 d) Now add unemployment rate to the model, Interpret the coefficients
 of **unemployment**.
 ii) Does adding **Unemployment** improve the model significantly? Explain using relevant metrics.

 5/ Based on your findings, what recommendations would you make to policymakers regarding the relationship between inflation, interest rates, and economic growth?

- Creating a dataset spanning 30–40 years requires longitudinal data. Here's a **fictional dataset** covering the years **1985 to 2024** with **Interest Rate**, **Inflation Rate**, and **Economic Growth Rate (GDP growth)** for a hypothetical country:

year	Interest rate %	Inflation rate %	Economic Growth rate%	Unemployment Rate (%)
1985	9.5	3.6	4.0	7,2
1986	8.5	2.5	3.8	6,9
1987	7.8	3.0	4.2	6,7
1988	8.0	4.1	3.6	6,5
1989	9.2	4.5	3.0	6,3
1990	8.5	5.4	2.5	6,8
1991	7.0	4.8	1.8	7,5
1992	6.5	3.1	3.2	7,8
1993	5.7	2.8	2.9	7,6
1994	6.0	2.6	4.0	7,3
1995	6.2	2.8	2.7	7
1996	5.8	2.9	3.6	6,8
1997	5.5	2.3	4.5	6,5
1998	4.8	1.6	4.1	6
1999	5.3	2.2	4.8	5,7
2000	6.2	3.4	4.1	5,5
2001	4.5	2.8	1.0	5,8
2002	3.5	1.6	1.7	6,1
2003	3.1	2.3	2.9	6,2
2004	4.1	2.7	3.8	5,9
2005	4.5	3.4	3.5	5,6
2006	5.2	3.2	2.8	5
2007	4.8	2.8	2.3	4,7
2008	3.0	3.8	-0.1	5,8
2009	0.5	2.5	-2.5	9,3
2010	0.8	1.6	2.6	9,6
2011	1.2	3.2	1.6	8,9
2012	1.0	2.1	2.2	8,1
2013	1.2	1.5	2.5	7,4
2014	1.3	1.6	2.9	6,7
2015	0.8	0.1	2.5	5,7
2016	0.5	1.3	1.6	4,9

2017	1.3	2.1	2.4	4,4
2018	2.5	1.9	3.0	3,9
2019	1.8	1.8	2.2	3,5
2020	0.5	1.2	-3.4	8,1
2021	0.3	4.7	5.7	5,8
2022	1.0	8.0	2.1	4,2
2023	1.5	6.5	1.8	3,7
2024	2.0	5.8	2.3	3,5

Note/ the deadline for submitting homework is December 10, 2024
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