
**KULLIYYAH OF INFORMATION & COMMUNICATION TECHNOLOGY**

**DEPARTMENT OF INFORMATION TECHNOLOGY**

**INFO 4314 BUSINESS DATA ANALYTICS**

**Section 1**

**Semester 2, 2023/2024**

**Group Assignment**

# Analyzing The Impact Of Interest Rates And Inflation On Unemployment For SDG 8

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# Analyzing The Impact Of Interest Rates And Inflation On Unemployment For SDG 8

## Introduction

This report looks at the relationship between unemployment rates, inflation rates (Consumer Price Index - CPI), and lending interest rates (BLR) to help policymakers make decisions that will reduce unemployment and boost economic growth, contributing to Sustainable Development Goal 8 (SDG 8): Decent Work and Economic Growth.

## Data Sources and Preprocessing

The analysis relies on data from three sources:

➢ The World Bank provides inflation statistics (CPI) at https://api.worldbank.org/v2/en/indicator/FP.CPI.TOTL.ZG?downloadformat=excel.

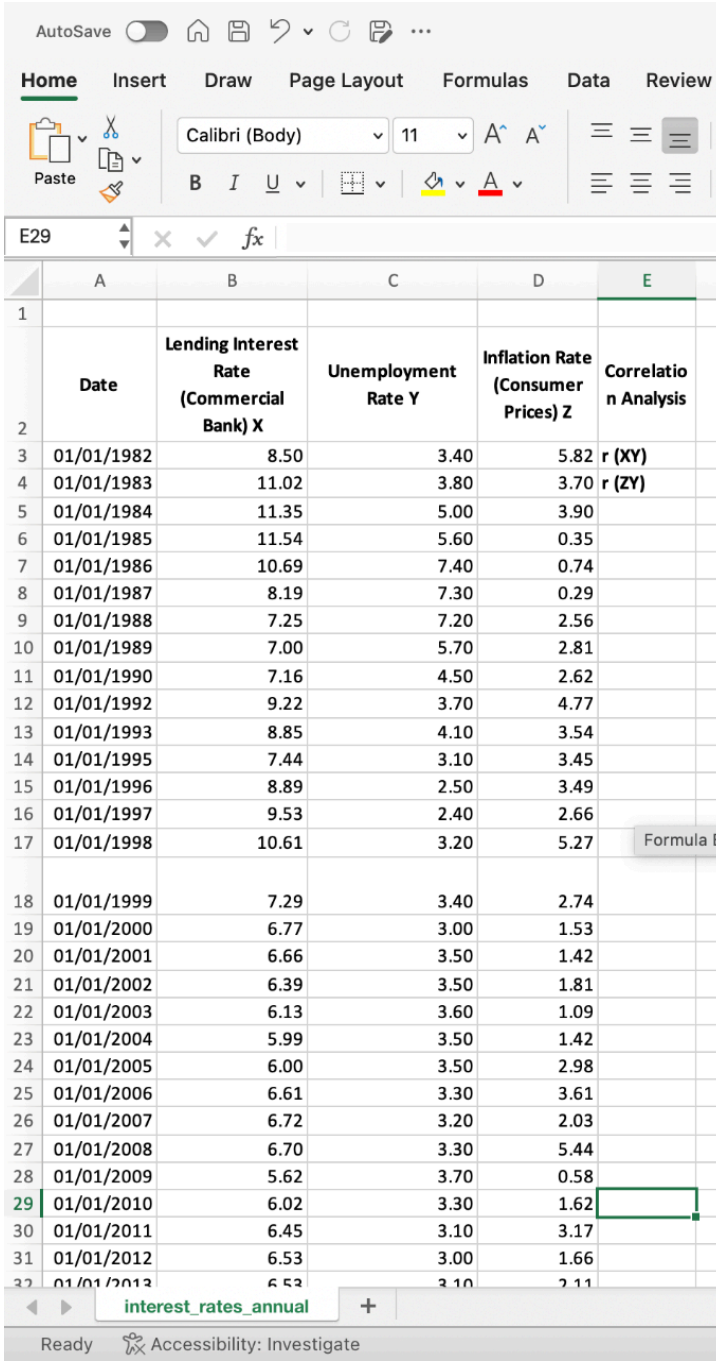
➢ DOSM's Labor Force Survey data (unemployment rate) may be found at https://storage.dosm.gov.my/labour/lfs_year.csv.

➢ Malaysia Open Data: interest rates data (year) - https://storage.data.gov.my/finsector/interest_rates_annual.csv

Data Preprocessing in Excel involves merging datasets. Using Excel tools such as VLOOKUP or INDEX MATCH to combine datasets based on a common identifier (e.g., year) into a single spreadsheet containing the unemployment rate, inflation rate, and BLR for each year.

Handle Missing Data: Develop a plan for dealing with missing data pieces. For example, eliminate rows with missing data or impute missing values using Excel's statistical methods (for example, the AVERAGE or MEDIAN functions).

Formatting: Using Excel's formatting options, ensure that all variables (unemployment rate, inflation rate, and BLR) have consistent units and formatting (for example, two decimal places).




| | A | B | C | D | E |
|---|---|---|---|---|---|
| 1 | | | | | |
| 2 | Date | Lending Interest Rate (Commercial Bank) X | Unemployment Rate Y | Inflation Rate (Consumer Prices) Z | Correlation Analysis |
| 3 | 01/01/1982 | 8.50 | 3.40 | 5.82 | r (XY) |
| 4 | 01/01/1983 | 11.02 | 3.80 | 3.70 | r (ZY) |
| 5 | 01/01/1984 | 11.35 | 5.00 | 3.90 | |
| 6 | 01/01/1985 | 11.54 | 5.60 | 0.35 | |
| 7 | 01/01/1986 | 10.69 | 7.40 | 0.74 | |
| 8 | 01/01/1987 | 8.19 | 7.30 | 0.29 | |
| 9 | 01/01/1988 | 7.25 | 7.20 | 2.56 | |
| 10 | 01/01/1989 | 7.00 | 5.70 | 2.81 | |
| 11 | 01/01/1990 | 7.16 | 4.50 | 2.62 | |
| 12 | 01/01/1992 | 9.22 | 3.70 | 4.77 | |
| 13 | 01/01/1993 | 8.85 | 4.10 | 3.54 | |
| 14 | 01/01/1995 | 7.44 | 3.10 | 3.45 | |
| 15 | 01/01/1996 | 8.89 | 2.50 | 3.49 | |
| 16 | 01/01/1997 | 9.53 | 2.40 | 2.66 | |
| 17 | 01/01/1998 | 10.61 | 3.20 | 5.27 | |
| 18 | 01/01/1999 | 7.29 | 3.40 | 2.74 | |
| 19 | 01/01/2000 | 6.77 | 3.00 | 1.53 | |
| 20 | 01/01/2001 | 6.66 | 3.50 | 1.42 | |
| 21 | 01/01/2002 | 6.39 | 3.50 | 1.81 | |
| 22 | 01/01/2003 | 6.13 | 3.60 | 1.09 | |
| 23 | 01/01/2004 | 5.99 | 3.50 | 1.42 | |
| 24 | 01/01/2005 | 6.00 | 3.50 | 2.98 | |
| 25 | 01/01/2006 | 6.61 | 3.30 | 3.61 | |
| 26 | 01/01/2007 | 6.72 | 3.20 | 2.03 | |
| 27 | 01/01/2008 | 6.70 | 3.30 | 5.44 | |
| 28 | 01/01/2009 | 5.62 | 3.70 | 0.58 | |
| 29 | 01/01/2010 | 6.02 | 3.30 | 1.62 | |
| 30 | 01/01/2011 | 6.45 | 3.10 | 3.17 | |
| 31 | 01/01/2012 | 6.53 | 3.00 | 1.66 | |

**Analysis Techniques**

Descriptive Statistics: Excel's built-in functions like MEAN, MODE, STANDARD DEVIATION, and other chart formats was used to analyze

Predictive modelling: Additionally used simple linear regression models to investigate the link between the unemployment rate (dependent variable) and a single independent variable (such as inflation or interest rate). This provides a rudimentary knowledge of how changes in a given economic factor may affect unemployment. And developed multiple regression models to analyze the combined influence of multiple independent variables (e.g., inflation rate, interest rate, government spending) on unemployment rate. This provides a more comprehensive understanding of the complex factors affecting unemployment and how policy adjustments can be tailored to achieve desired outcomes.

**Visualization**

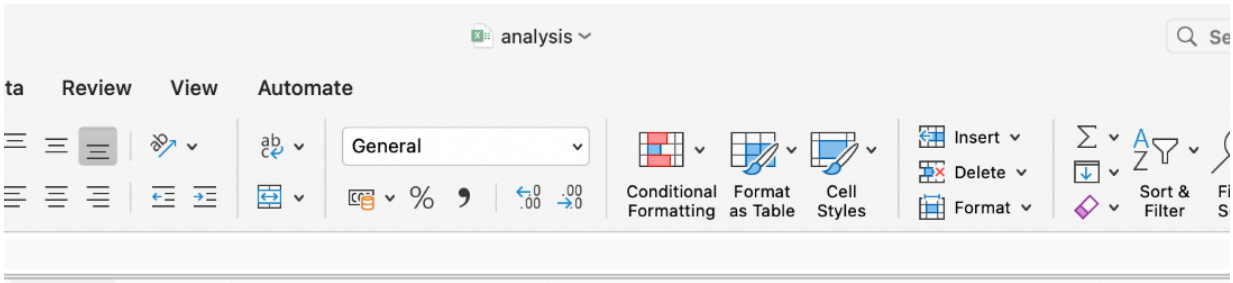
Scatter graphs: In Excel, create scatter graphs to show the relationship between the unemployment rate and the inflation rate, as well as the unemployment rate and the BLR.
Line Graphs: Use line graphs to visualize these variables over time (years) and find trends.
Heatmaps: Use a separate tool (e.g., online heatmap generators) to show the correlation matrix, emphasizing the strength and direction of correlations between variables.

**Discussion and Policy Implications**

This analysis should consider the limitations of data and the chosen approach (descriptive statistics and visualization) to determine whether the findings on the relationship between unemployment rate, inflation rate, and BLR support or challenge the Phillips Curve theory (negative correlation between unemployment and inflation or interest rates).
How regulating interest rates and inflation, based on observable links, could help to lower unemployment and economic growth, in line with SDG 8.
The limitations of utilizing merely descriptive statistics, as well as the possible benefits of using more complex approaches, such as regression analysis (discussed previously), to gain a more thorough knowledge of the relationships.

**Explanation of Choices**

Focus on Excel: Because Excel is so widely available, this research expects that it will be used for data manipulation and visualization.
Descriptive Statistics: Given the emphasis on Excel, this paper focuses on descriptive statistics that are readily available in Excel. However, it acknowledges the potential for more complex techniques, such as regression analysis, to provide deeper insights.

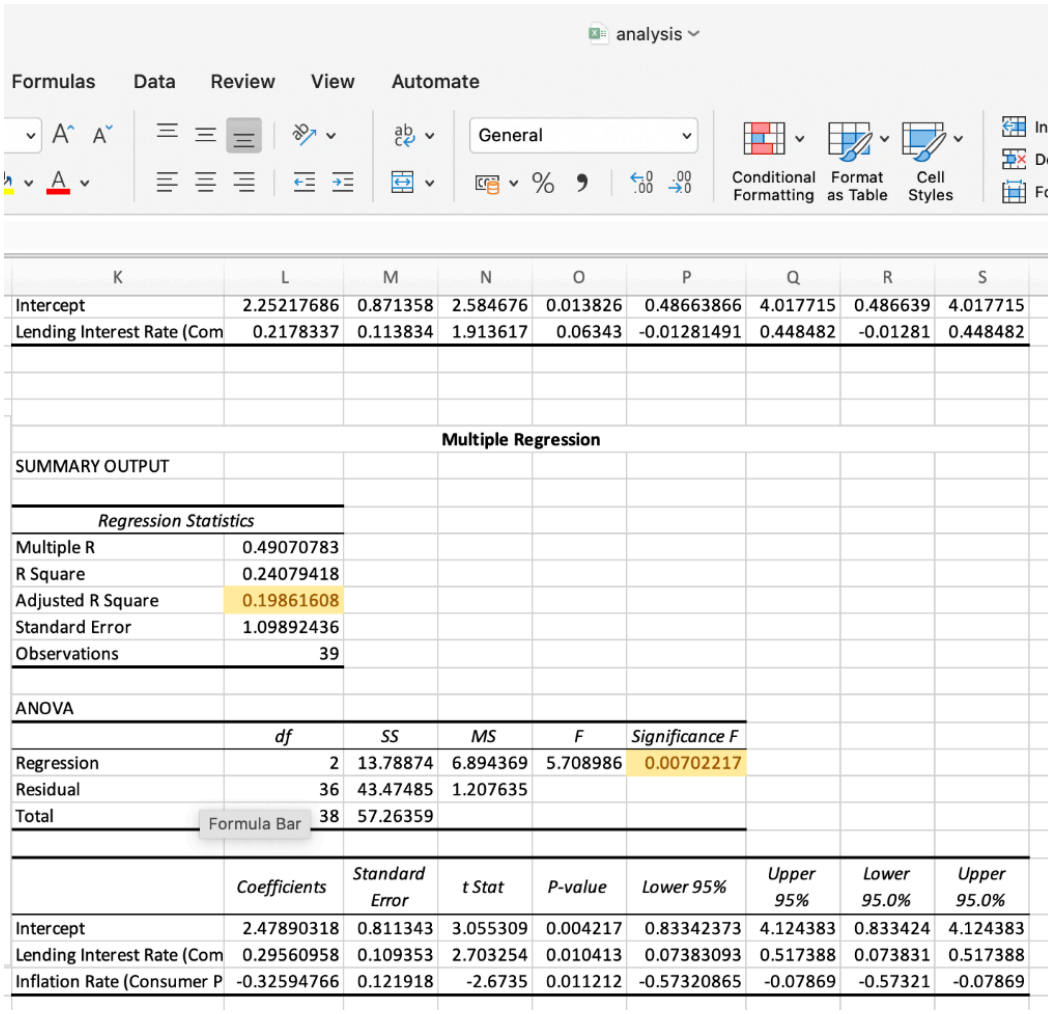



| E | F | G | H | I | J |
|---|---|---|---|---|---|
| | | **Descriptive Statistics** | | | |
| **Correlation Analysis** | | **Central Tendency** | | **Dispersion** | |
| **r (XY)** | 0.30 | Mean(Unemployment Rate) | 3.88 | Standard Deviation(Unemployment Rate) | 1.23 |
| **r (ZY)** | -0.29 | Mean(Lending Interest Rate) | 7.47 | Standard Deviation(Lending Interest Rate) | 1.69 |
| | | Mode(Unemployment Rate) | 3.3 | Standard Deviation(Inflation Rate) | 1.52 |
| | | Mode(Lending Interest Rate) | 6.53 | | |
| | | Mean(Inflation Rate) | 2.48 | | |

Predictive modeling: The application of predictive modeling techniques like simple linear regression and multiple regression emphasizes objectives of the project. By incorporating these models, the application goes beyond basic data visualization and allows users to explore the potential impact of policy changes on unemployment rates.

| J | K | L | M | N | O | P | Q | R | S | T |
|---|---|---|---|---|---|---|---|---|---|---|
| | **Predictive Modeling** | | | | | | | | | |
| | **Simple Linear Regression** | | | | | | | | | |
| 1.23 | SUMMARY OUTPUT | | | | | | | | | |
| 1.69 | | | | | | | | | | |
| 1.52 | *Regression Statistics* | | | | | | | | | |
| | Multiple R | 0.30009651 | | | | | | | | |
| | R Square | 0.09005791 | | | | | | | | |
| | Adjusted R Square | 0.06546488 | | | | | | | | |
| | Standard Error | 1.1867119 | | | | | | | | |
| | Observations | 39 | | | | | | | | |
| | | | | | | | | | | |
| | ANOVA | | | | | | | | | |
| | | *df* | *SS* | *MS* | *F* | *Significance F* | | | | |
| | Regression | 1 | 5.157039 | 5.157039 | 3.661928 | 0.06342973 | | | | |
| | Residual | 37 | 52.10655 | 1.408285 | | | | | | |
| | Total | 38 | 57.26359 | | | | | | | |
| | | | | | | | | | | |
| | | *Coefficients* | *Standard Error* | *t Stat* | *P-value* | *Lower 95%* | *Upper 95%* | *Lower 95.0%* | *Upper 95.0%* | |
| | Intercept | 2.25217686 | 0.871358 | 2.584676 | 0.013826 | 0.48663866 | 4.017715 | 0.486639 | 4.017715 | |
| | Lending Interest Rate (Com | 0.2178337 | 0.113834 | 1.913617 | 0.06343 | -0.01281491 | 0.448482 | -0.01281 | 0.448482 | |
| 0 | 7.00 | | | | | | | | | |

Formula Bar




| | K | L | M | N | O | P | Q | R | S |
|---|---|---|---|---|---|---|---|---|---|
| | Intercept | 2.25217686 | 0.871358 | 2.584676 | 0.013826 | 0.48663866 | 4.017715 | 0.486639 | 4.017715 |
| | Lending Interest Rate (Com | 0.2178337 | 0.113834 | 1.913617 | 0.06343 | -0.01281491 | 0.448482 | -0.01281 | 0.448482 |

**Multiple Regression**

SUMMARY OUTPUT

| *Regression Statistics* | |
|---|---|
| Multiple R | 0.49070783 |
| R Square | 0.24079418 |
| Adjusted R Square | 0.19861608 |
| Standard Error | 1.09892436 |
| Observations | 39 |

ANOVA

| | *df* | *SS* | *MS* | *F* | *Significance F* |
|---|---|---|---|---|---|
| Regression | 2 | 13.78874 | 6.894369 | 5.708986 | 0.00702217 |
| Residual | 36 | 43.47485 | 1.207635 | | |
| Total | 38 | 57.26359 | | | |

Formula Bar

| | *Coefficients* | *Standard Error* | *t Stat* | *P-value* | *Lower 95%* | *Upper 95%* | *Lower 95.0%* | *Upper 95.0%* |
|---|---|---|---|---|---|---|---|---|
| Intercept | 2.47890318 | 0.811343 | 3.055309 | 0.004217 | 0.83342373 | 4.124383 | 0.833424 | 4.124383 |
| Lending Interest Rate (Com | 0.29560958 | 0.109353 | 2.703254 | 0.010413 | 0.07383093 | 0.517388 | 0.073831 | 0.517388 |
| Inflation Rate (Consumer P | -0.32594766 | 0.121918 | -2.6735 | 0.011212 | -0.57320865 | -0.07869 | -0.57321 | -0.07869 |

## Conclusion

This paper provides policymakers with preliminary insights on the relationship between unemployment, inflation, and interest rates. Further analysis utilizing advanced methodologies could provide a more comprehensive picture of how economic policies can help achieve SDG 8: Decent Work and Economic Growth. Using advanced modelling approaches to provide deeper insights and integrating data on job markets and disaggregated unemployment rates are some recommendations and potential solutions. Wider adoption and long-term sustainability can also be ensured by supporting open-source principles, improving user experience with interactive maps, and providing collaborative tools.

## Website

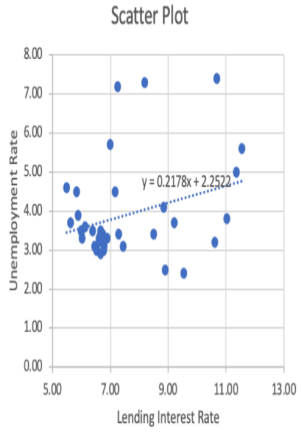
WorkSage

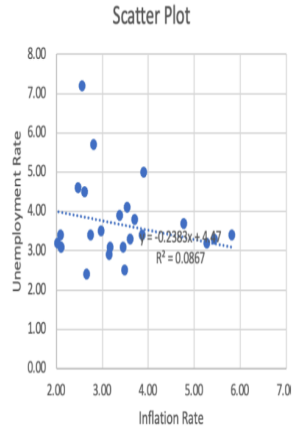

### OVERVIEW

This data-driven platform empowers policymakers and researchers to analyze unemployment trends, predict the impact of policies, and work towards achieving SDG 8.

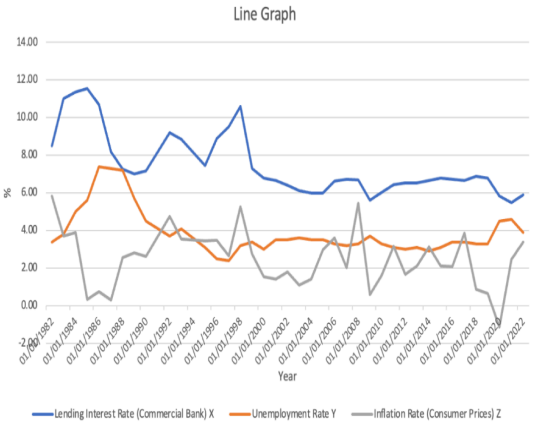
Explore the Data And Start Analyzing!

### EXPLORE DATA



Careful management of interest rates and inflation can help in achieving lower unemployment rates. Policies that aim to stimulate economic growth by managing these economic indicators can contribute to achieving SDG




**EXPLORE THE APPLICATION AND GET MORE ACCESS TO DATA**

# BENEFITS

**Informed Decisions:** Gain data-driven insights for policymaking
**Improved Understanding:** Analyze unemployment dynamics and identify trends
**Free & Accessible:** Explore data and tools at your fingertips

**LEARN MORE...**

**Data & Methodology:** Explore data sources and statistical models (optional)
**Visualizations & Analysis:** See examples of interactive data exploration
**News & Resources:** Stay updated on SDG 8 and labor market trends

**CONTACT US:**

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**Link:** https://sites.google.com/view/worksage/home