Analysing the Effect of Longitude and Latitude on European Inflation Dynamics

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Motivation & Aim

- Inflation can stimulate economic growth but has limitations. [1]
- Rising prices reduce purchasing power, disproportionately affecting wage earners. [1]
- Understanding drivers of inflation is crucial.

- **We focus on whether geographic coordinates (longitude, latitude) influence inflation rates in Europe.**

[1] "The Effect of Inflation on Economic Development" (1963)

Data

- Inflation data: *OECD dataset* (29 European countries, Dec. 2005 – Sep. 2024).
  - Removed missing time periods for consistency.
- Geographic data: Google's *countries.csv*, filtered for European countries.

Methodology

- Longitude-latitude
  - Use centroid-based longitude and latitude for each European country.
- Model
  - Linear regressions on inflation using longitude, latitude, and both.

- **Goal: Identify any measurable geographic influence on inflation.**

Results Latitude regression

	Coefficient	Std. Error	P-Value
Intercept	7.108	4.0227	0.0885
latitude	-0.0767	0.0791	0.3413
R-squared	0.043		
F-Statistic probability	0.341		

- The results of the latitude regression are not statistically significant

Results Longitude Regression

	Coefficient	Std. Error	P-Value
Intercept	1.9919	0.7193	0.0100
longitude	0.1061	0.0424	0.0187
R-squared	0.188		
F-Statistic probability	0.0188		

- The results of the longitude regression are statistically significant at the 5% significance level
- This indicates a positive correlation between the degree of longitude and the mean inflation rate
- Simplified this means moving more to the east results in a higher inflation rate

Results of combined regression

	Coefficient	Std. Error	P-Value
Intercept	4.8368	3.8383	0.2188
latitude	-0.0556	0.0737	0.4571
longitude	0.1022	0.0430	0.0253
R-squared	0.205		
F-Statistic Probability	0.0503		

- Similar results to the univariate regressions
- Latitude remains statistically insignificant
- Longitude remains statistically significant

Discussion

- Latitude
  - There seems to be no north-south effect
- Longitude
  - Mean inflation rates seem to increase moving eastward
- R-squared
  - The R-squared of the combined regression is 20.5%
  - This suggests only limited explanatory power of the model

- Limitations
  - Longitude data seems to be heavily influenced by Turkey, which lies is one of the most eastern countries and has a high inflation rate
  - The low R-squared value suggests that more factors should be included to model inflation effectively

References I

 "The Effect of Inflation on Economic Development" (1963). In: *IMF Staff Papers* 1963(001), A001.