

Investigating Relationships Between Nations' Inflation Rates

A DS4002 Case Study by Miranda Khoury

Economic trends play a crucial role in everyday life for people all around the world, especially as the world becomes increasingly globalized. Savvy citizens can gain much benefit from observing trends in their country's economic factors such as inflation rates and the purchasing power of their country's national currency; for instance, knowing economic trends can help one make wise investments and prepare for oncoming financial crises. But it's not just one's own country that people need to look out for; because of global trade, the economic health of one country can play a direct impact on economic factors in other countries.

As a person living and working in the United States, you are tasked with investigating the relationship between the US's economic trends and those of its two closest trading partners, Canada and Mexico. In doing so, you will reveal economic relationships that will aid you and others make smart financial decisions. In particular, you will analyze time series data of annual inflation rates and purchasing power parities (PPP) for the US, Canada, and Mexico using two techniques: Granger causality analysis and autoregressive integrated moving average (ARIMA) modeling.

Granger causality allows researchers to answer "Does time series X forecast time series Y?" and will be used in this project to determine whether the various time series studied affect each other. ARIMA is a modeling approach that allows researchers to predict future values of time series. By using both analysis types in this project, you will be able to reveal more information about the relationships between economics in the US, Canada, and Mexico and provide useful insights to yourself and your peers for making financial decisions.

Deliverable:

First, you will conduct exploratory data analysis to understand the properties of the six time series you will be working with. Then, you are tasked with employing Granger causality analysis and ARIMA. Your goal is to answer three research questions using Granger causality analysis: 1) Can PPP be used to predict inflation or vice versa? 2) Can one country's inflation rate changes predict inflation rate changes in another country? 3) Can one country's PPP changes predict changes in another country's PPP? Additionally, you will use ARIMA to develop forecasts of each country's annual inflation rate and PPP.