Title

Inflation Dynamics in Selected European Economies (2020–2024)

Abstract

This paper examines inflation dynamics in selected European economies—Germany, France, Italy, Switzerland, Czechia, Spain, and the Netherlands—over the period 2020–2024. Using descriptive statistics and data visualization techniques, the study analyzes inflation trends, cross-country differences, distributional properties, and volatility during a period characterized by major economic shocks. The results show a pronounced inflation surge after 2022, accompanied by increased dispersion and volatility across countries. Switzerland exhibits comparatively lower inflation levels, while Germany, Italy, and Czechia display higher variability. The findings highlight the importance of comparative descriptive analysis in understanding recent European inflation dynamics.

Introduction

The period from 2020 to 2024 represents an exceptional phase in recent European economic history, marked by the COVID-19 pandemic, supply-chain disruptions, and a subsequent inflation surge beginning in 2022. Understanding inflation behavior during this period is essential for evaluating macroeconomic stability and policy challenges across European economies. This study provides a comparative analysis of inflation dynamics in Germany, France, Italy, Switzerland, Czechia, Spain, and the Netherlands. By focusing on these countries, the analysis captures both core and peripheral European economies with heterogeneous inflation experiences. The objective of the paper is to examine inflation trends, cross-country differences, and volatility patterns using descriptive statistics and visualization methods. Rather than applying complex econometric models, the study emphasizes transparency and interpretability through data-driven visual analysis.
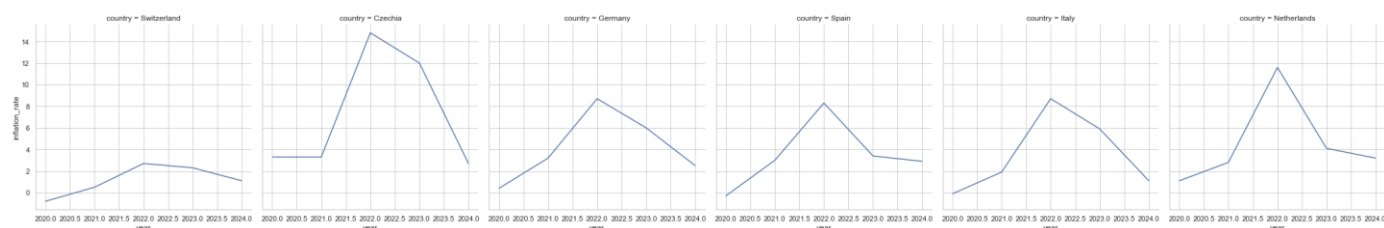
Data and Methodology

The dataset consists of annual inflation rates for seven European countries covering the period 2020–2024. Inflation rates are measured on a year-over-year basis. The analysis employs descriptive statistics, including mean inflation and standard deviation, to assess average inflation levels and volatility across countries. Several visualization techniques are used to capture different dimensions of the data. Line plots illustrate inflation trends over time, box plots examine the distribution of inflation rates across years, and bar charts compare inflation volatility between countries. All data processing and visualizations were conducted using Python, with Pandas for data manipulation and Seaborn for graphical analysis. This study was conducted as an independent self-initiated project and does not form part of any supervised coursework.
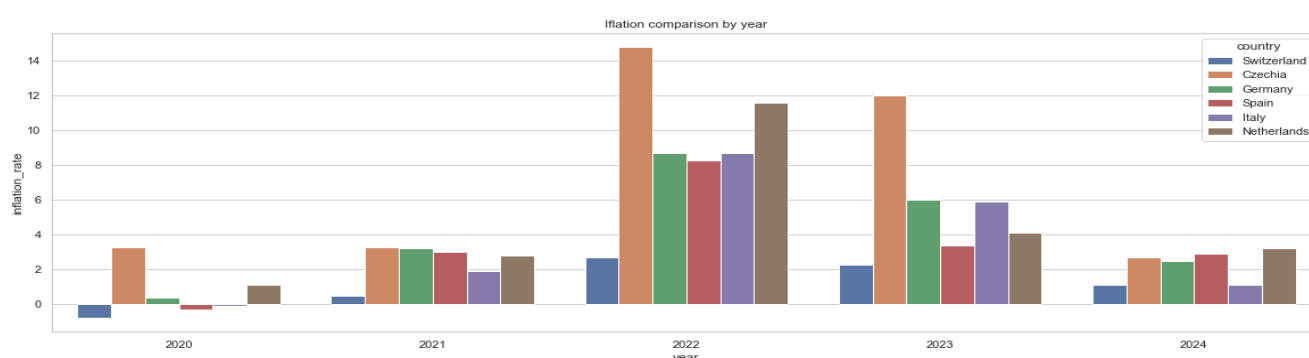
Results

Inflation Trends Over Time

Figure 1 illustrates inflation trends across countries. Inflation remained relatively subdued during 2020 and 2021, followed by a sharp increase after 2022. This pattern reflects a common inflationary shock across Europe. However, the magnitude of the increase differs substantially across countries. Czechia and Germany experienced particularly strong inflation surges, while Switzerland maintained comparatively lower inflation throughout the period.
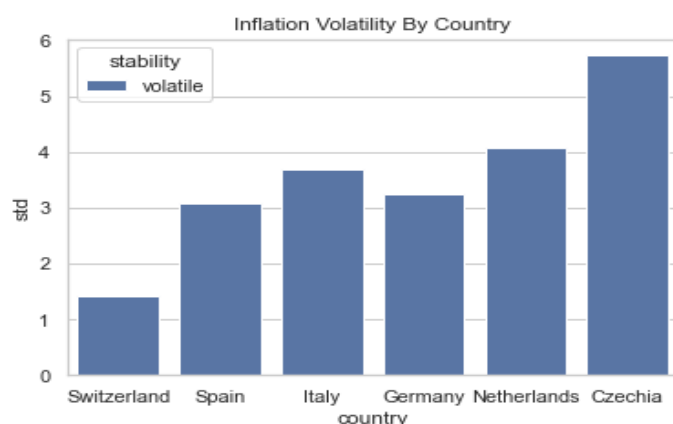
Distribution of Inflation Rates

Figure 2 presents the distribution of inflation rates by year. The results indicate a clear increase in dispersion after 2022, as reflected in wider interquartile ranges and the presence of outliers. This suggests rising inflation uncertainty and growing divergence across European countries during the post-2022 period.

Inflation Volatility Across Countries

Inflation volatility is assessed using the standard deviation of inflation rates over the sample period. As shown in Table 1 and Figure 3, Czechia, Italy, and Germany exhibit the highest inflation volatility, while Switzerland records the lowest mean inflation and relatively lower variability. These findings highlight substantial cross-country differences in inflation stability within Europe.

country	min	mean	std	max	stability
Switzerland	-0.8	1.16	1.41	2.7	volatile
Spain	-0.3	3.46	3.09	8.3	volatile
Italy	-0.1	3.50	3.68	8.7	volatile
Germany	0.4	4.16	3.23	8.7	volatile
Netherlands	1.1	4.56	4.08	11.6	volatile
Czechia	2.7	7.22	5.73	14.8	volatile

Conclusion

The analysis shows that inflation dynamics in Europe between 2020 and 2024 were strongly shaped by major economic shocks, particularly after 2022. While all countries experienced higher inflation, the degree of volatility and dispersion varied considerably. Switzerland appears relatively resilient, whereas several other economies faced pronounced inflation instability. This study demonstrates the usefulness of descriptive statistics and visualization techniques for analyzing macroeconomic developments and provides a solid foundation for graduate-level economics research.