# Unemployment Ratio in the Americas Based on Population Growth (2020–2023)

**Course:** Methods of Advanced Data Engineering

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# Introduction

Unemployment Ratio in the Americas Based on Population Growth (2020–2023)

**Population growth**

Steady inceases observed despite the pendemic

**Unemployment growth**

Despite economic challegenge population growth continued in several states.

**Regional Disparities**

A detailed analysis of population growth and unemployment ratios, highlighting state-level disparities and recovery patterns from 2020 to 2023.

## Description of the scenario

The study relies on data from two trusted government sources to examine these trends and their interplay, providing insights into how population dynamics and unemployment shaped recovery efforts.

**Population Data:**
Annual Population Estimates for U.S. States and Regions (2020–2023) from U.S. Census Bureau. This dataset includes annual population estimates for all U.S. states and regions from 2020 to 2023. It provides insights into demographic changes and trends across geographic areas in the United States.

**Unemployment Data:**
Sourced from the U.S. Department of Labor and Iowa State University, this dataset contains annual unemployment rates for U.S. states during the same period. It provides a foundation for understanding the complex interplay between economic and demographic factors during one of the most challenging periods in recent history.

To analyze how rapid population growth influences unemployment rates across multiple U.S. states and assess the socioeconomic impacts of these changes.
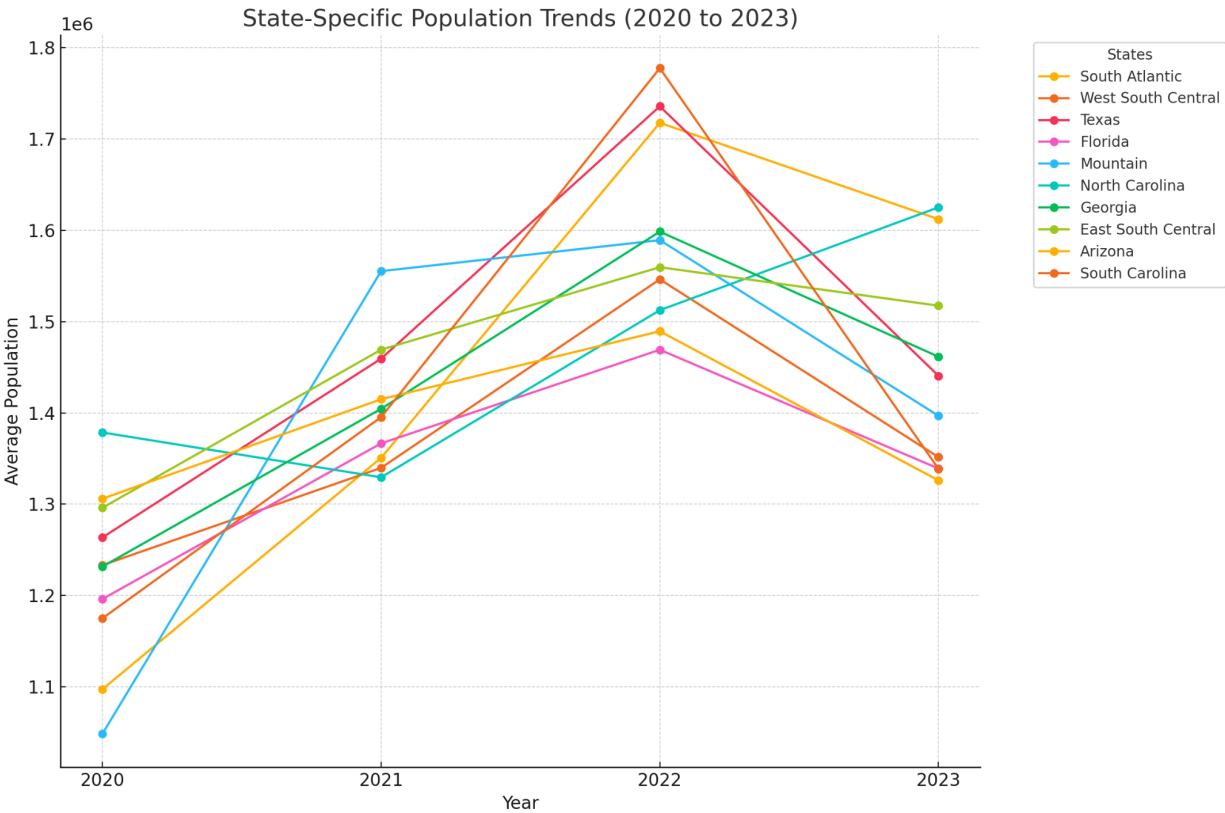
### Key Focus Areas:

1. Identifying trends in population growth and their correlation with unemployment rates.

2. Evaluating the extent of impact on different states based on population and employment data.

3. Providing insights into the economic and demographic interplay driving these change

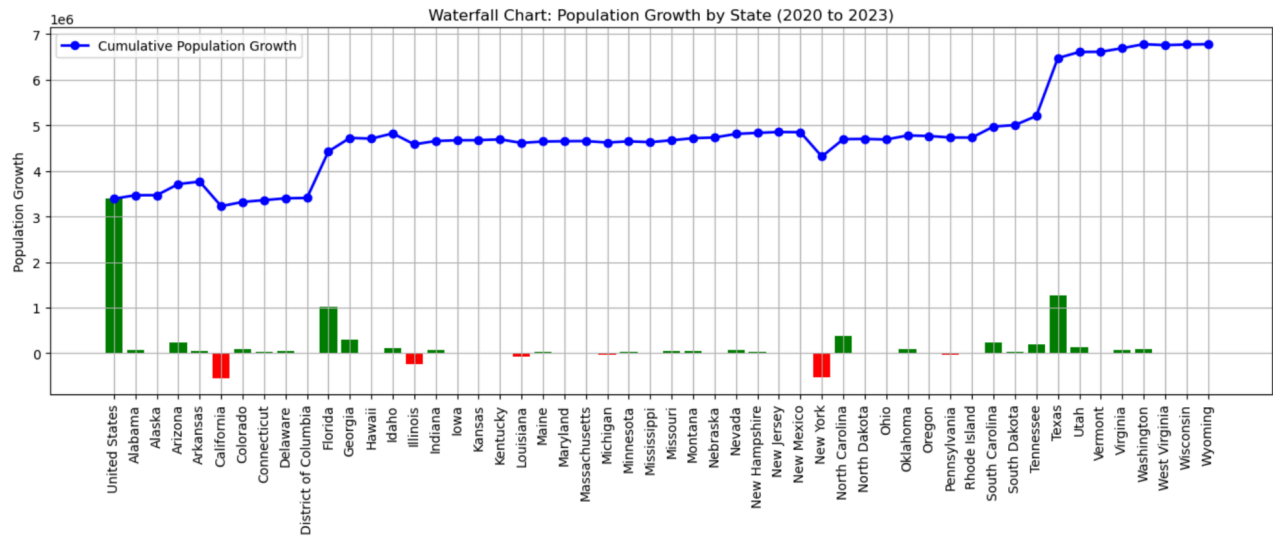## Population Growth Trends Across All U.S. States (2020–2023)

### Top 10 States By Population Growth (2020-2023)

|    | State | 2020 | 2021 | 2022 | 2023 |
|----|-------|------|------|------|------|
| 1 | South Atlantic | 66174797 | 66673601 | 67445114 | 68225883 |
| 2 | West South Central | 40865965 | 41208410 | 41683546 | 42198606 |
| 3 | Texas | 29234361 | 29561286 | 30029848 | 30503301 |
| 4 | Florida | 21591299 | 21830708 | 22245521 | 22610726 |
| 5 | Mountain | 25004426 | 25277400 | 25522359 | 25716830 |
| 6 | North Carolina | 10453812 | 10567100 | 10695965 | 10835491 |
| 7 | Georgia | 10732390 | 10790385 | 10913150 | 11029227 |
| 8 | East South Central | 19424519 | 19471271 | 19573370 | 19700801 |
| 9 | Arizona | 7186683 | 7272487 | 7365684 | 7431344 |
| 10 | South Carolina | 5132151 | 5193848 | 5282955 | 5373555 |



State-Specific Population Trends (2020 to 2023)

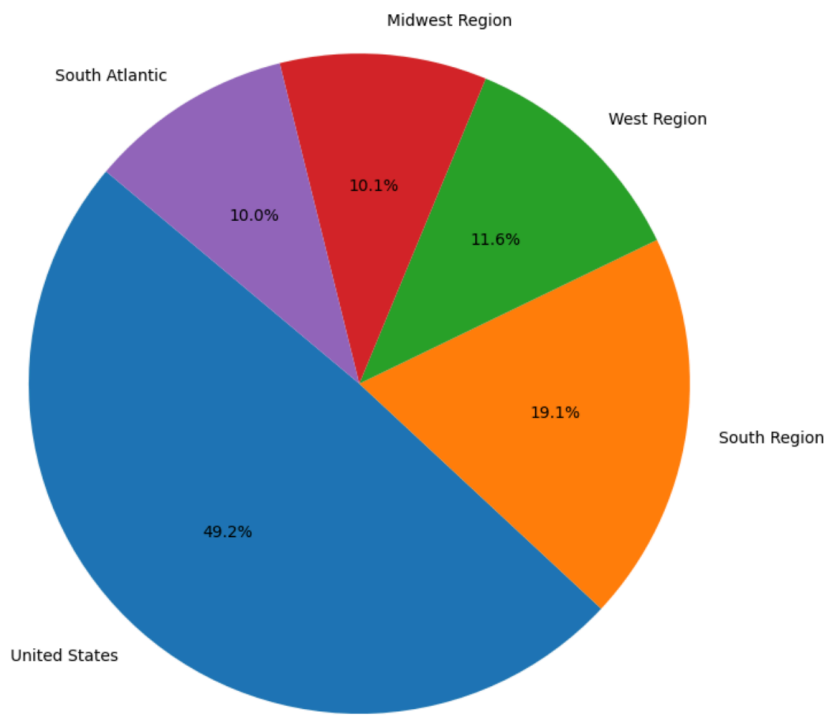# Population Growth Trends Across All U.S. States (2020–2023)


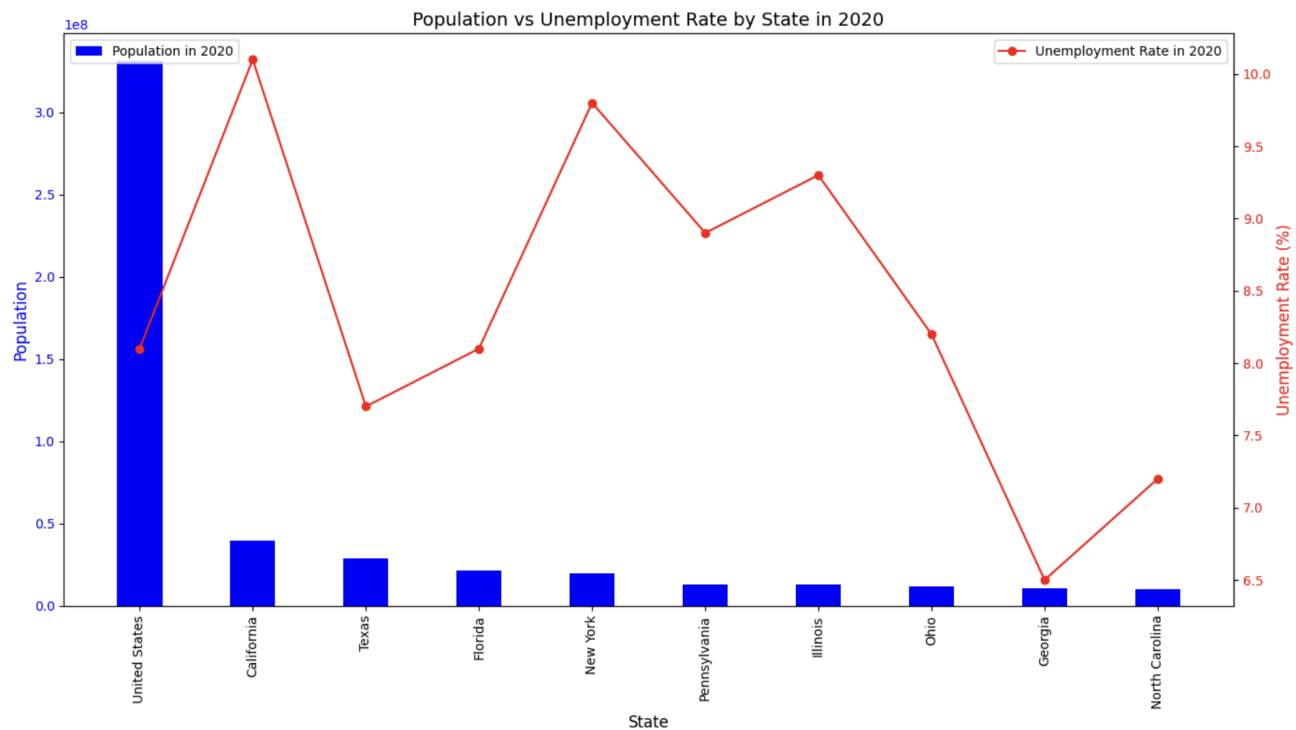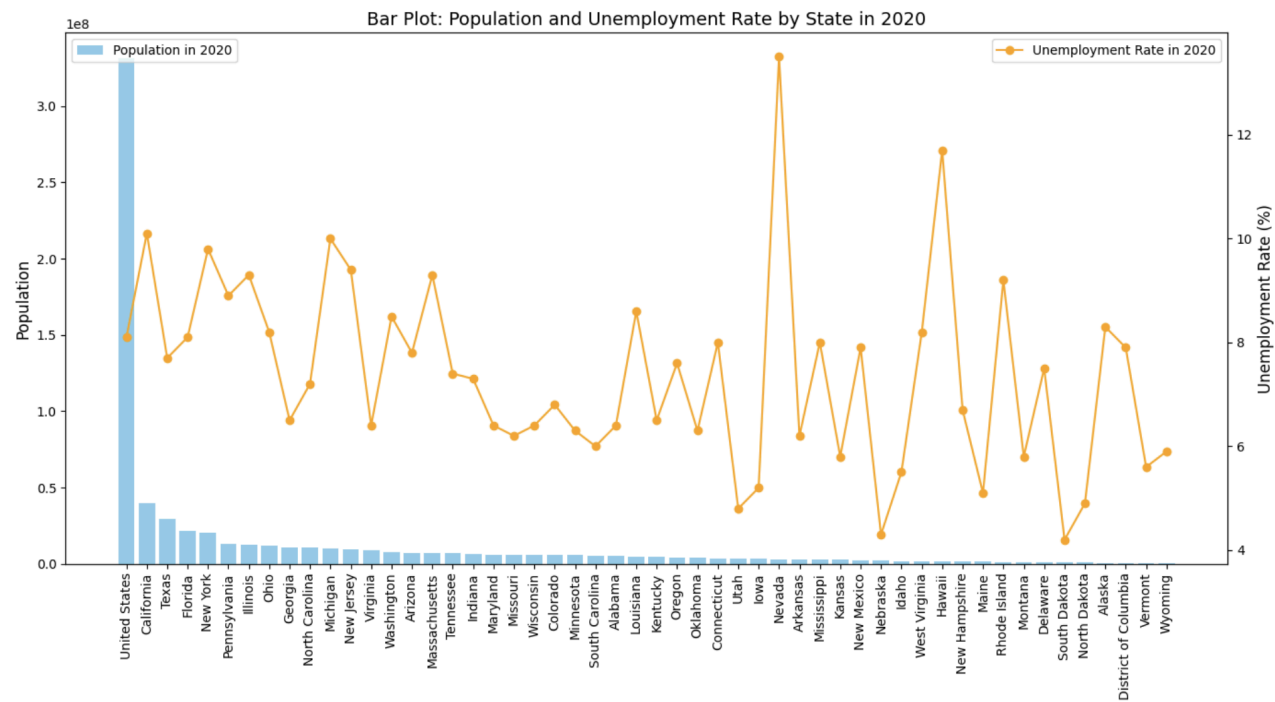Waterfall Chart: Population Growth by State (2020 to 2023)

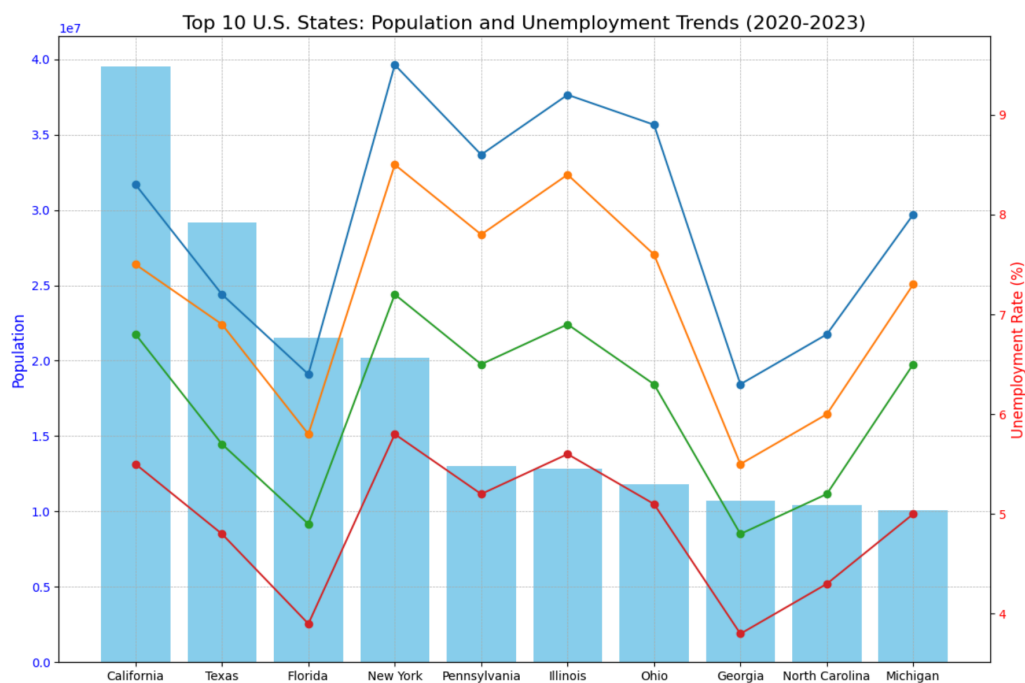
Population Distribution Among Top 5 States (2023)

## Population and Unemployment Growth Trends(2020)



Bar Plot: Population and Unemployment Rate by State in 2020



Population vs Unemployment Rate by State in 2020

# Population and Unemployment Growth Trends (2020 to 2023)



Population Trends and Average Unemployment Rate by State (2020-2023)



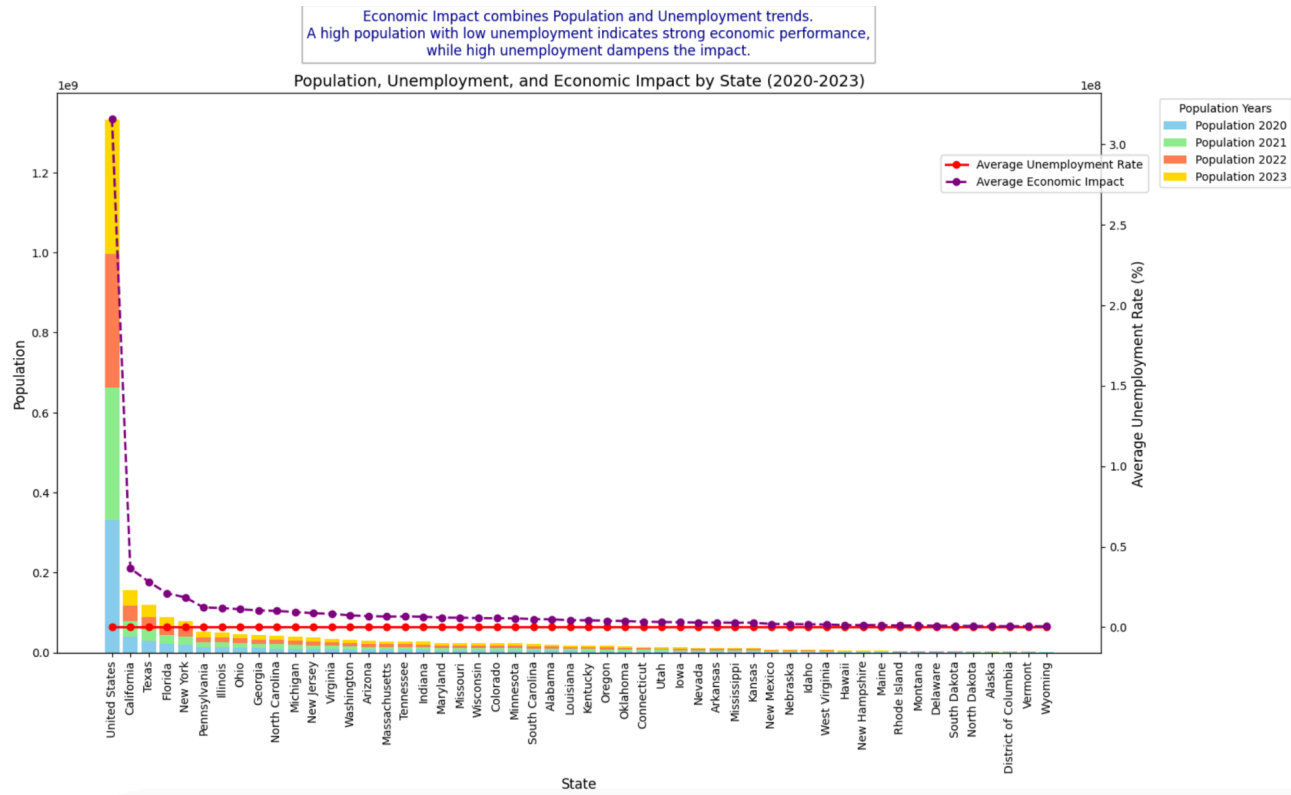Top 10 U.S. States: Population and Unemployment Trends (2020-2023)
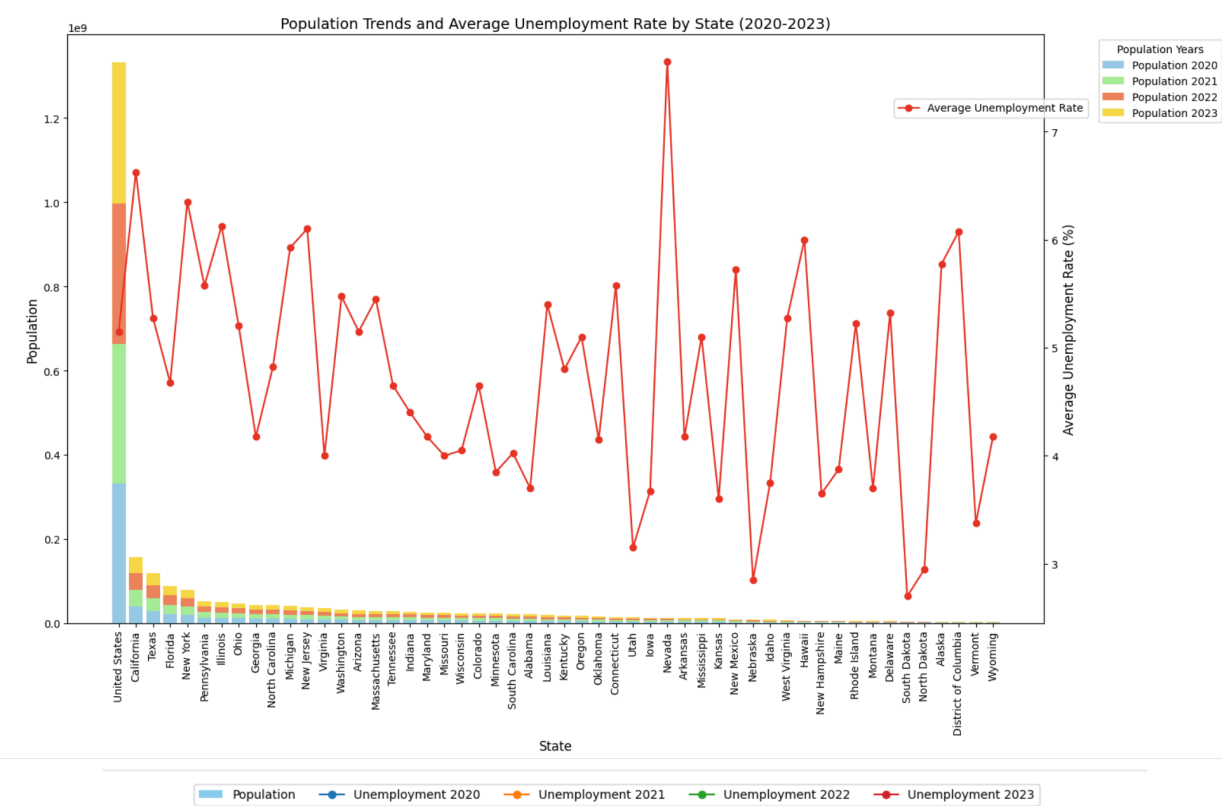
# Economic impact of population and unemployment trends.

Economic Impact combines Population and Unemployment trends.
A high population with low unemployment indicates strong economic performance,
while high unemployment dampens the impact.



Population, Unemployment, and Economic Impact by State (2020-2023)



Population Growth (%) (2020-2023)



Unemployment Growth (%) (2020-2023)



Economic Impact (%) (2020-2023)
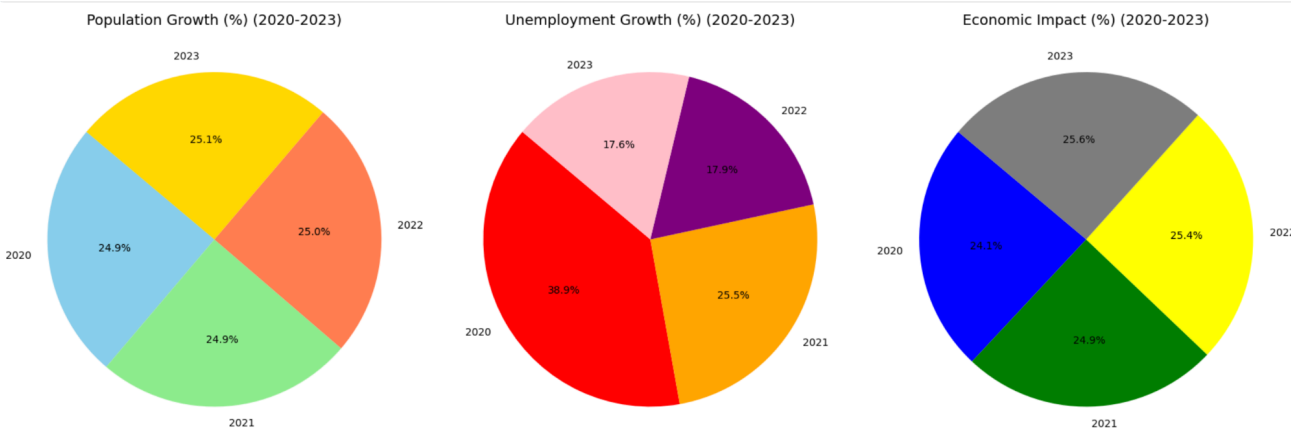
## Methodology

The analysis utilized population data (CSV) and unemployment data (Excel) for all 50 U.S. states from 2020 to 2023. The data processing and analysis were conducted in Jupyter Notebook using Python. Key tools and libraries included:

- **Pandas:** For data cleaning and manipulation.

- **Matplotlib:** For creating visualizations such as bar charts, line graphs, and combined visuals.

- **SQLite3:** For storing and managing cleaned data efficiently.

The study focused on trends across all states, with particular emphasis on the top 10 states by population and their unemployment recovery patterns. Visualizations were used to highlight key insights and trends effectively.

## Limitations and Future Work

**Limitations:**

1. The analysis focuses only on 50 U.S. states, excluding territories and other regions.

2. Data is annual (2020–2023) and lacks finer time intervals like monthly or quarterly trends.

3. Key factors such as GDP, migration patterns, and industry-specific impacts are not included.

4. Regional policies and pandemic-specific effects were not explicitly analyzed.

5. Social and infrastructure factors, like healthcare and education, were not considered.

**Future Work:**

1. Incorporate additional datasets (e.g., GDP, migration, healthcare) for a more comprehensive analysis.

2. Include data from U.S. territories to broaden the scope.

3. Use finer time intervals (monthly or quarterly) to capture short-term trends.

4. Apply machine learning to predict future trends in population and unemployment.

5. Analyze the effects of regional policies and industries on recovery patterns.

## Conclusion

From 2020 to 2023, U.S. states like Texas, Florida, and Georgia showcased resilience with population growth and low unemployment, while states like New York and California faced higher unemployment and cost-of-living challenges. Migration trends reflect shifting economic power toward business-friendly states. Policymakers must address regional disparities, invest in infrastructure, and foster innovation to ensure sustainable and equitable growth.

# Thank You!

- For your time and attention.
- For exploring this analysis with us.
- For your interest in understanding population and unemployment trends.



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