Analyzing the Economic Impacts of Government Expenditure and Income

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Introduction

- Governments make important decision on how to spend and make money.

- Our project aims to explore relationships and correlations between spending money on a specific sector and its effects.

- Using our project, governments gain an insight into which sectors provide the most value for citizens.

Data Description

- Source: https://www.kaggle.com/datasets/robertolofaro/selected-indicators-from-world-bank-20002019

- Size: 266 rows by 37 columns

- Key Features:
    - Inflation (Annual, %)
    - Energy Imports, (% of total energy used)
    - Tax Revenue, (% of GDP)
    - Time required to start a business (female, days)
    - Time required to start a business (male, days)
    - GDP Growth (annual %)
    - Unemployment (female, %)
    - Unemployment (male, %)

Data Quality Report

|	Row Index	Country	Missing Values	Completeness (%)	Unique Values
0	0	AFE	7	70.833333	14
1	1	AFE	15	37.500000	9
2	2	AFE	1	95.833333	23
3	3	AFE	7	70.833333	17
4	4	AFE	7	70.833333	17
...	...	...	...	...	...
8773	8773	ZWE	7	70.833333	13
8774	8774	ZWE	13	45.833333	11
8775	8775	ZWE	0	100.000000	24
8776	8776	ZWE	0	100.000000	24
8777	8777	ZWE	0	100.000000	24

8778 rows × 5 columns

Research Questions

- Under which conditions do high taxation rates lead to high annual GDP growth?

- Under which conditions does high government expenditure on R&D (research and development) lead to high number of high-tech export?

- Under which conditions does high government expenditure on education lead to low unemployment rates?
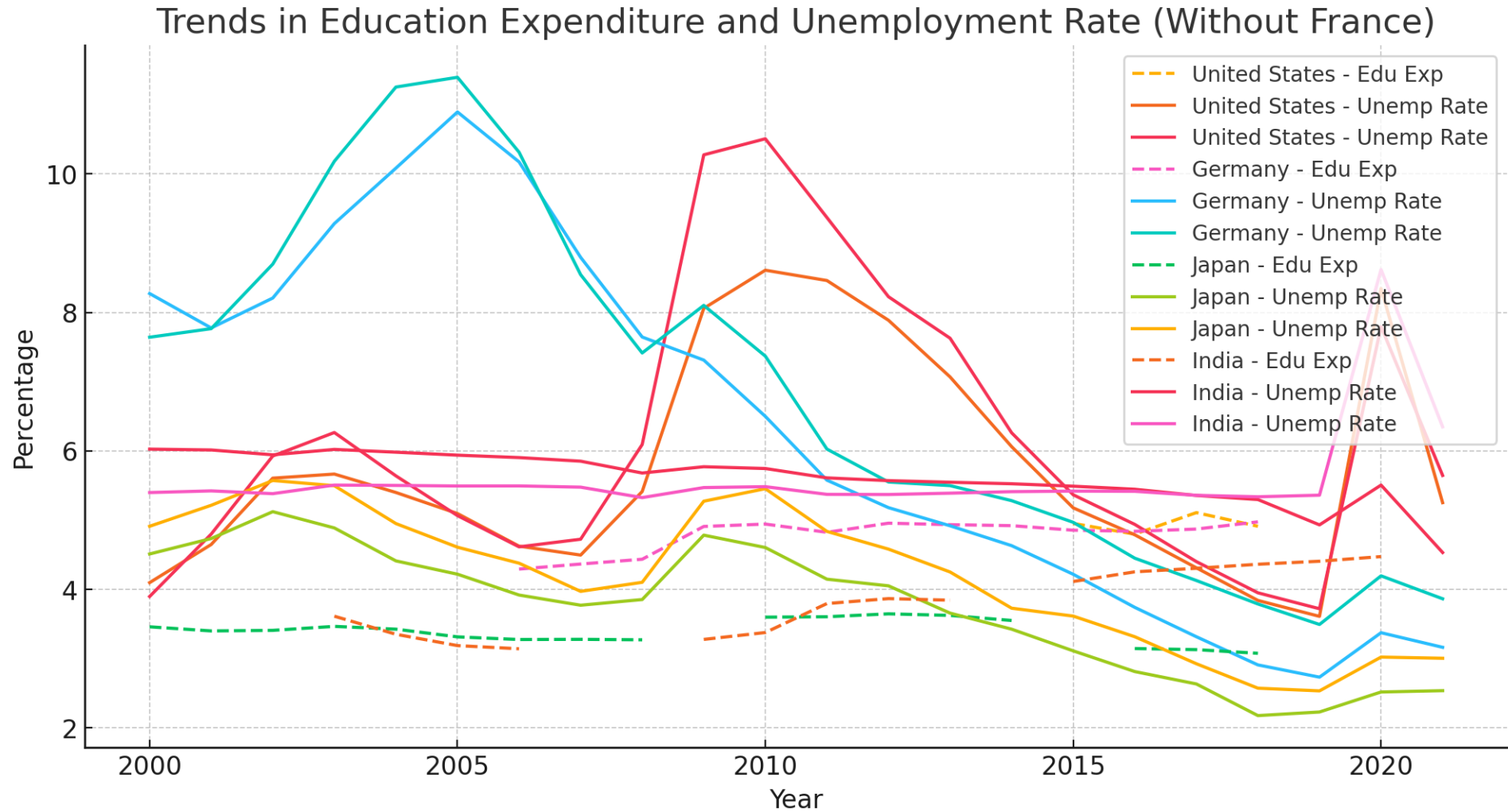
Plot 1

Education Expenditure vs Unemployment Rate (2019)

Plot 2

Trends in Education Expenditure and Unemployment Rate (Without France)
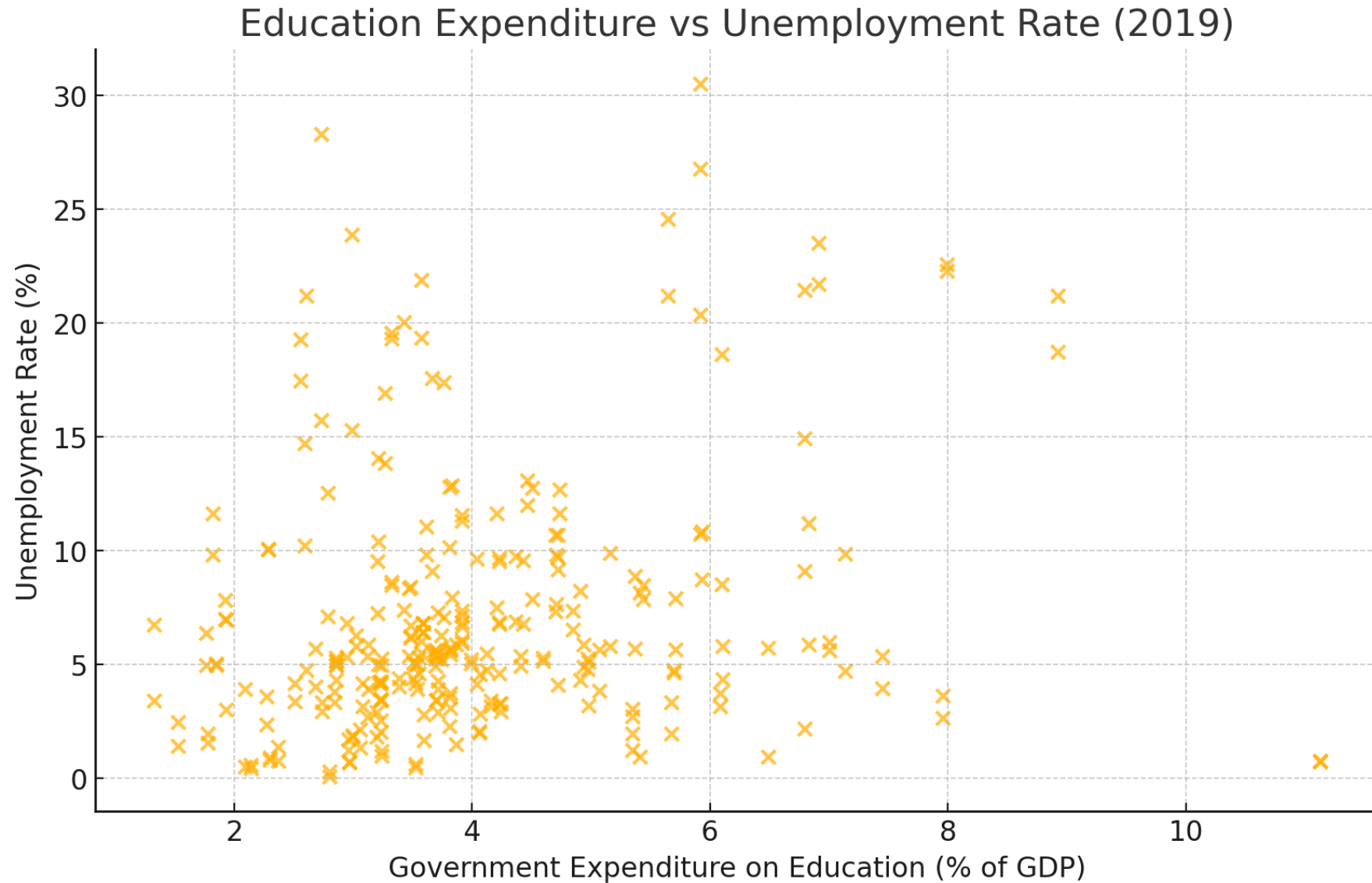
Statistical Methods

- PreProcessing:
  - Use dplyr and corrplot to determine which features are most crucial (Correlation Analysis)
  - Drop unrelated features to our questions

- Model:
  - Linear and Generalized Linear Model (lm, mgcv. lme4)

- Hypothesis Testing:
  - ANOVA (t.test, stats::anova, p-values)

- Visual Aids:
  - mainly scatterplots in ggplot

Thank you, Questions?