Education Data and Trends

Ironhack Data Analytics Bootcamp - Ceci

The Objective

Present a statistical analysis overview of Education and factors that influence it in diverse areas of the world is one part of this project.

Present a small machine learning model study on binned Areas of the world and how they influence literacy, using models learn in class.

The Questions

- What are the observable enrollment trends?
- How does the government expenditure in education look across the world?
- Are there enough teachers? And do all of them have the minimum necessary qualifications?
- Does the Capital Expenditure in Education influence the Overall enrollment ratios?
- What policy recommendations can be made?

01

The Data

Where it came from and the processes it went through

Data Handling Process

Gathering and Cleaning

Data gathered from the public UNData site, the main 4 datasets did not need much cleaning.

Handling

Data handled through normalizing columns, filling missing values and dropping non-needed columns

Filtering

Filtered data into respective needed countries to proceed with analysis, EDA and ML testing and implementation

Caveats

As not all the years in the Datasets were reflected for the whole list of countries being used. They were filtered in a way that kept the years that had the most amount of data for the largest number of countries.

The same was done for the Geographical Areas in Study.

Region/Country/Area	Country/Area Name
9	Oceania
15	Northern Africa
21	Northern America
30	Eastern Asia
34	Southern Asia
35	South-eastern Asia
62	South-central Asia
143	Central Asia
145	Western Asia
150	Europe
202	Sub-Saharan Africa
419	Latin America & the Caribbean

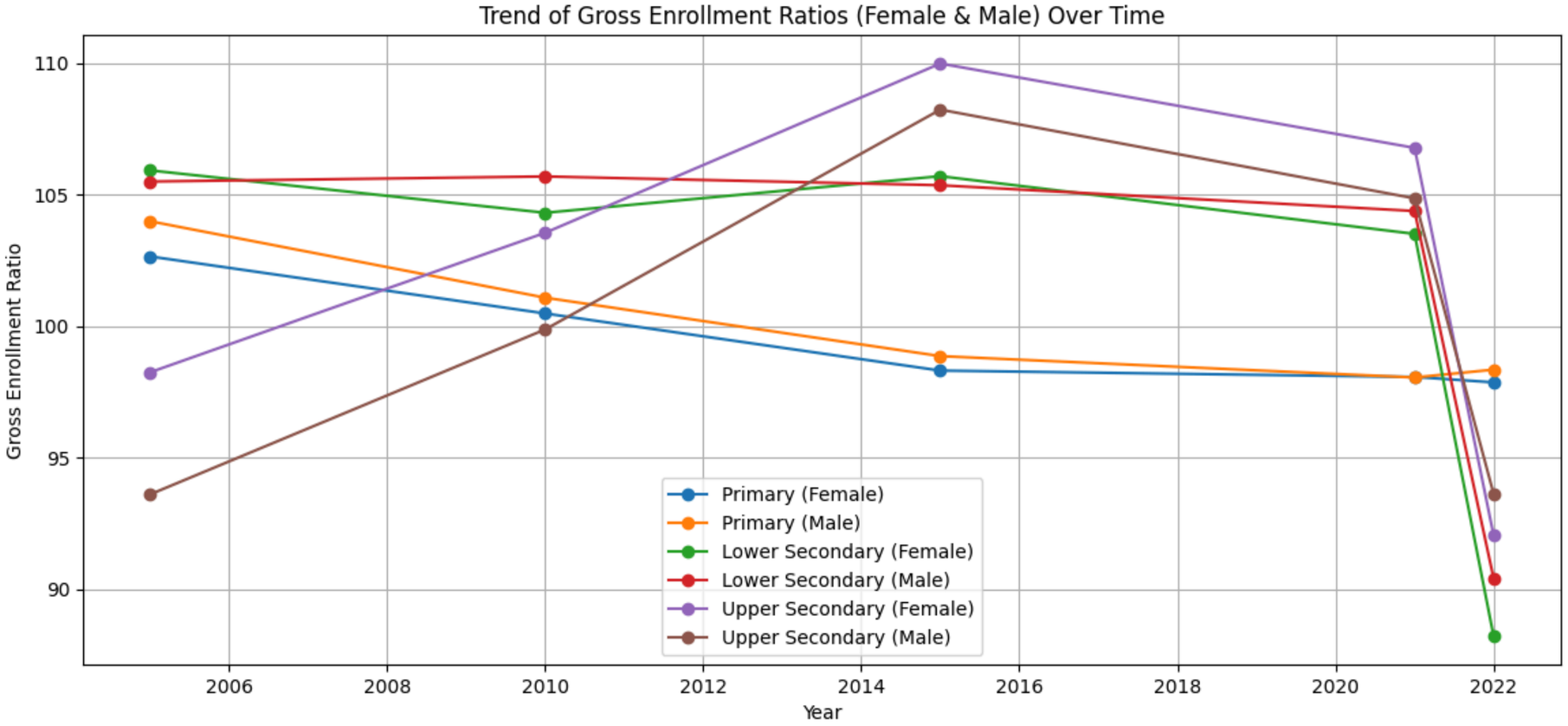
Final Country Based Dataset

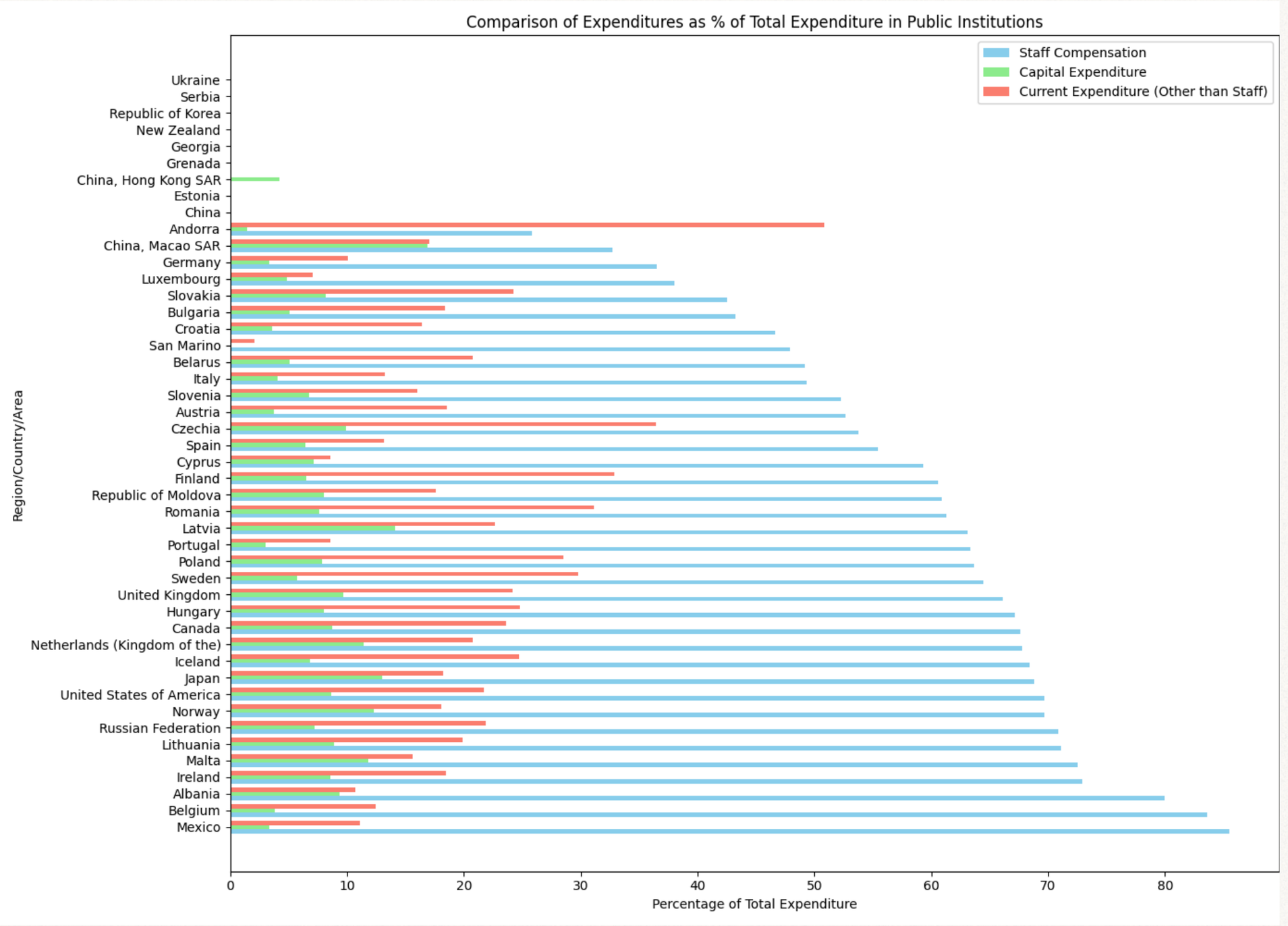
- Spans from 2005 to 2022, with most data points concentrated around the early 2010s.
- Primarily reflects stable educational systems in high-income countries, capturing trends during a dynamic period, including the effects of events like the global financial crisis.
- Mainly includes high-income countries from Europe, advanced Asian economies and the US.
- Countries like Albania, Gibraltar, Montenegro, and Moldova have fewer data points.
- Countries such as China, Russia, India, and the US appear more often.

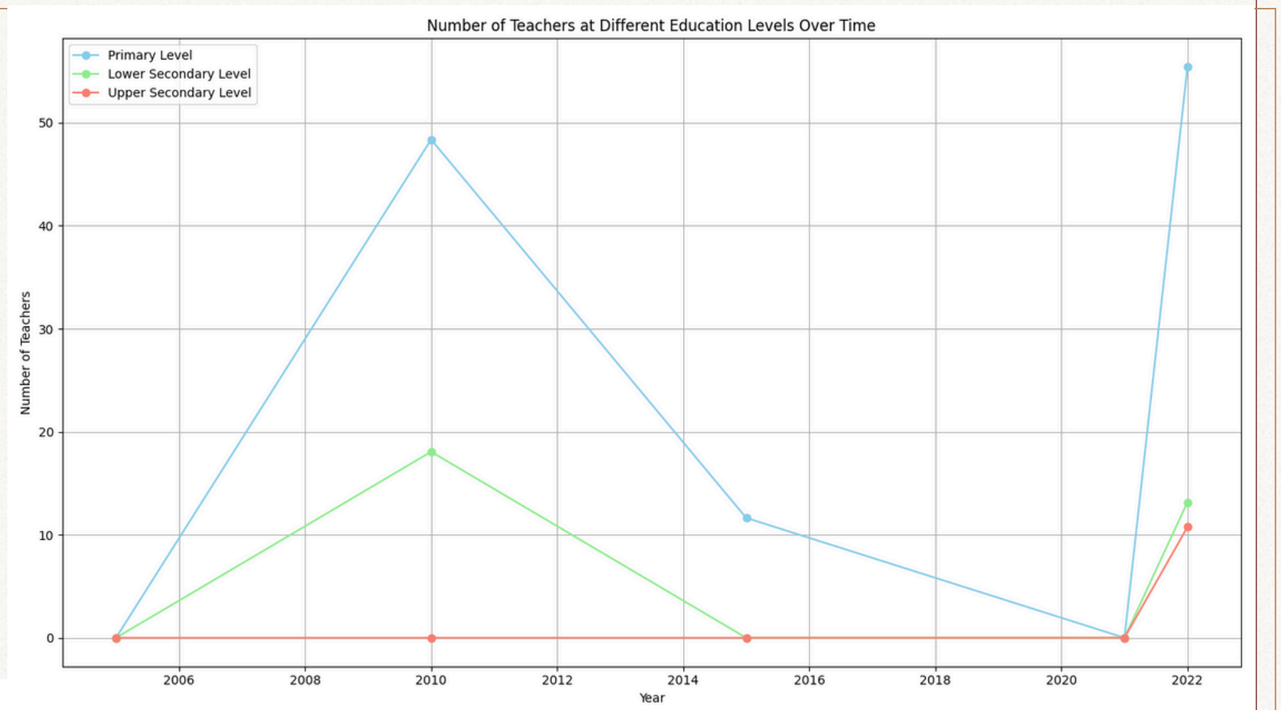
02

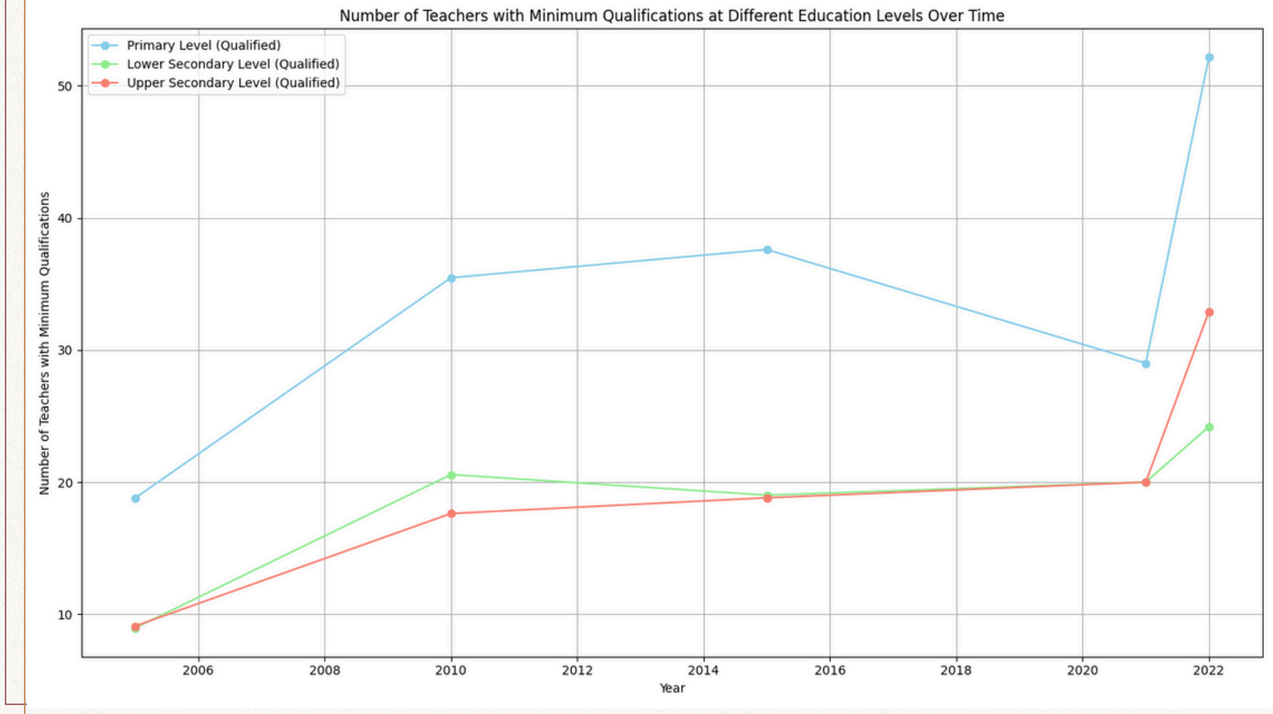
EDA

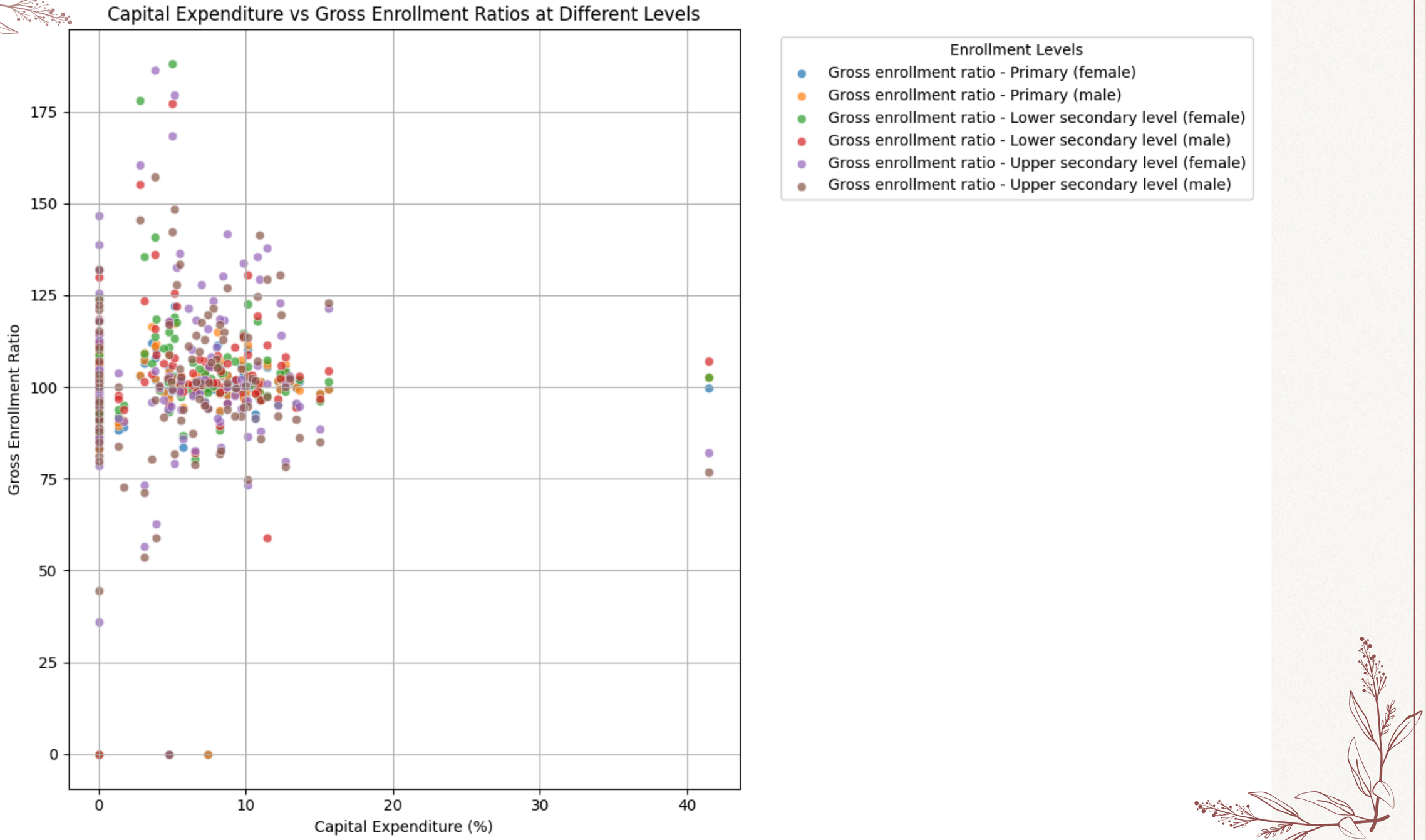
Comparing Enrollment Ratios




Comparison of Expenditures as % of Total Expenditure in Public Institutions
Staff Compensation
Capital Expenditure
Current Expenditure (Other than Staff)
Region/Country/Area
Ukraine
Serbia
Republic of Korea
New Zealand
Georgia
Grenada
China, Hong Kong SAR
Estonia
China
Andorra
China, Macao SAR
Germany
Luxembourg
Slovakia
Bulgaria
Croatia
San Marino
Belarus
Italy
Slovenia
Austria
Czechia
Spain
Cyprus
Finland
Republic of Moldova
Romania
Latvia
Portugal
Poland
Sweden
United Kingdom
Hungary
Canada
Netherlands (Kingdom of the)
Iceland
Japan
United States of America
Norway
Russian Federation
Lithuania
Malta
Ireland
Albania
Belgium
Mexico
0
10
20
30
40
50
60
70
80
Percentage of Total Expenditure


Number of Teachers at Different Education Levels Over Time
Primary Level
Lower Secondary Level
Upper Secondary Level
Number of Teachers
Year
0
10
20
30
40
50
2006
2008
2010
2012
2014
2016
2018
2020
2022


Number of Teachers with Minimum Qualifications at Different Education Levels Over Time
Primary Level (Qualified)
Lower Secondary Level (Qualified)
Upper Secondary Level (Qualified)
Number of Teachers with Minimum Qualifications
Year
10
20
30
40
50
2006
2008
2010
2012
2014
2016
2018
2020
2022


Capital Expenditure vs Gross Enrollment Ratios at Different Levels
Gross Enrollment Ratio
Capital Expenditure (%)
0
25
50
75
100
125
150
175
0
10
20
30
40
Enrollment Levels
Gross enrollment ratio - Primary (female)
Gross enrollment ratio - Primary (male)
Gross enrollment ratio - Lower secondary level (female)
Gross enrollment ratio - Lower secondary level (male)
Gross enrollment ratio - Upper secondary level (female)
Gross enrollment ratio - Upper secondary level (male)

03

Machine Learning

04

Conclusions

05

Policy Recomendations

Learnings and Challenges

Finding rewards in unexpected places
Being glad when things work
Realizing I'm more capable than I think
Taking off pressure because I CAN do it - I AM DOING IT

Choosing a theme
Setting an Objective
Deciding what to keep and what to drop
Making Choices
Time Management
Pressure

Thank You!

Any questions?
Comments?
Concerns?