

Correlation between SPI Scores and GDP Per Capita Among Religions

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Introduction

Raw data must be processed into usable information to support informed decision-making → A nation's ability to collect and disseminate quality data is closely linked to policymaking and economic development.

The **Statistical Performance Indicator (SPI)** (World Bank) measures:

- How well, how broadly, and how frequently countries produce and share high-quality data
- SPI serves as a proxy for:
 - Institutional strength
 - Governance quality

GDP per capita is a widely used indicator of economic prosperity and cross-country wellbeing—so, examining the relationship between SPI and GDP per capita helps assess whether stronger data systems are associated with greater economic prosperity.

Religion may influence institutions, governance, and investment in data systems, so countries are grouped by dominant religion:

- Buddhism, Christianity, Hinduism, Islam, and No Religious Majority

Hypotheses:

- Higher SPI scores are associated with higher GDP per capita
- The SPI–GDP relationship is strongest in predominantly Christian countries

Across the most dominant religious cultures around the world, how do SPI (statistical performance indicator) scores and GDP per capita compare?

Data

Data sources:

- simplemaps.com
 - Country data
- GitHub #tidytuesday
 - SPI data from World Bank

SPI data includes five pillars:

- Data infrastructure
- Data use
- Data products
- Data services
- Data sources

Data cleaning and tidying:

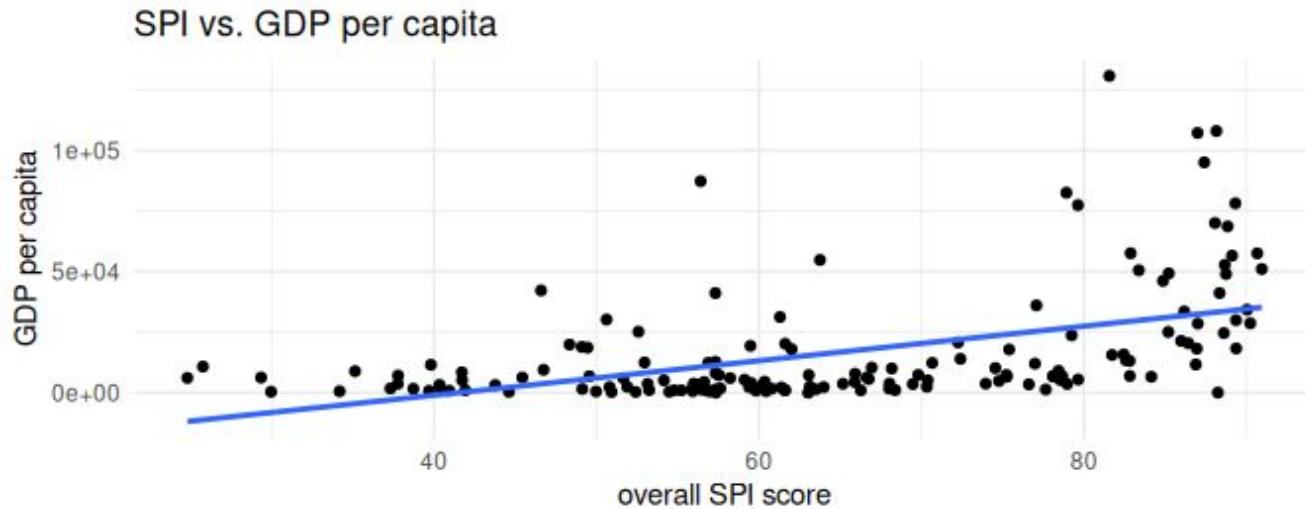
- Removed unnecessary columns
- Calculated GDP per capita
- Averaged metrics from 2004-2023

Final data set:

- 187 unique countries
- Averaged GDP, population, and SPI scores; also had dominant religion
- One row per country

Analysis

Overall SPI scores vs. GDP



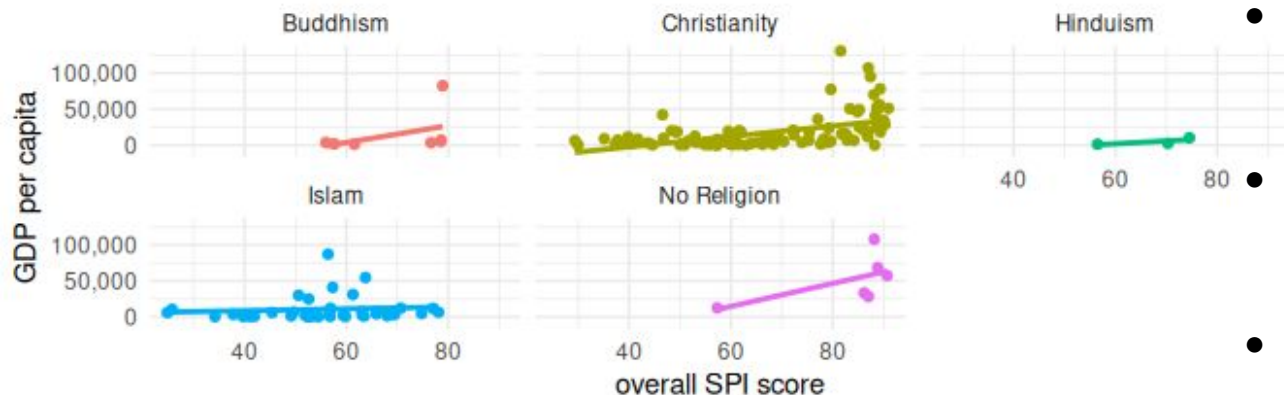
Overall relationship:

- Moderate positive correlation between SPI and GDP per capita
- Correlation coefficient: **R = 0.486**

SPI scores vs. GDP by religion

SPI vs. GDP per capita

across religions, tracked by the World Bank

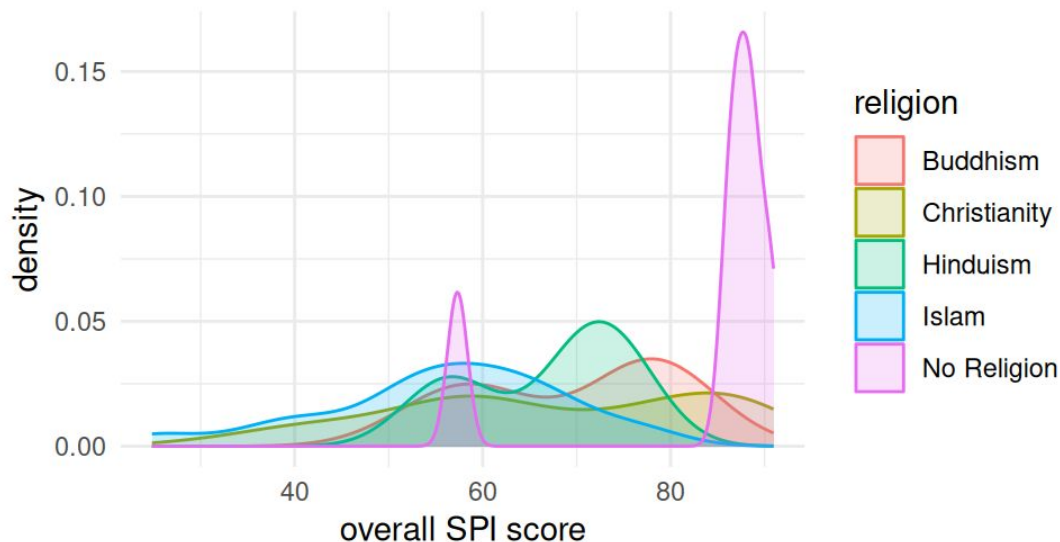


- Religion is a weak predictor of SPI–GDP relationships
- Christian countries:
 - GDP values = widespread
 - High GDP outliers
- Islamic countries:
 - Clusters at low GDP per capita
 - Some have high SPI but relatively low GDP overall
- No Religion countries:
 - Positive relationship
 - Too few data points to be a strong predictor
- Buddhism
 - Moderately positive
 - Too few data points
- Hinduism:
 - Too few data points

SPI scores across religions

SPI across religions

for countries tracked by the World Bank



Regression results:

- SPI vs. GDP per capita:
- Adj. $R^2 = 23.2\%$

Takeaways

- SPI and GDP per capita are positively related, but weakly
- Christianity shows the strongest SPI–GDP association, though still limited
- Religion overall is a weak explanatory variable

Discussion

Conclusions

0.49
Correlation (r)

23%
Adj. R² (SPI
alone)

26%
Adj. R² (+
religion)

27%
Adj. R²
(income–SPI)

Positive SPI–GDP relationship, but moderate

R ≈ 0.49, Adj. R² ≈ 23% – SPI alone does not sufficiently predict GDP per capita.
Initial hypothesis of positive relationship confirmed.

Religion adds limited explanatory power

R² increases from 23% → 26% when religion is added to the model.
Prediction that Christianity would show strongest correlation was contradicted.

Income is a comparable or better predictor of SPI

Income–SPI density model: R² ≈ 27% – comparable to religion's effect on SPI–GDP.
Higher income countries: SPI 75–85 | Lower income countries: SPI 50–60.

Limitations

1. Crude religion measure

Country-level dominant religion may misrepresent religiously diverse nations

2. Missing data

27 countries dropped due to missing religion and GDP data, potentially skewing results

3. Low R² values

Suggest important omitted variables that could strengthen the model

4. Correlation \neq causation

High SPI may be a result of wealth rather than a driver of it

Future Work

→ Time-series analysis

Examine whether SPI improvements preceded GDP growth to better establish directional causality

+ Additional variables

Include governance indices and education levels to improve model accuracy and explanatory power

◆ Religious diversity index

Replace single dominant religion variable with a more detailed measure of religious composition