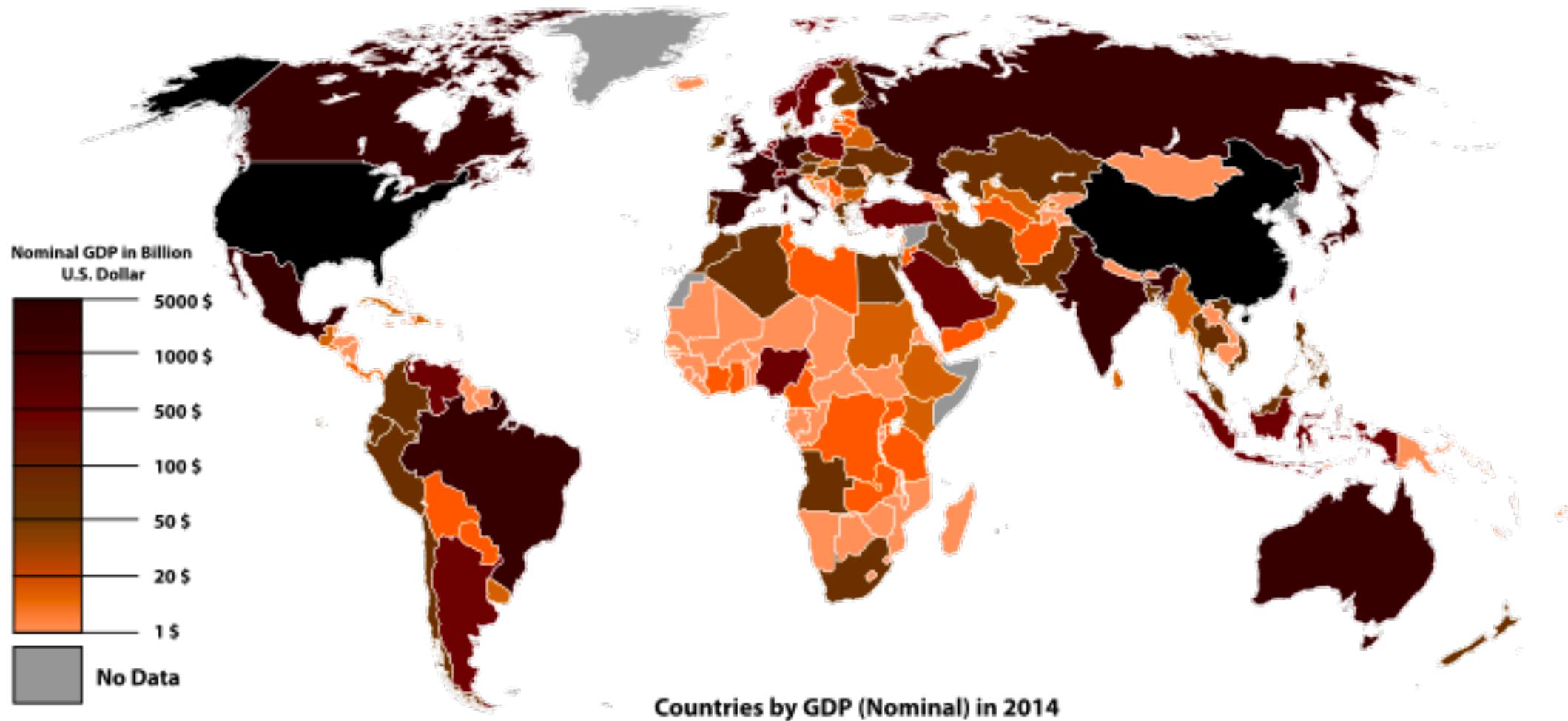




# Investigating the Economic Health of the United Nations

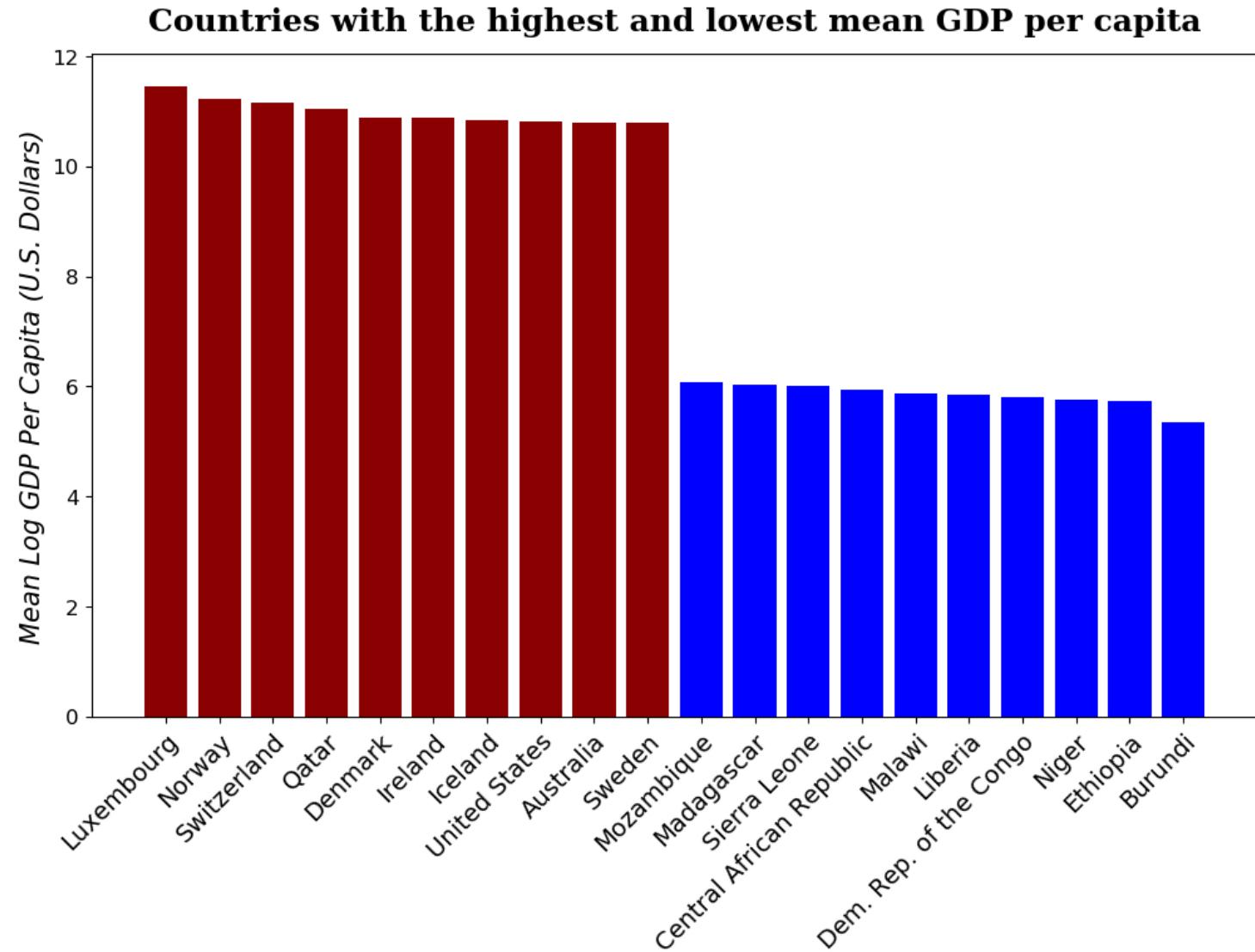
Peter Ilhardt  
July 19, 2019

**UN Charter:** “Achieve international co-operation in solving international problems of an economic, social, cultural, or humanitarian character.”



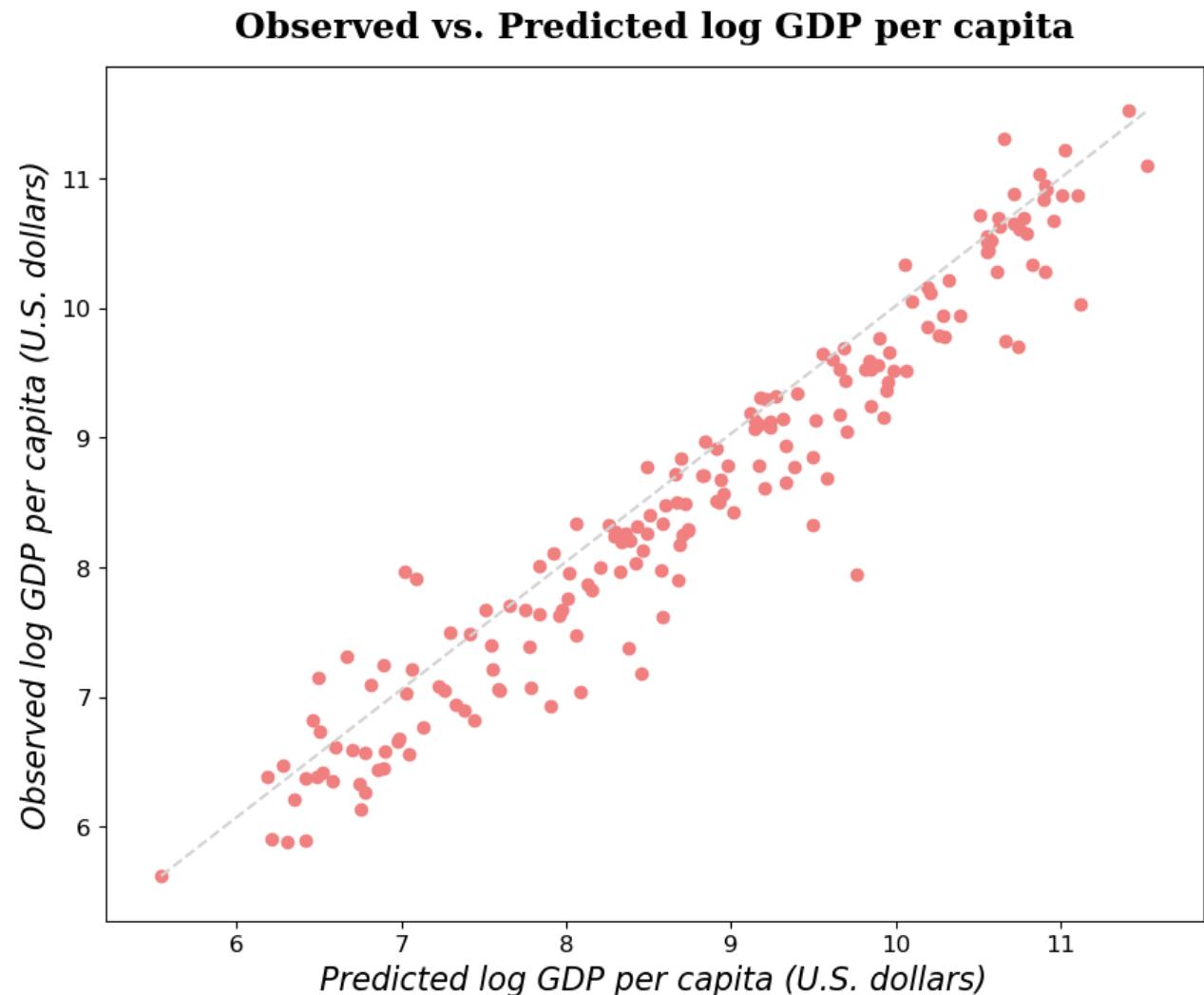
# What Factors Most Influence a Nation's Wealth?

- Sources: United Nations Statistics Division (UNdata), Wikipedia
- Data: Economic and social aggregate metrics for 182 nations as measured in 2005, 2010, and 2015
- Aim: Predict GDP per capita in 2015 and determine most predictive metrics
- Methods: Multiple linear regression with regularization



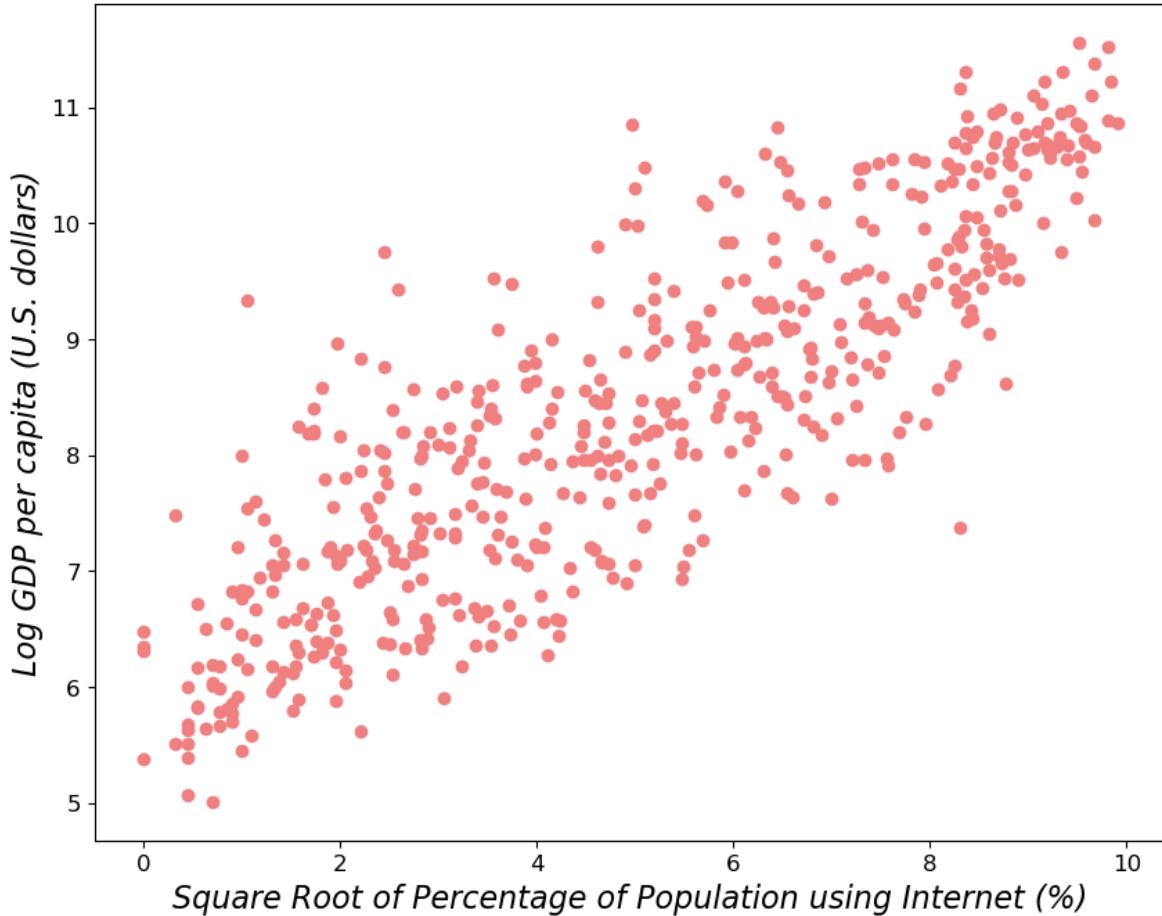
# Predicted ~90% of Variance in 2015 Data

- Best Predictive Model had  $R^2$  value of 0.905 on test data (0.953 on training data)
- Typical deviation of  $\sim \$1.50$  U.S.
- Effectively reproduced GDP calculation

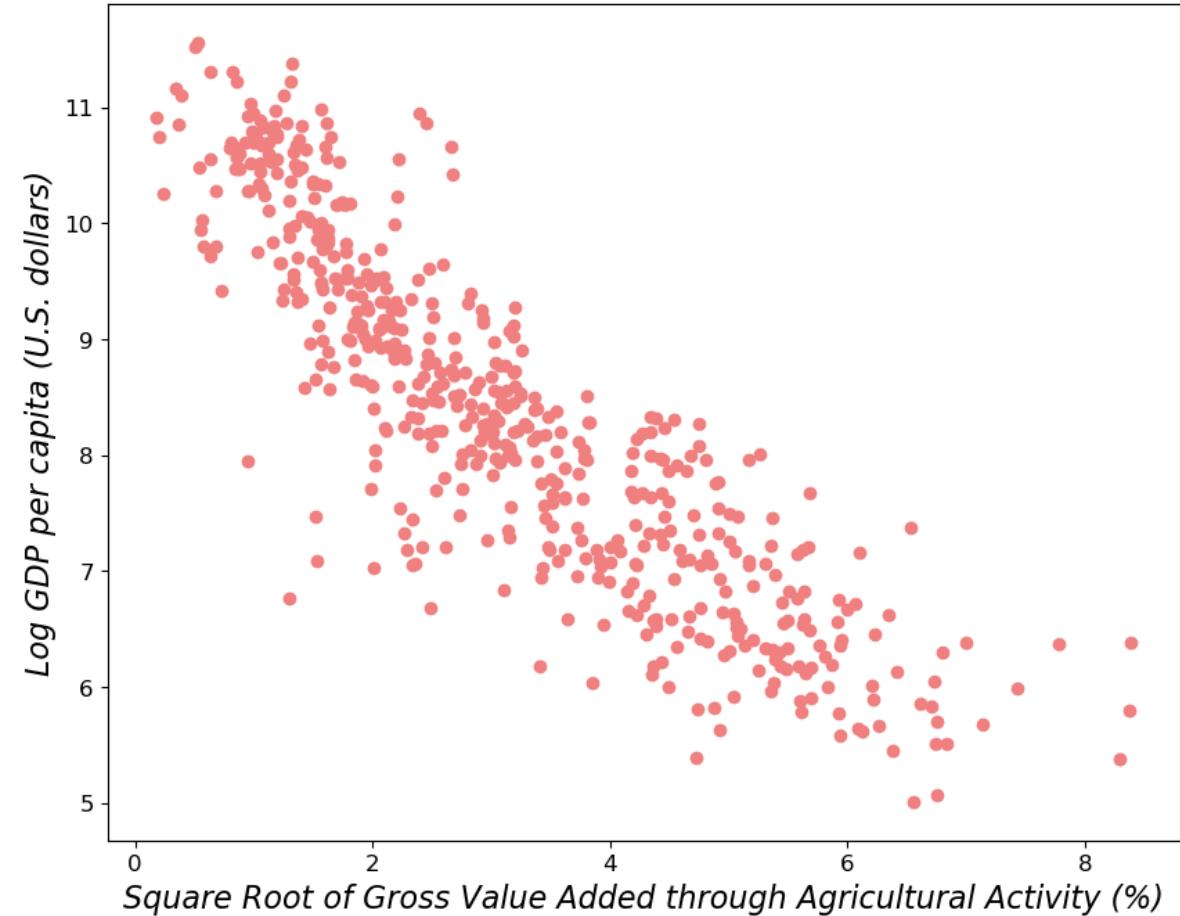


# Strongest predictors largely economic indicators, but not entirely

**GDP per capita vs. Internet Usage**



**GDP per capita vs. Gross Value Added by Agriculture**

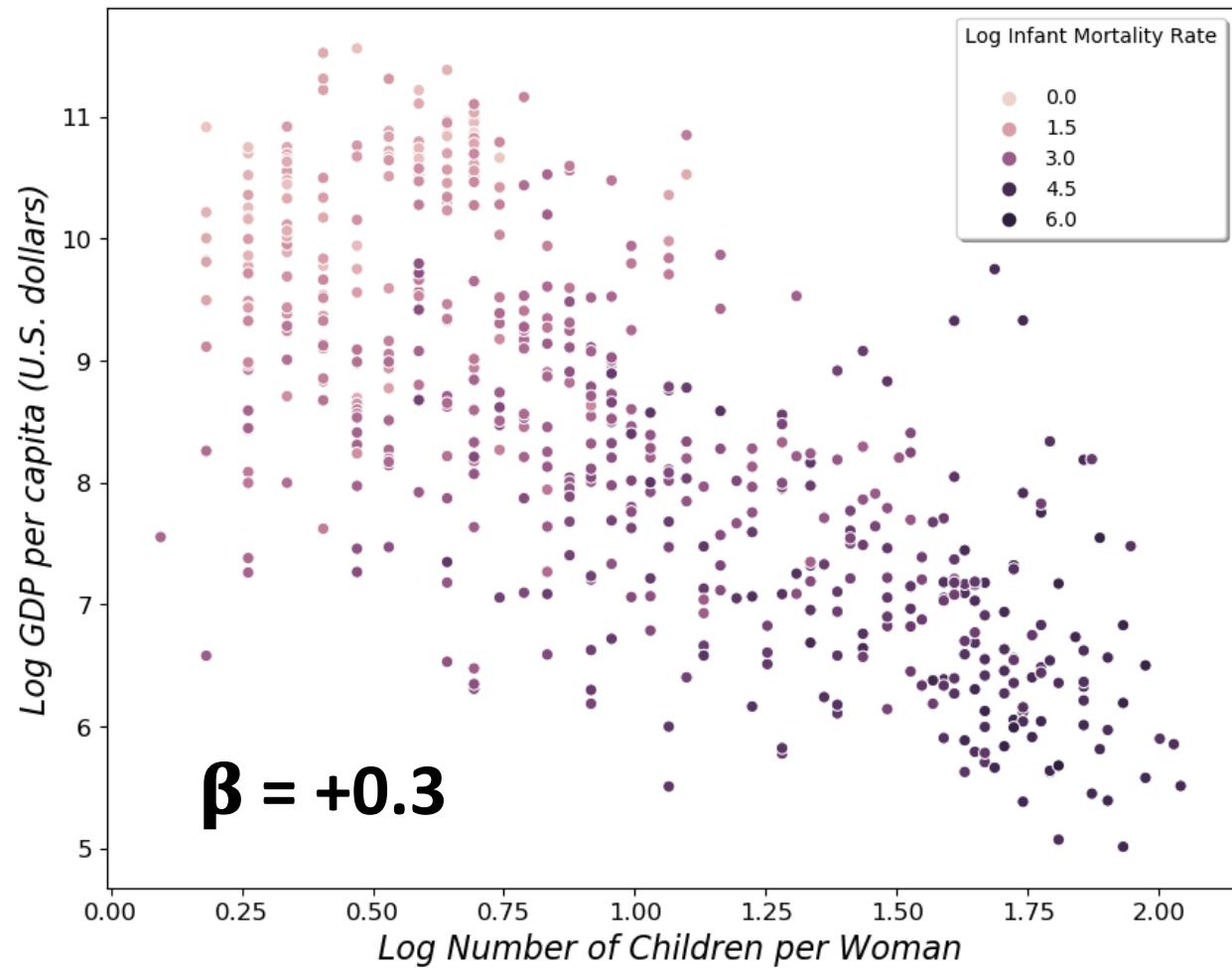


# Which Features Were Significant?

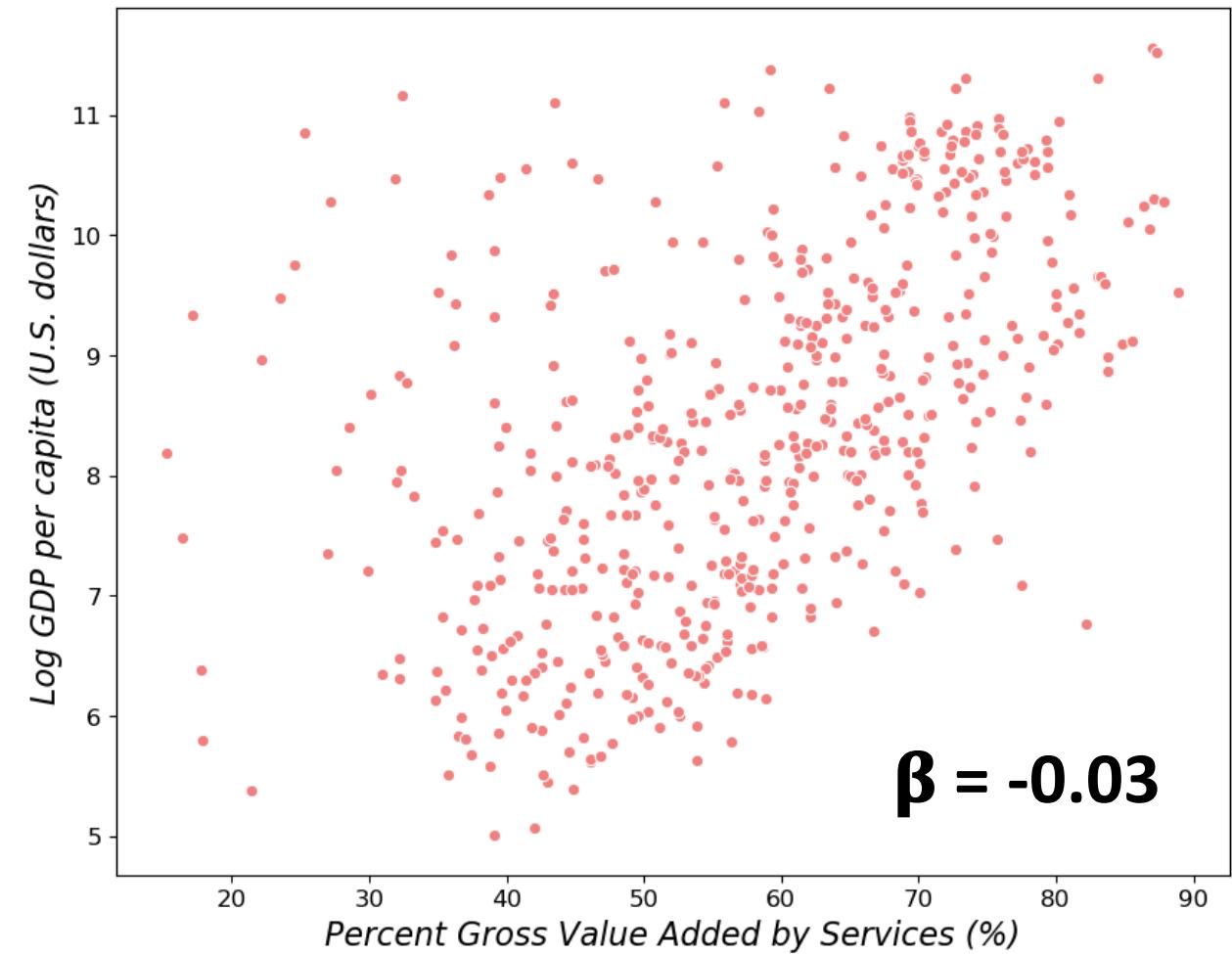
<b>Not Predictive</b>	<b>Positively Related</b>	<b>Negatively Related</b>
Exports - Imports Difference	Percentage of Population using Internet	Gross Value Added by Agriculture
Year-to-Year Population Gain	Tourism Expenditure	Infant Mortality Ratio
Total Population	Energy Consumed per Capita	Maternal Mortality Ratio
Gender Ratio	GHG Emissions per Capita	Population Density
Energy Produced per Capita	Life Expectancy	Labor Force Participation Rate
Percentage of GDP Spent on Health	Percentage of Population Being Migrants	Unemployment Rate

# Interpretations often hindered by multicollinearity and confounding

GDP per capita vs. Fertility and Infant Mortality Rates



GDP per capita vs. Gross Value Added by Service



# Key Insights

- Regularization offered little improvement in predictive performance, but effectively de-emphasized redundant features
- Countries with higher GDP per capita characterized by better access to healthcare and technology, larger energy consumption/GHG emissions, service-driven economies, and diverse urban populations
- Social metrics such as education, gender distribution, and population growth largely non-predictive, but family size surprisingly relevant