

# Visualizing Relationship Between Education and Corruption (2018)

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## INTRODUCTION

Education and corruption represent critical dimensions in understanding the socioeconomic fabric of nations worldwide. A growing body of research has identified a robust correlation between levels of educational attainment and perceptions of corruption across countries. This relationship suggests that societies with higher average years of schooling tend to exhibit lower levels of corruption, as measured by indices such as Transparency International's Corruption Perception Index. Moreover, studies such as those by Glaeser and Saks (2006)<sup>1</sup> underscore the potential causal link between education and reduced corruption, illustrating how historical educational legacies can influence contemporary governance outcomes. This introduction sets the stage for exploring the nuanced interplay between education and corruption, emphasizing the multifaceted factors that contribute to these complex societal dynamics.

## PREVIOUS VISUALIZATION

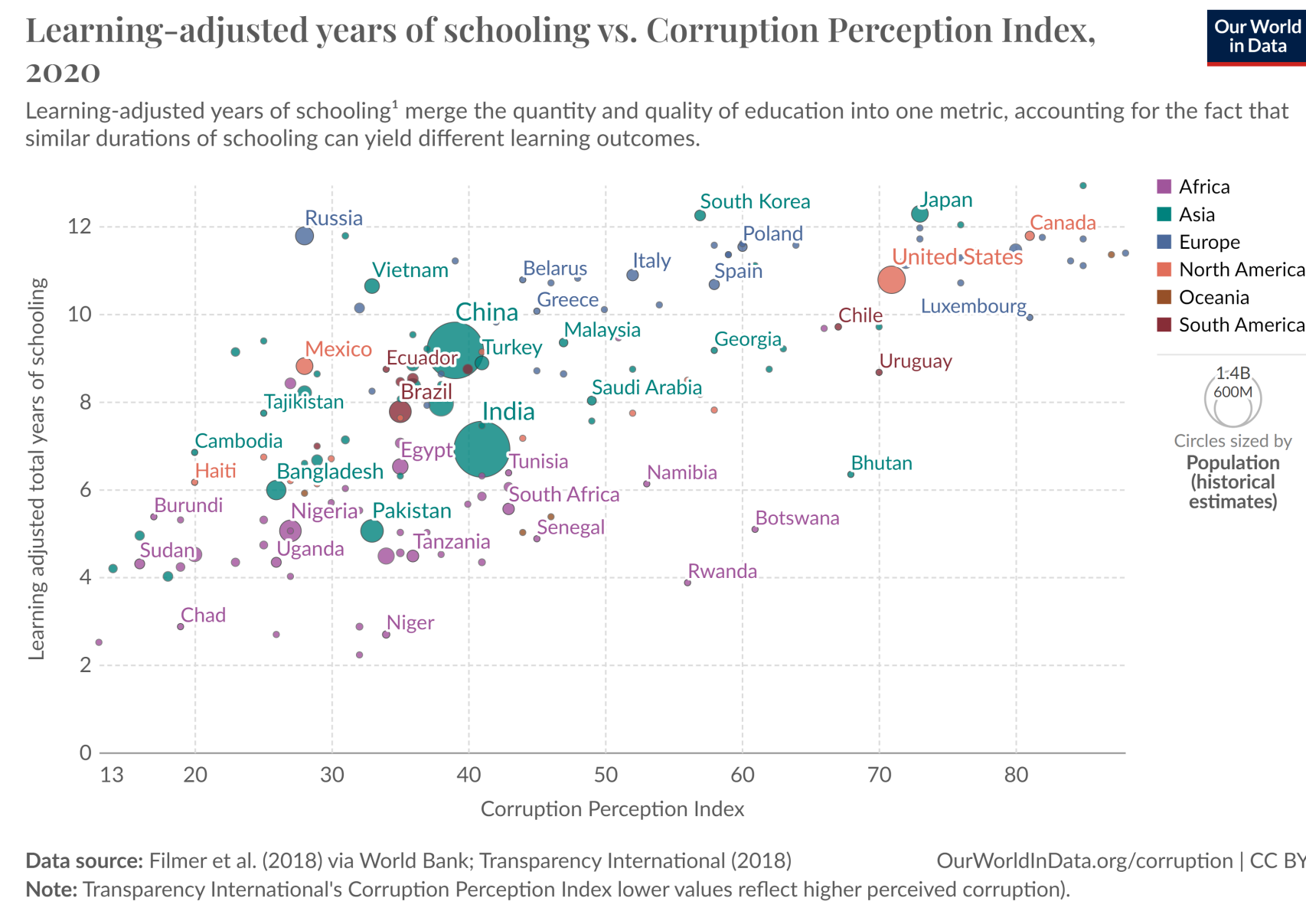


Figure 1: Learning-adjusted years of schooling vs. Corruption Perception Index, 2018

## STRENGTHS

- Visual representation: The scatter plot effectively visualizes the relationship between learning-adjusted years of schooling and the Corruption Perception Index across various countries and regions.

- Color coding: The use of different colors for different regions or continents makes it easier to identify and distinguish countries belonging to the same geographical area.
- Clear labeling: The countries and regions are labeled directly on the plot, allowing for easy identification and reference.
- Bubble size: The size of the bubbles (circles) represents the population of each country, providing an additional dimension of information.

## SUGGESTED IMPROVEMENTS

- The inclusion of smoothing lines (trend lines).* It helps to visualize the general trends and relationships between the schooling index and the Corruption Perception Index within each global region.
- Use a discrete color palette.* Continuous palettes can make it challenging for humans to detect patterns with little color differences. Consider using a qualitative ColorBrewer palette instead<sup>2</sup>.
- Divide into differnt charts* provides a clearer comparison of regions with different socio-economic backgrounds.
- Removing some of the lesser-known or less-popular countries* simplifies the visualization, reducing clutter and focusing attention on the more significant data points that are likely to be more familiar and relevant to the audience.
- Misleading Title :* Correct the header for the graph to accurately indicate the year the data is sourced from.

## IMPLEMENTATION

### Data

- The data compares learning-adjusted years of schooling and the 2018 Corruption Perception Index (CPI)<sup>3</sup>. Learning-adjusted years account for both education quality and quantity, recognizing that similar schooling durations can yield different outcomes. The CPI from Transparency International measures perceived corruption, with lower values indicating higher corruption.
- We used data from the top 50 most popular countries<sup>4</sup>.
- We edited the schooling index and corruption index to 0-100 to spread out the distribution of the geom points.

### Software

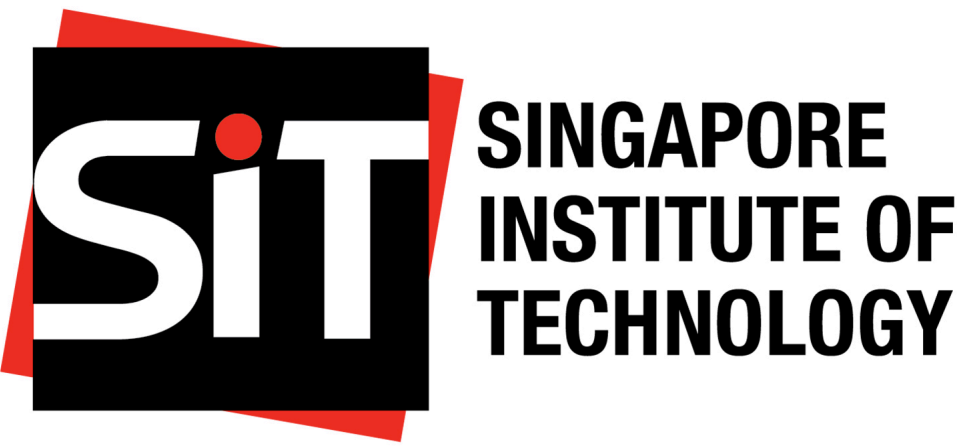
We used the Quarto publication framework and the R programming language, along with the following third-party packages:

- readxl* for data import
- tidyverse* specifically *dplyr* for manipulation and *ggplot2* for visualization
- ggreal* extension for *ggplot2* that helps in preventing overlapping text labels in plots.
- shadowtext* extension for *ggplot2* that helps in adding shadow effects to text labels in plots.
- countrycode* converting country names and codes into various coding schemes.
- dbscan* for clustering data based on density.
- FNN* for performing KNN classification.

<sup>2</sup><https://colorbrewer2.org/#type=sequential&scheme=Reds&n=5>

<sup>3</sup><https://ourworldindata.org/grapher/average-years-of-schooling-vs-corruption-perception-index>

<sup>4</sup><https://worldeducators.org/pages/top-100-countries-for-tourists>



## IMPROVED VISUALIZATION

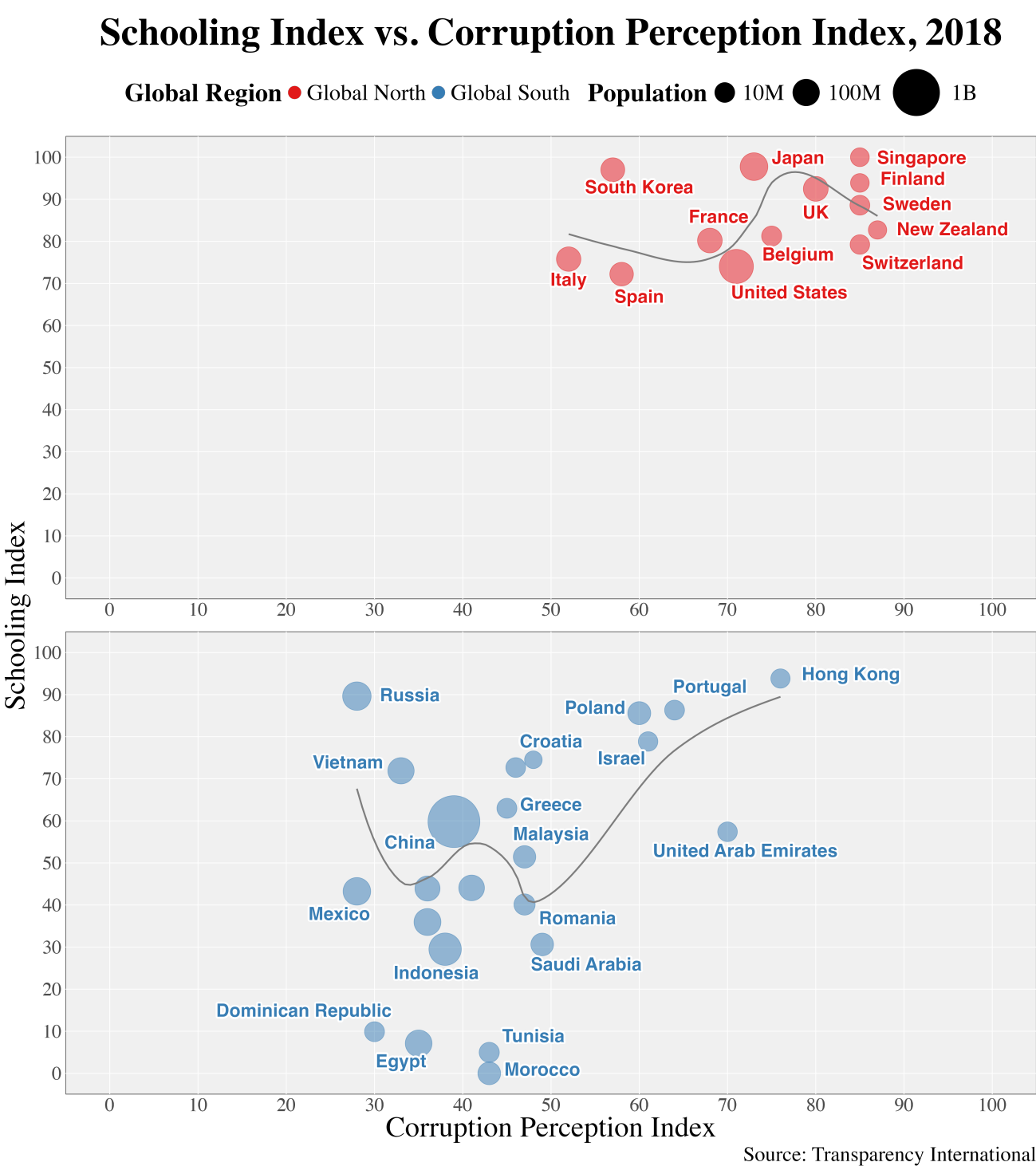


Figure 2: Schooling Index vs. Corruption Perception Index, 2018

## FURTHER SUGGESTIONS FOR INTERACTIVITY

Because our visualization was intended for a poster, we did not implement any interactive features, including the infotip. However, if the data is visualized in an HTML document, interactive features can be achieved using the R packages such as *plotly*. In that case we recommend adding tooltips that display detailed information when hovering over a data point. This can include specific values for average years of schooling, the Corruption Perception Index, population size, and the country name. Tooltips enhance the user's ability to gain precise information without cluttering the visual.

## CONCLUSION

We successfully implemented all suggested improvements for the non-interactive visualization. By separating global regions into distinct graphs and with a more intuitive legend for population sizes, the plots effectively highlight the relationship between average years of schooling and the Corruption Perception Index across various countries. The visual distinction between the Global North and Global South, along with the clear labeling of key countries, allows for easy interpretation of the data.