A Statistical Study of Economic Growth and The Impacts of Corruption

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Introduction

How does corruption shape economic development around the world? We start with the idea that corruption slows down growth, especially in poorer countries. By looking at the Corruption Perceptions Index (CPI) along with GDP, education, and healthcare data, we find interesting patterns. We explore how government spending on education and healthcare ties into CPI rankings, showing the harmful effects of corruption. Our findings reveal unexpected insights and highlight the importance of fighting corruption to support lasting development.

Analysis

1.1 CPI Measures Corruption

The Corruption Perceptions Index (CPI) is a key indicator for assessing the extent of corruption in the global public sector. As shown in Figure 1, the CPI data for 179 countries shows an average of 42.84, indicating a bit lower than moderate levels of corruption globally. The median is 39, indicating that more than half of the countries are considered below this threshold, highlighting widespread corruption issues. The standard deviation of 18.62 indicates considerable differences in perceptions of corruption across countries. The articles also highlight the vicious cycle of "poverty fuels corruption and corruption fuels poverty". This is especially true for sub-Saharan Africa, which has an average CPI score of 33, compared with 66 points for Western Europe (The Economist, 2022). Also, a variable named "The Rank of xxx" has been made for representing the countries from the least number to the greatest number, as STATA would not convert the regular data. To express it more clearly, for example in Figure 2, "Rank of

CPI" has the number rank 1 to 179. This shows that a country with a larger number means its CPI is higher than some of the other countries, that is, less corruption from the definition of CPI.

1.2 CPI and GDP (per capita and growth)

Our initial hypothesis is built on the assumption that since corruption has a negative effect on economic development, then underdeveloped poorer countries should in turn be more corrupted. To expand the breadth of our analysis, we compared the rank of CPI to the GDP per capita (NYGDPPC) of each country, a strong indicator of national wealth. Figure 3 shows a scatterplot of all countries and we can observe a really weak positive correlation between CPI and NYGDPPC of 0.1909 given by the table in Figure 4. This statistic implies that a country's wealth is not a significant indicator of corruption within that country. This discovery seemingly goes against our initial hypothesis and gives us a wider view and different perspective of the topic.

To further evaluate the effects of corruption on economic growth, we widen our focus to look at characteristics aligning with corruption in both rich and poor countries. Intuitively, we like to believe that poorer countries are more prone to corruption since "poverty makes corruption worse and…corruption makes poverty worse" (The Economist, 2022). However, there is a close relation of corruption in poor countries with the rich ones since "companies based in rich countries often facilitate corruption abroad," (The Economist, 2022) making us suspect that there are likely similar bribery actions in their own country.

Signs of corruption in any country, regardless if it is poor or rich, usually signifies a misallocation of funds or resources that should be put towards factors that promote economic growth and successful development. Part 1.3 and 1.4 look at the connection between corruption and factors of economic growth from the viewpoints of education and healthcare.

1.3 Government Education Expenditure and Rank of CPI, further to SEPRM and SLUEN

The scatterplot in Figure 5, examining the relationship between the Rank of (CPI) and government expenditure on education (SEXPD) shows that countries with higher CPI scores, that is, countries with lower levels of corruption, have consistently invested a higher proportion of GDP in education. When we try to ignore the outliers, this trend shows a clear negative relationship between corruption and investment in education, one of the key indicators of successful development. “Countries with high levels of education and government transparency have better economic outcomes.” (The Economist, 2022) This emphasises that corruption is detrimental to both the quality of education and subsequent economic stability.

The data on Figure 6 links national government spending on education (SEXPD) to primary school completion rates (SEPRM) and provides a nuanced perspective on this relationship. Higher education spending tends to be associated with higher completion rates at the primary level, suggesting that when governments allocate more resources to education, there are real improvements in educational outcomes. However, the existence of corruption may distort this positive outcome. When corruption is rife, even large investments in education may not yield the expected benefits. Funds can be siphoned off, leading to poor infrastructure and inadequate educational materials, which directly affects student retention and graduation rates.

When we look through the unemployment rates (SLUEN) in Figure 7, it reveals a complex scenario where higher investment in education does not consistently correlate with lower unemployment rates. "Mr Svensson found clear correlations between all these variables and the overall level of corruption." (The Economist, 2022) This implies that corruption significantly influences the effectiveness of government spending in reducing unemployment. Although

increased educational spending theoretically equips citizens with necessary skills for the labour market, corruption can severely undermine these potential benefits.

Thus, corruption is a significant impediment to economic growth because it not only undermines government transparency but also reduces investment in essential public services that promote long-term development progress. In countries where corruption is rampant, even substantial educational investments may not translate into better employment outcomes due to inefficiencies and the misallocation of resources. This underlines the critical need for strong governance and anti-corruption measures to ensure that investments in education effectively contribute to economic stability and growth.

1.4 Rank of CPI and health (SHXPD) to connect Life Expectancy (SPDYN)

Let us now examine corruption from a country's healthcare point of view. Figure 8 shows a scatterplot for the relationship between the rank of CPI and the rank of current health expenditure per capita (SHXPD). In the Figure, we can see a relatively strong positive correlation, meaning that a country tends to be less corrupt as its government and its citizens spend more on healthcare. A high health expenditure could be an indicator of positive health investment by the country and economic prosperity, both indicators of successful development and economic growth. Such governments also tend to be more transparent, trusted, and mindful of the social well-being of its citizens.

Looking at Figure 9, we can also see that a higher rank of health expenditure per capita (SHXPD) reflects a higher rank of life expectancy at birth (SPDYN). A healthier general population with a higher life expectancy conveys that a country has a more productive labour

force and better living conditions less prone to disease. Most notably, for example, in countries like Nigeria, “when public cash is siphoned off…investment in healthcare, education and roads suffer…[affecting] 61.2% of the population liv[ing] in absolute poverty” (The Economist, 2016). This further implies that corruption influences economic growth through misallocation of resources to the health sector, strengthening our initial hypothesis.

An interesting phenomenon to note is that both Figures 8 and 9 show strong positive correlation, however, there are two noticeable different clusters of observations, dividing the data into an upper and lower rank. Going deeper into specific countries in the upper and lower ranks we will find that countries in the upper rank with a high SHXPD and SPDYN share common characteristics such as a higher GPD per capita which reflects a country’s wealth, and vice versa. This can help us conclude that corruption exists regardless of the country’s wealth, further supporting our findings in part 1.1. Therefore, if public resources and funds are misallocated and crucial public services such as healthcare is undermined, a country can still be corrupted and restrained from successful development.

Conclusion

In conclusion, the analysis robustly supports that corruption significantly impedes economic growth by misallocating resources crucial for development. Data indicates a negative association between corruption and indicators like education and healthcare, affirming that lower corruption levels correlate with enhanced economic stability and development success.

Appendix

All visuals were made original by the authors of this paper

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. sum CPI, detail

                            CPI
-------------------------------------------------------------
      Percentiles      Smallest
 1%           13            12
 5%           17            13
10%           22            13       Obs                 179
25%           29            14       Sum of Wgt.         179

50%           39                     Mean           42.83799
                      Largest        Std. Dev.      18.61893
75%           55            84
90%           73            87       Variance       346.6646
95%           79            87       Skewness       .6257958
99%           87            90       Kurtosis       2.561295
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Figure 1 - *Descriptive Statistics of Corruption Perception Index*

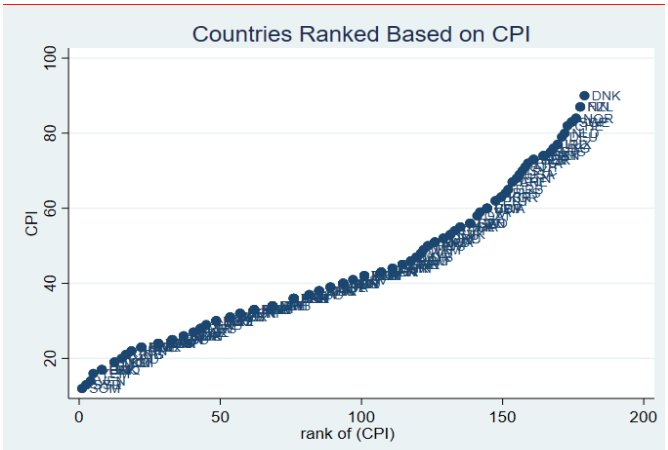

Figure 2 – *A visual of countries being ranked 1-179 based on CPI*

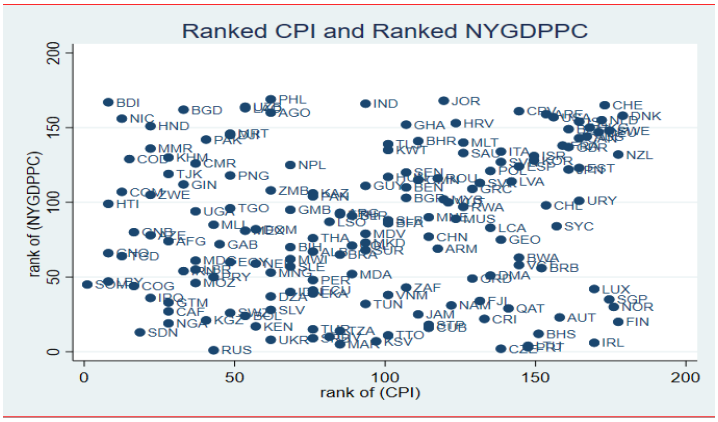

Figure 3 – *A visual of countries ranked based on Ranked Corruption Perception Index and Ranked GDP Per Capita*

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. pwcorr SHXPD SPDYN CPI NYGDPG FPCPI NYGDPPC SEXPD SLUEM SEPRM CCPERRNK
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	SHXPD	SPDYN	CPI	NYGDPG	FPCPI	NYGDPPC	SEXPD
SHXPD	1.0000						
SPDYN	-0.1288	1.0000					
CPI	-0.0633	0.6572	1.0000				
NYGDPG	0.0461	0.0562	0.0989	1.0000			
FPCPI	-0.0314	-0.1110	-0.1267	0.1556	1.0000		
NYGDPPC	0.0006	0.1679	0.1909	0.1359	-0.0176	1.0000	
SEXPD	-0.0080	-0.0348	0.0857	0.0480	-0.0305	-0.0691	1.0000
SLUEM	-0.0228	0.0394	0.0470	-0.1384	-0.0100	-0.0234	0.1044
SEPRM	-0.0912	0.2023	0.1305	-0.0568	-0.1017	0.0087	0.1698
CCPERRNK	-0.0492	0.6680	0.9517	0.1354	-0.1206	0.1918	0.0800

	SLUEM	SEPRM	CCPERRNK
SLUEM	1.0000		
SEPRM	-0.0392	1.0000	
CCPERRNK	0.0312	0.1348	1.0000

Figure 4 – *Correlation of Variables used in Analysis*

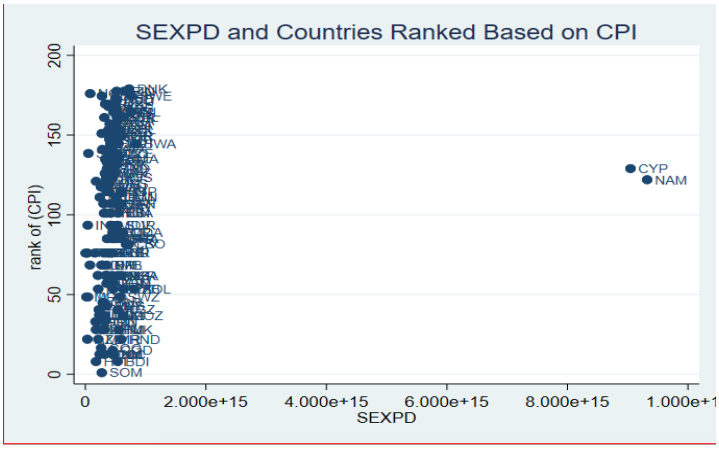

Figure 5 – *A visual of countries based on Government Expenditure on Education and Ranked Corruption Perception Index*

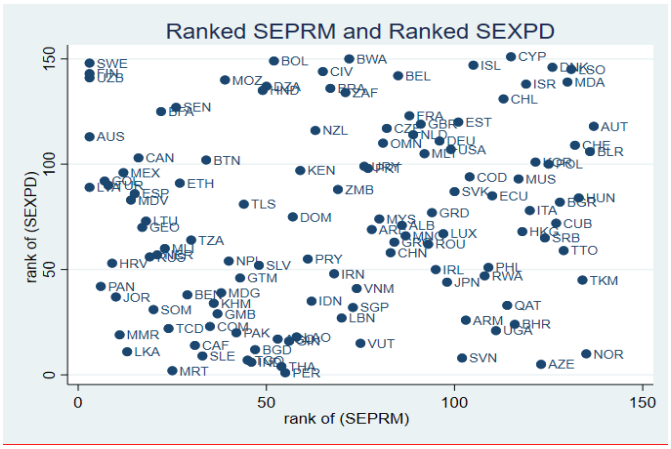

Figure 6 – *A visual of countries based on Primary Completion Rate and Government Expenditure*

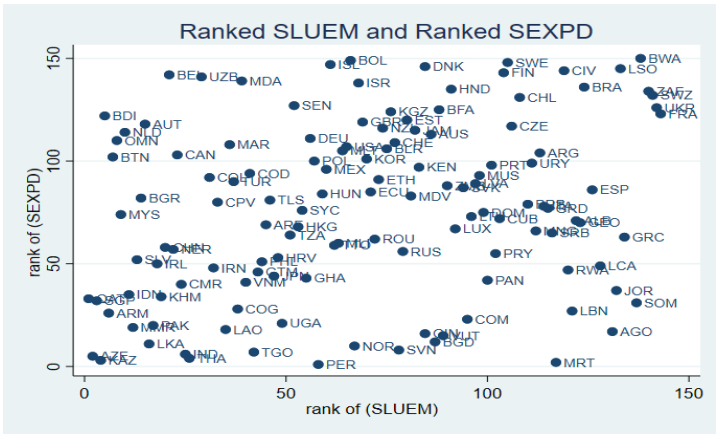

Figure 7 – *A visual of countries based on Ranked Unemployment and Ranked Government Expenditure*

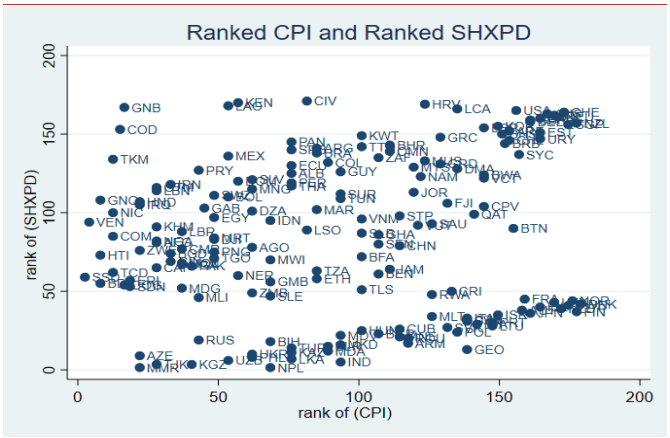

Figure 8 – *A visual of countries ranked based on Ranked Corruption Perception Index and Ranked Current Health Expenditure*

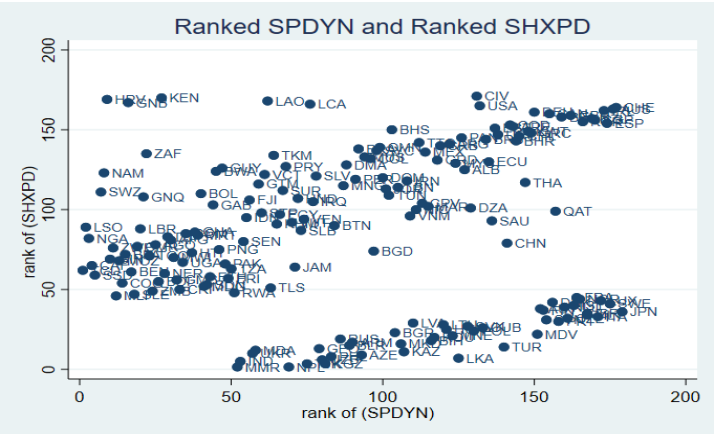

Figure 9 – *A visual of countries ranked on Current Health Expenditure and Life expectancy at Birth*