Education As an Investment: A Comparative Analysis of Impact on Economic Growth and Development across the G-20 Countries

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ABSTRACT

The impact of education was the focus, particularly considering that other economic variables were considered as control variables without doing a thorough analysis. The combined two-stage Least Square (2SLS) estimation was conducted in conjunction with phenomenological analysis and multiple regression using a mixed-methods approach. The findings demonstrated that the lifelong learning index and primary school attendance had no statistically significant impact on corruption levels across all G20 nations. On the other hand, secondary school attendance significantly lowered corruption levels across all national classes. Furthermore, it was discovered that participation in post-secondary education decreased corruption levels in emerging nations and all other members while increasing them in wealthy nations. It is exceptional that the GDP per capita had a notable and positive useful effect on developing countries and a contrastingly strong and negative influence on developed countries. The government effectiveness index had a substantial adverse impact on secondary education across all country categories, according to research. However, the influence of inflation and economic openness on corruption levels was shown to be significant and positive only in rising economies. The report's strategic suggestion (implication for policy) is that the secondary education should be prioritized above all else to overcome concerns of corruption.

Keywords: Economic openness, G20 member countries, Inflation, Gross Domestic Product, Government effectiveness.

1. INTRODUCTION

At the national level, low levels of average education, per capita income, and other mass production index are highly directly linked with high levels of corruption [1-3]. The flow of goods, capital, and foreign aid are all impacted by corruption in addition to government spending and Gross Domestic Product (GDP) [4, 5]. The political system, the pay of public servants, imperialist theory, gender, and other cultural elements like education stand blended amidst corruption [6]. Education plays a vital act in defining a nation's level of corruption because it is associated to the growth of human resources. It is in general sense acknowledged that education influences the creation of social norms. People's attitudes toward corruption change from one of tolerance to resistance when social standards are promoted by high-quality education [7, 8]. Economic data show that initiatives to combat corruption encourage just business competition, increase investment, and quicken economic growth [9]. The Anti-Corruption Work Group (ACGW) was established by the G20 member states in 2010, and since then, they have steadfastly and aggressively opposed corruption. To make it illegal to pay foreign public officials, every G20 country has signed receptive services about Convention on Corruption at UN and the bylaws containing consortium for the collaboration of Nations. The G20 Combating Corruption Action Plan 2019–2021 was also adopted. [10]. Figure 1 shows the graft Perception Index (CPI) that the level of graft varies among the G20 countries.
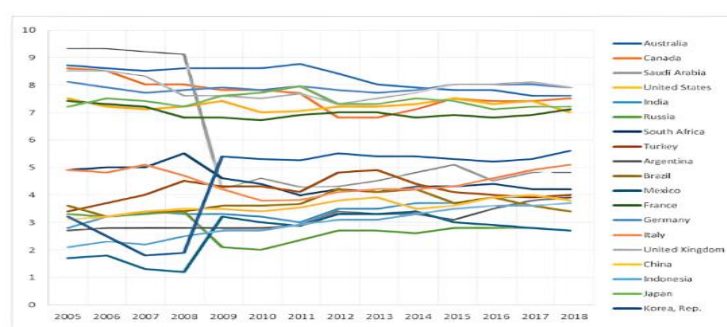
Figure 1. The Corruption Perception Index for G-20 nations from 2005 to 2018.[11]

Figure 1 uses a CPI threshold of six to segregate countries into two major groups: those that are thought to be very clean and those that are thought to be highly to moderately corrupt.

Investigating the causes of corruption in the G20 focuses on education and other macroeconomic variables. The government efficacy index, GDP per capita, inflation, and economic openness are additional macroeconomic factors that impact corruption levels. They were looked at because several earlier researches discovered a strong correlation between these macroeconomic factors and the degree of corruption. The correlation between corruption levels and educational attainment findings, like its focus on Africa, was broadened to cover the G20 member states [12]. The analysis integrated several macroeconomic flexibles that had been reviewed in prior research to control the effect of macroeconomic determinants on corruption levels in G20 member states. Nevertheless, the analysis was constrained to thirteen nations due to limitations in data accessibility.

1.1 Changes in Industrialization caused by Vocational Education

India is a nation that has recently seen substantial economic expansion and progress. Vocational education has provided millions of people around the nation to acquire relevant skills, which has greatly added aforementioned advancement.

1.2 Pradhan Mantri Kaushal Vikas Yojana (PMKVY)

To assist young people all around the nation in developing their skills, the Indian government launched the PMKVY in 2015. By 2020, the project hopes to have trained more than ten million people. A coalition of educational institutions, both public and private, is currently carrying it out.

An effort to improve job prospects and skill development in India is the PMKVY. It is composed of numerous vital components. In an attempt to assist jobless individuals and those who give up of college or school, PMKVY Training Centres (TCs) offer Short Term Training. The National Skills Qualification Framework (NSQF), digital literacy; financial literacy, entrepreneurship, and interpersonal skills are covered in the training. The evaluation and training of the candidates are funded by the government, and placement support is provided to those who pass. By attitudinizing individuals' competencies to the National Skill Framework (NSQF), Recognition of Prior Learning (RPL) permits certification and evaluation of individuals who possess pre-existing powers. The success of PMKVY is critically dependent on social and community mobilization, which involves the active participation of target beneficiaries in organized Kaushal and Rozgar Melas and mobilization procedures. To make sure that quality design criterion is met, the Skills Development and Management System (SDMS), self-audits, call validations, unexpected visits, and the use of SDMS are all used.

By December 31, 2021, the PMKVY was anticipated to have assisted 13.4 million candidates nationwide. The number of individuals who have obtained certification in the domain of PMKVY-Short Term Training (STT) stands at 5.389 million. In a variety of industries, 2.37 million qualified applicants have been effectively hired nationwide (PIB, 2022). 295,000 of these applicants have achieved the status of independent contractors. A multitude of educational programme has provided documentation supporting the notion that the national policy fosters economic development and expansion [12]

1.3 National Skill Development Corporation (NSDC)

The NSDC, created in 2009 as a public-private partnership, works to improve job development in India. To fill in skill gaps, NSDC works with many different businesses to create training programs. Many fields, such as building, healthcare, information technology, and automotive, have been able to get skilled workers thanks to the NSDC. The program has helped close the gap between urban and rural areas by giving training to people who live in rural places as well. One important thing that the NSDC has done is set up Pradhan Mantri Kaushal Kendras (PMKKs), which are skill-development centres for young people across the country. Not only have the PMKKs helped millions of people get an educational programme, nevertheless they further supported many other businesses grow. The NSDC has also done a lot to encourage people to start their businesses in India.

This initiative has facilitated the provision of financial aid and training to aspiring entrepreneurs, with a specific focus on those operating within the MSME sector. This has produced employment opportunities and sustained the expansion of the MSME sector, both of which have been beneficial to the economy.

NSDC operated 8,503 training centres in India as of 2019 via a network of 443 training partners. The placement rate for the 9.95 million individuals trained by the NSDC through fee-based courses was 49.3% [13]. Of these, 4.91 million secured employments due to the training. The NSDC had augmented its network throughout India to 10,373 training centres and 538 training partners by 2022. During this period, the NSDC provided training to 20.45 lakh individuals, of which 1.86 lakh secured employment [14].

The considerable influence that vocational education can exert on economic development and growth is illustrated by these case studies. Vocational education can contribute to the development of an economically viable workforce by imparting specialized knowledge and abilities to individuals across diverse industries facilitated by initiatives such as PMKVY and NSDC, the Indian government has contributed to economic expansion and enabled millions of individuals to improve their skill sets.

1.4 Sustainable Economic Development Assessment (SEDA)

Presently, world leaders are placing significant emphasis on the transition from relying solely on GDP as an indicator of a nation's prosperity to the establishment of a holistic development scenario. Sustainability, the economy, and the environment—the three primary domains of sustainable development-are evaluated using SEDA scores. True development comprises ten additional dimensions or sub-parameters, of which the three are merely a subset: the environment, government, civil society, income, employment, infrastructure, economic stability, and health and education.

The three fundamental elements are:

1. Economics 2. Investments 3. Sustainability

These three crucial determinants consist of the following 10 elements: per capita GDP, social stability, environment, income, employment, health, inequality, governance, and civil society. SEDA calculates a coefficient of transition from GDP wealth to overall well-being by establishing relationships between previous variables and variations in per capita GDP. Employment (unemployment and employment rates), economic stability (inflation and GDP volatility), and income (wealth) comprise this facet of economics. Infrastructure (including water, sanitation, transportation, and communication); health (including mortality and morbidity rates); and education (including access to and equity in education) are the three spheres that comprise investment. The sustainability element comprises the following: income inequality (differences in income), governance (responsibility, stability, and quality of government), the environment (conditions of the environment), and civil society (gender equality and interpersonal relationships).

Economics	Investment	Sustainability
▪ Income	▪ Health	▪ Income Inequality
▪ Economic Stability	▪ Education	▪ Governance
▪ Employment	▪ Infrastructure	▪ Civil Society
		▪ Environment

Figure 2: Ten Dimensions of SEDA

The ten dimensions of sustainable economic development, as illustrated in Figure 2, were computed to comprehend the transition of each nation from a prosperous to a welfare state status. The initial component of income is wealth, which is computed as the GDP per capita. Volatility in GDP growth and inflation are both components of the economic stability definition. Income inequality refers to the inequitable distribution of earnings among members of a specific demographic, in contrast to employment inequality which encompasses both unemployment and employment rates. Civil society is bounded by gender equality, civic engagement, and relationships within and beyond the community. Nonetheless, governance takes into account civic and economic liberty in addition to the effectiveness and accountability of the administration. Education quality and accessibility are crucial determinants of health, and they influence the mortality rates of a population. Equal importance is attributed to the integrity of transportation systems, water supplies, environmental regulations, and enhancements.

2. LITERATURE REVIEW

P Mukherjee.al (2018) [15] mentioned that present-day global head are significantly far more active with developing a holistic development scenario than with relying solely on the GDP as an indicator of a nation's prosperity. This work intends to furnish a comprehensive outline of the ongoing endeavours to discern a nation's capacity to convert growth in GDP into wealth using Sustainable Economic Development Assessment (SEDA) scores. Sustainability, the environment, and the economy are the three overarching factors considered by SEDA when assessing sustainable development. It conducts a benchmarking study of the present and evolving sustainable development scores of the G20 nations. A case study was steered harnessing 2016 data to ascertain the genuine and anticipate scores, in addition to illustrate the temporal evolution of the scores. Furthermore, to determine the global standing of these scores in their entirety, a comparison was made with the global median. However, upon applying analysis of variance to the data, it is determined that the variance of scores for specific dimensions and countries among the G20 nations varies statistically significantly.

I Lapinskaitė et.al; (2020) [16] discussed the discourse surrounding the imperative of attaining sustainable economic development, which safeguards natural resources, prevents environmental damage, and mitigates social conflicts, and has gained significant traction in recent times. This study looks at the state of economic progress and the nature of work environments in the G20 countries beginning from 2013 to 2018. This is because the economies of these countries make up most of the worldwide economy and are also the fastest-growing in the world. An analysis in science is done in this study to look closely at the ideas behind the consistent growth initiative and its goals, with a focal point on goal 8: creating good jobs and growing the economy. Amidst 2013 and 2018, Japan had the momentous industrial development and the best working conditions, as shown by the results. The United States comes in at number two, and the country of the Republic of Korea is in third place. The bottom three are South Africa, Brazil, and Argentina. Relevance, practical consequences, and being different. Considering the complexities involved in assessing the advancing towards consistent growth objectives, including work environment and economic development, the outcomes may provide policymakers, economists, and other partners with good prospects into the future.

NSB Maria et.al., (2021) [17] determined the effect of various macroeconomic indicators on the corruption index in the member nations of the G20. The variables considered include economic openness, GDP per capita, inflation, educational attainment, and government efficacy index. To enhance comprehension of the correlation between education and corruption in G20 member states, unanalysed control variables were employed to represent supplementary macroeconomic parameters. It was discovered that the degree of corruption in all G20 member states—developed and developing—was not substantially impacted by either the lifelong learning index or attendance at elementary school. Robust statistical evidence indicates that secondary school enrolment is negatively correlated with levels of corruption in all country categories (developed, developing, and all members). The percentage of individuals enrolled in postsecondary education was established to have a adverse and statistically significant correlation with corruption levels in both developing and member nations.

S Gautam et.al., (2021) [18] presented the correlation between entrepreneurial dynamics and industrial development in the G-20, this review takes into deliberation the comparative effects of economies in lower and higher income brackets. From 2001 to 2016, time-series data on particular nations were aggregated using an

econometric model, provided that the dataset was accessible. This required the aggregation of cross-sectional data from each country. The Global Competitiveness Index (GCI) and GDP per capita (adjusted PPP) are indicators of competitiveness and economic development, respectively, whereas the dynamics of entrepreneurship are denoted by Total Entrepreneurship Activity (TEA). Entrepreneurial activity is significantly correlated with the corresponding GDP and GCI in a positive direction. Furthermore, entrepreneurial endeavours are significantly swayed by the control variable. Based on the results of the regression model, economic growth, and competitiveness have a substantial outcome regarding entrepreneurial dynamics of G-20 nations. To expedite the adoption of the Schumpeterian framework and the pace of progress, the findings indicate that more different approach are required. Promoting inventive and innovative entrepreneurship should be a top priority for policymakers seeking to support economic growth and development.

P Dixit et.al (2023) [19] proposed the effect vocational training has on development and economic expansion. The training and education that gives students the knowledge and skills they need to work in fields that need those skills and knowledge is called vocational education. Vocational education has many economic benefits, such as higher productivity, less poverty, more jobs, and a boost to the GDP. The review not just moot about countries that have done vocational education programs well, but it also looks at how vocational education has helped technology advance. In the end, it talks about the strength and weaknesses of vocational education and gives lawmakers and other individuals with an interest some ideas. They show that investing money into technical education could help the economy grow and move forward in a big way. This is why people who make decisions and have a stake in the economy should put academic achievement at the top of their prioritized lists when they formulate proposals and plans for economic growth.

3. METHODOLOGY & EXPERIMENTATION

3.1 Data

The United States, Canada, India, Russia, Argentina, Brazil, Mexico, France, Italy, the United Kingdom, Indonesia, Japan, and South Korea were among the nations that provided the data. The database duration dates from 2007 to 2017.Enrolment in primary, secondary, and post-secondary education, economic openness, inflation, per capita GDP, Educatex (a long-term learning indicator derived from principal component analysis), and economic openness constituted the independent variables. The CPI (Table 1) was utilized as the criterion to discover the degree of corruption. The secondary data utilized in this analysis are readily accessible; they originated from the World Bank and Transparency International.

Table 1. Variable list.

Variable	Explanation	Source
Corrupt $_{it}$	Corruption Perception Index (0–10)	[14]
β_0, γ_0	Intercept	[14]
GDPC $_{it}$	Gross Domestic Product per Capita (Current US$)	[14]
GDPC $_{it}$	Gross Domestic Product Per capita Estimate	[14]
Gov $_{it}$	Government Effectiveness Index (−2.58 to 2.59)	[14]
Inf$_{it}$	Inflation (%)	[14]
Openness $_{it}$	Trade Openness ((Export + Import)/GDP)	[14]
Edu $_{it}$	Primary School Enrolment	[14]
	Secondary School Enrolment	[14]
	Tertiary School Enrolment	[14]
	Educate x (lifelong learning index, obtained by Principal Component Analysis (PCA))	[14]
$\gamma_1, \beta_1, \beta_2, \beta_3, \beta_4, \beta_{5-8}$	Regression coefficient	
μ_{it}, μ^*_{it}	Error term	

3.2. Two-Stage Least Squares (2SLS) Regression

To resolve endogeneity concerns and substantiate the theory of a causal relationship between the GDP per capita and the corruption variable, this study employed two-stage least squares (2SLS). It comprises two consecutive iterations of ordinary least squares (OLS).The following is the equation for 2SLS regression:

$Corrupt_{it} = \beta_0 + \beta_1 GDPC_{it} + \beta_2 Gov_{it} + \beta_3\ Inf_{it} + \beta_4 Openess_{it} + \beta_5{-}_8 Edu_{it} + \mu_{1it}$

$GDPC_{it} = \gamma_0 + \gamma_1 Corrupt_{it} + \mu_{2it}$

In the initial stage, dependent parameters are regressed against predetermined parameters using 2SLS attributes to the over-identification of the equation. Consequently, upon substituting the estimated values of GDPC and Corruptit in the second stage, the final equation becomes as follows:

$Corrupt_{it} = \beta_0 + \beta_1 GDPC_{it} + \beta_2 Gov_{it} + \beta_3\ Inf_{it} + \beta_4 Openess_{it} + \beta_5{-}_8 Edu_{it} + \mu^*_{1it}$

$GDPC_{it} = \gamma_0 + \gamma_1 Corrupt_{it} + \mu^*_{2it}$

3.3. Principal Component Analysis (PCA)

To resolve endogeneity concerns and substantiate the theory of a causal relationship between the GDP per capita and the corruption variable, the present investigation employed two-stage least squares (2SLS). PCA, a statistical technique, is used to divide a larger amount of the total variance into uncorrelated variables while minimizing the number of highly linked variables. Applying an eigenvalue larger than one allows one to calculate intake variables produced by the PCA.

The first principal component (first PC) in Table 2 represents almost 61% of the entire data, with an eigenvalue of 1848.Educatex is the designation assigned to the solitary index generated by the PCA.

Table 2. PCA that formed the educational index (Educatex).

	PSE	SSE	TSE	Proportion (%)	Cumulative Proportion (%)	Eigen Value
First PC	−0.699	0.661	0.241	61.599	61.599	1.79
Second PC	0.699	0.550	-0.340	25.070	86.669	0.80
Third PC	0.861	0.064	0.470	13.400	100.1	0.41

4. RESULTS & DISCUSSION

4.1. Descriptive Statistics

In contrast to developing nations, affluent countries exhibited comparatively reduced levels of corruption (approximately 1/9) and inflation (approximately 1/9), as indicated by CPI data (Table 3). Globally speaking, industrialized countries outperformed emerging countries in terms of GDP per capita, economic openness, and government effectiveness. In comparison to the six developing nations, the seven developed nations exhibited an economic output proportionately was five times greater. Developing countries exhibited a significantly higher mean primary school enrolment rate in comparison to developed countries within realm of education. Befitting with the results drawn in before that established a causal link between the two variables (e.g., GDP per capita and economic growth), these outcomes stipulate considering corruption and both of these factors are inversely related. There exists a negative correlation between a nation's GDP per capita and its level of corruption.

Table 3. Descriptive statistics.

Indicator	CPI			GDP/CAP			GPF-EFF			Inflation			Openness		
	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C
Mean	5.080	6.59	3.30	25,577.60	40868.910	7893.5	0.683	1.349	-0.09	5.423	1.287	10.24	0.503	0.55	0.44
Median	4.3	7.200	3.400	24,358.78	41793.5	10119.3	0.422	1.477	-0.11	2.563	1.547	7.48	0.51	0.56	0.46
Maximum	8.4	8.400	4.300	59,927.93	53382.7	1173.8	1.854	1.854	0.345	41.119	3.997	41.11	1.1	1.1	0.77
Minimum	1.3	1.900	1.300	998.522	20385.3	3962.01	-0.47	0.198	-0.47	-2.316	-2.31	1.53	0.22	0.24	0.22
Std. Dev	2.041	1.434	0.588	17902.69	8828.6	-0.696	0.801	0.438	0.199	7.378	1.270	8.55	0.18	0.20	0.14
Skewness	0.16	-1.35	-0.93	0.118	0.908	1.686	0.094	-1.29	0.261	2.48	-0.66	1.79	0.72	0.57	0.13
Kurtosis	1.466	4.292	4.630	1.491	2.952	66	1.296	3.608	2.443	10.10	3.379	6.09	3.80	3.23	2.39
Observation	143	77	66	143	77		143	77	66	143	77	66	143	77	66

Indicator	Educate x			Primary			Secondary			Tertiary		
	A	B	C	A	B	C	A	B	C	A	B	C
Mean	0	0.66	-0.77	106.70	101.471	110.659	96.53	102.83	88.9	59.30	70.59	46.50
Median	0.38	0.58	-0.86	102.90	101.532	109.439	99.51	101.50	91.98	61.74	63.85	36.83
Maximum	1.25	1.24	0.94	134.54	107.109	134.519	126.4	126.40	108.82	104.30	104.30	59.89
Minimum	-2.45	-0.19	-2.46	95.69	97.701	95.679	57.38	91.60	57.30	13.20	52.50	13.20
Std. Dev	1	0.34	0.98	7.466	1.969	8.459	12.72	7.44	13.50	23.024	15.60	23.70
Skewness	-0.84	0.049	0.20	1.834	0.110	1.070	-0.81	1.80	-0.68	-0.100	0.929	0.44
Kurtosis	2.50	2.29	1.83	6.945	2.969	4.430	4.47	6.30	2.50	2.30	2.40	1.62
Observation	142	76	65	142	76	65	142	76	65	142	75	65

4.2. Two-Stage Least Square (2SLS) Analysis

Table 4 shows the four models for the purpose of data analysis. These models describe the instructional variables secondary school enrolment, elementary school enrolment, and tertiary school enrolment (Educatex). Thirteen countries that are part of the G20, developing nations (including Argentina, Brazil, Mexico, and Indonesia), and developed nations (including Canada, the US, France, Italy, Japan, and South Korea) made up the last three groups of the study.

The initial hypothesis that required examination was the inverse relationship between education and corruption within the G20. Only secondary school attendance among the four factors analysed demonstrated a statistically significant decline in corruption levels in both developed and developing member states, according to the education sector's findings. In the G20 countries, Educatex did not have a significant impact on corruption when continuous literature was assessed applying multitudinous variables. A correlation between primary school enrolment and levels of corruption in the G20 nations was not established, in accordance with the conclusions of this study. In contrast, primary school enrolment was a critical factor in the eradication of corruption, in keeping with the outcome of an additional study that examined 123 countries. An intriguing finding emerged within the developed member nations: there was a positive correlation between enrolment in tertiary education and the prevalence of corruption. This result was consistent with the research findings, which indicated that corruption increased with higher levels of education. A greater proportion of individuals (13.7%) are influenced by their undergraduate or graduate degrees; consequently, they are more prone to participating in corrupt practices in

comparison to those lacking such a formal education. These findings suggest that individuals with advanced degrees residing in developed nations are more prone to engaging in unethical practices.

Assessing the second hypothesis which investigated the correlation between GDP and corruption within developing G20 countries in addition its potential to mitigate corruption in developed G20 countries, bring about the outcome considering corruption levels were substantially impacted by GDP per capita across all models and data sets. The finding is in line with studies that have shown a relationship between the gross domestic product and the intensity of corruption. The findings signify the distinction between developed and developing nations was not statistically significant. As predicted, corruption and GDP per capita in each region of Italy would have a negative correlation. However, the findings contradicted this hypothesis.

Furthermore, upon conducting a 2SLS regression analysis with a third hypothesis regarding the adverse impact of government effectiveness on corruption levels in the G20, a statistically significant correlation was observed between the two variables. In both developed and emerging member states, a decrease in corruption is positively and strongly connected with government efficiency. Thirty countries experience a decline in corruption levels as the government index increases. This suggests that as the governance index of a country increases, so does the degree of corruption within that country.

Conforming with the analytical processing conducted to study the fourth hypothesis concerning the positive correlation between inflation and corruption levels among G20 members, a significant correlation was observed exclusively in the model pertinent to developing nations. This aligns in accordance with the conclusions of an investigation that analysed data from 97 countries spanning three distinct income-level categories from 2002 to 2010. All 97 countries showed a statistically significant and positive correlation between inflation and corruption, according to the analysis.

Table 4. Results of the two-stage least square (TSLS).

Dependent Variable = Corruption Perception Index (CPI)											
	Model 1			Model 2			Model 3			Model 4		
Variable	A	B	C	A	B	C	A	B	C	A	B	C
C	3.84	2.72	4.990	6.089	5.940	4.800	2.830	0.720	3.760	3.920	4.532	4.870
	(0.399)	(0.610)	(0.311)	(1.463)	(3.86)	(1.115)	(0.730)	(0.940)	(0.700)	(0.410)	(0.609)	(0.240)
GDPC	3×10^{-5}	4×10^{-5}	-2×10^{-5}	3×10^{-5}	4×10^{-5}	-1×10^{-5}	3×10^{-5}	3×10^{-5}	-4×10^{-5}	3×10^{-5}	2×10^{-5}	-2×10^{-5}
	(7×10^{-6})	(9×10^{-6})	(9×10^{-6})	(7×10^{-6})	(1×10^{-5})	(7×10^{-6})	(7×10^{-6})	(8×10^{-6})	(1×10^{-6})	(7×10^{-6})	(8×10^{-6})	(9×10^{-6})
Gov Eff	1.095	1.739	0.880	1.032	1.600	0.720	1.06	1.908	0.700	1.080	2.039	0.849
	(0.270)	(2.270)	(2.80)	(0.280)	(0.280)	(0.298)	(0.280)	(0.206)	(0.277)	(0.280)	(0.192)	(0.290)
Openness	-0.466	0.490	-2.970	-0.580	0.440	-2.858	-0.380	-0.620	-2.700	-0.385	-0.390	-2.890
	(0.571)	(0.690)	(0.430)	(0.580)	(0.680)	(0.555)	(0.580)	(0.600)	(0.432)	(0.570)	(0.520)	(0.392)
Inflation	0.009	-0.077	-0.017	-0.010	-0.085	-0.015	-0.008	-0.064	-0.017	-0.006	-0.020	-0.016
	(0.010)	(0.058)	(0.007)	(0.010)	(0.059)	(0.008)	(0.020)	(0.053)	(0.008)	(0.014)	(0.054)	(0.009)
Educate x		-0.220	0.042		-0.030							
		(246)	(0.079)		(0.036)							
Primary Enrolment				-0.022		0.001						
				(0.014)		(0.009)						
Secondary Enrolment							0.011	0.027	0.014			
							(0.008)	(0.011)	(0.009)			
Tertiary Enrolment										-0.005	-0.019	0.0011
										(0.003)	(0.006)	(0.005)
R	0.610	0.680	0.401	0.600	0.640	0.40	0.604	0.780	0.43	0.630	0.800	0.400
Ad R2	0.592	0.670	0.360	0.601	0.620	0.42	0.600	0.770	0.38	0.61	0.79	0.40
F-stat	41.794	31.600	7.990	40.500	25.099	7.900	41.300	49.51	8.69	44.62	55.33	7.90

Based on the statistical findings, the fifth hypothesis posits that economic openness is going to have a substantial influence on corruption reduction in developed members of the G20, but not in developing countries. This is rational with the assertions put forth by those who contend that a decline in economic transparency substantially contributed to the escalation of corruption. Several factors, including a poor economic structure, an overly active government, a dearth of both high-quality and high-volume oversight institutions, sluggish social development, and low pay for public personnel, may be contributing to this. This discovery suggests that a distinct correlation exists between the degree of economic openness and the prevalence of unethical practices within these nations. Therefore, it is possible that unethical conduct could compromise the credibility of import and export operations in these developing nations. This investigation contradicts the hypothesis that economic

openness has a substantial impact on the battle against corruption only in developed nations and not in developing ones. The findings, nevertheless, corroborate this result among those who employed panel data encompassing 175 countries from 2012 to 2018. Every standard deviation increases in corruption, as measured by a rise in the reversed CPI value, was found to result in a 17% decline in real GDP per capita. Foreign direct investment (FDI) is reduced and inflation rises due to corruption.

Furthermore, an analysis and synthesis of data from developed member nations revealed a robust correlation between the decline in corruption levels and per capita gross domestic product. This indicates that nations with a greater per capita gross domestic product have lower corruption rates. Within this frame of reference of developing member countries, it is noteworthy that an upsurge in corruption was accompanied by a rise in GDP per capita thereby combination of extreme disparity and a comparatively low per unit of population in developing nations. Developing countries, excluding the United States, which has an exceptionally high per capita income, exhibit marginally greater degrees of income distribution inequality than developed countries, as standardized through Gini Index (Figure 3). This demonstrates that the extreme inequality in developing nations is attributable to control about country's income by a small minority.
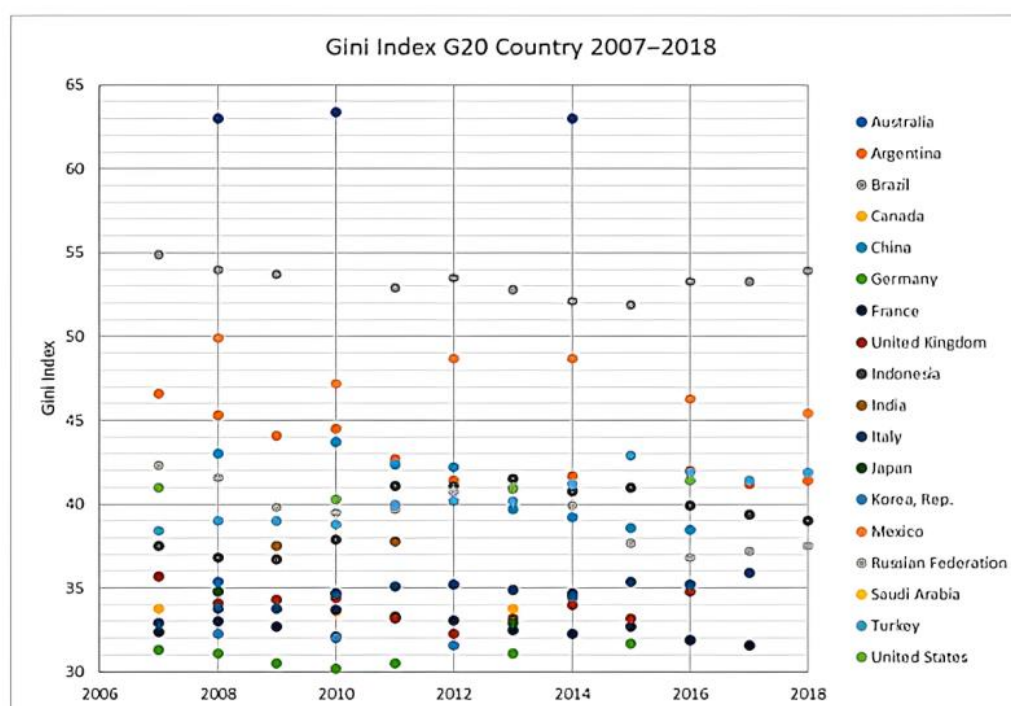

Figure 3. Gini Index of G20 countries during 2007–2018.

The descriptive statistics revealed that the inflation rate in developing member countries was higher than that of industrialized nations, which showed a higher level of stability. Given that inflation in these nations had a substantial impact on the rise in corruption, the propensity for price increases in developing nations could also contribute to an upsurge in unrest.

CONCLUSION

In conclusion, comparing education as an investment to economic growth and development throughout the G-20 shows interesting patterns and trends. Education's varied function in moulding the economy attain a critical investment for growth and development in accordance with the report. The analysis shows that education boosts economic growth across the G-20. Primary, secondary, and tertiary education affect economic indices differently. Higher education boosts human capital, innovation, and productivity, sustaining economic growth. The comparison research also provides subtle insights into educational investment efficacy across economic circumstances. A well-educated workforce promotes established economies in developed nations. Strategic education investments can speed growth in emerging countries, where the relationship is more fluid. The review

also features the need for policy actions to enhance education's economic growth benefit. To maximize educational returns, targeted efforts including extending access to quality education, skill development, and lifetime learning are essential. The conclusion emphasizes that education, as an investment, shapes G-20 economies. Recognizing and exploiting education's potential is crucial for sustained economic growth and development as nations negotiate global economic forces.

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