The Dynamics of Corruption, Human Capital Development and Economic Performance in Nigeria

[*]Ibrahim Adeolu Bakare[1] and [*]Azuka Elvis Ozegbe[2]

[1] Dept of Economics Lagos State University, Lagos, Nigeria
[2] Dept of Economics Lagos State University, Lagos, Nigeria

[*]E-mail: elvisozegbe@gmail.com

Received: 20 Feb, 2022
Accepted for publication: 25 April, 2022
Published: 27 June, 2022

Abstract

This study examined the relationship among corruption, human capital development and Nigeria's economic performance with the motivation to answer questions linked to empirical data reported in recent literature. The study deployed the Auto Regressive Distributed lag (ARDL) to test the short-run and long-run relationship among dependent and independent variables using annual time series data from the World Bank's Development Indicators and the Central Bank of Nigeria over the period 1982 to 2020. Stemming from the empirical results, the short-run estimates revealed that human capital development, gross fixed capital formation, and government expenditure exert a positive and statistically significant impact on Nigeria's economic performance. However, the long-run estimation results indicate that corruption, government expenditure and trade openness exert a negative impact on economic performance. In the nutshell, economic performance responds negatively to changes in the country's level of corruption overtime. Nevertheless, it reacts positively to the changes in human capital development in the long-run. This implies that, with the availability of appropriate policies and resources, human capital development has the potential to massively enhance Nigeria's economic performance in the long-run. The nature of linkage between corruption and economic performance through human capital development remains less defended in the economic and social literature.

Keywords: Corruption, human capital development (HCD), economic performance, Nigeria and autoregressive distribution lag (ARDL)

Introduction

Nigeria has one of the largest economies in Africa and it was among the fastest growing economies in the world between 2001 and 2015, yet it has the most people below the poverty line compared to other emerging and frontier economies (Bakare and Edozie, 2015; African Development Bank, 2017; Udemba, 2020). There are six geo-political zones filled with enormous natural resources, ranging from high deposits of crude oil and natural gas to large volumes of solid minerals in many parts of the country. Yet, Nigeria ranks high on measures of corruption, it is plagued by low education quality, and it is not a strong global competitor. With Nigeria being "one of the world's most youthful countries" (World Bank, 2020) it is expected that this favourable age profile would be associated with high levels of productivity, an active labour force, and developing economies with a high growth rate. However, in terms of education, Nigeria does not have an encouraging outlook. As of 2020, Nigeria

had the highest rate of exclusion of children from school in Africa, even though primary education is officially free and compulsory, about 10.5 million of the country's children aged 5-14 years are not in school. Only 61 per cent of 6-11-year-olds regularly attend primary school and only 35.6 per cent of children aged 36-59 months receive early childhood education (UNESCO Institute for Statistics, 2020).

In the country's north, the picture is even bleaker, with a net attendance rate of 53 per cent. Getting out-of-school children back into education poses a massive challenge. Gender, like geography and poverty, is an important factor in the pattern of educational marginalisation. States in the north-east and north-west have female primary net attendance rates of 47.7 per cent and 47.3 per cent, respectively, meaning that more than half of the girls are not in school. The level of poverty in one of Africa's largest economies has become worrisome in recent years. The National Bureau of Statistics (NBS) released the "2020 Poverty and Inequality in Nigeria" report, which highlights that 40 per cent of the total population, or almost 83 million people, live below the country's poverty line of 137,430 naira ($381.75) per year. Statistical evidence revealed that human capital is weak in Nigeria and such weakness emanates from the high level of corruption and poverty prevalence in the country and vice versa. Childhoods that are disadvantaged with little to no education culminate in a human development trap. The human development trap will confine families and in the long run, generations, in cycles of poverty (Beegle and Christiaensen, 2019; Omodero, 2019a). Thus, human capital investment is necessary to correct this deep-rooted problem caused by a high level of corruption and poverty. Nevertheless, Anetor (2020) examined the nexus among financial development threshold, human capital development and economic growth in Sub-Sahara African economies. Also, Nwani (2021) investigated the linkage between human capital interactions and foreign aid-growth among some selected South-Asian and Sub-Sahara African countries. However, both studies completely ignored the critical importance of corruption phenomenon as a barrier to human capital development and the overall economic performance of the countries considered in their inquiry. Corruption has been adjudged to have a devastating effect on the ability of governments at level to carry out their primary responsibilities; in the private sector to grow and create employment; on the talents and energies of people to add value in productive ways; and ultimately on societies to lift themselves out of poverty' (Hope, 2017; Dorasamy, 2021).

In the economic and social literature, several studies have investigated how corruption directly or indirectly affects economic performance through investment (Ogunlana *et al.,* 2016; Nguedie, 2018; Sbaouelgi, 2019; Bitterhout and Simo-Kengne, 2020); government spending (d'Agostino *et al.,* 2016; Mauro, 2017; Lawal and George, 2020) bureaucracy (Papaconstantinou *et al.,* 2013; Gans-Morse *et al.,* 2018; Laajaj *et al.,* 2019) and institutional quality (Ojeka *et al.,* 2019; Osabiyi *et al.,* 2019; Tran *et al.,* 2021) among others. However, corruption affects not only economic performance through investment, government spending bureaucracy, institutional quality and other transmission channels, but also through its impact on human capital formation (Seka, 2013). Therefore, corruption and economic performance are also connected through human capital formation. To the best of our knowledge, the nature of linkage between corruption and economic performance through human capital development remains less defended in the economic and social literature. Part of the motivation for this inquiry is to provide an empirical insight on how corruption could undermine human capital formation through the discouragement of young adults and adults from undertaking long-studies advanced educational attainment, which could have an adverse impact on future economic performance. To close the research gaps and improve the limitations of extant studies, this study built its framework on the Barro (1990) endogenous growth theory. This study ascertains the mediating role of human capital development in the corruption and economic performance nexus. The study used the autoregressive distributed lag (ARDL) to test framework built on the Barro (1990) endogenous growth theory.

The contribution of this study to knowledge is two-fold. From a theoretical standpoint, this study affirmed the position of Barro's (1990) endogenous growth theory on the role of human capital formation on economic performance. Second, the study also extended the theory by incorporating corruption into the origin of Barro's (1990); based on that the study revealed the critical importance of corruption in determining the performance of the Nigerian economy. Such a theoretic extension would contribute invaluably to the assessment of corruption and growth in economic and social literature. Finally, the study improved on previous studies (Ogunlana *et al.,* 2016; Ondo, 2017; Sbaouelgi, 2019) by utilising the autoregressive distributed lag (ARDL) technique is more efficient with small and finite sample data sizes; it produces unbiased results that are reliable and valid for policy suggestions.

The outline of the study is as follows. The second section contains the theoretical foundation and empirical review. The third part contains the methodology, the fourth part presents the study's analysis, the fifth part discusses the findings, the sixth part presents the conclusion based on the results, and the final part of the provides the implications and future research directions.

Literature Review

Theoretical Foundation

The endogenous growth theory propounded by Romer (1986) and Lucas (1988) led to renewed interest in economic growth analysis. An essential advantage of the endogenous model over traditional growth models is that, through the assumption of constant or increasing returns to a factor input, in particular human capital, it is possible to define the absence of income and growth convergence between countries and to account more fully for the residual factor in Solow-type analyses. The "growth

accounting" exercises, popularised by Barro and others (Barro, 1991, 2000; Barro and Sala-i-Martin, 1992), fall within the generalised Solow-type growth model. The essential feature of this approach is the inclusion of various indicators of economic structure. Most empirical research using this approach has found evidence of "conditional" convergence, where convergence is conditional on the level of availability of complementary forms of investment, including human capital and a supportive policy environment. This suggests that the failure of developing countries to converge on the income levels of developed countries may be attributed to institutional factors.

Variants of endogenous growth models, including Lucas (1988) Model, Barro (1990) Model, AK models of Rebelo (1992) and others have demonstrated that policy variables can have a significant impact on long-run economic growth. This thesis will adopt the famous Barro (1990) model, which is an outgrowth of Romer (1986) model. This is because the model permits the inclusion of a broader range of policy variables, including corruption. This model provides both the theoretical foundation and analytical tool for the analysis of the impact of corruption on economic growth in Nigeria. The model assumes the economy comprises the public sector (G) and Private sector (P). Since the investment by the public sector in infrastructure can make the private sector more profitable, it is assumed that the output of (G) exerts some externalities on the output of the private sector. The model also assumes that the government levies an income tax and runs a balanced budget.

Corruption and Human Capital Development

Dridi (2014) examined the linkages between corruption and human capital in a cross-country study. The study used multiple proxies for human capital such as school enrolment rate and secondary school repetition rate and other indicators. The study deployed the two-stage least square technique to analyse the cross-country data generated for the study and revealed that the countries with a higher degree of corruption reported a higher secondary school repetition rates. It also showed that a one-point rise in corruption led to a decline in secondary school enrolment by ten points. Boikos (2016) assessed the impact of corruption on human capital accumulation. The study asserted that corruption influences human capital in a non-linear manner through a dual channel. The dual channels are its impact on public spending on education and public investment in infrastructure. The study employed the ordinary least square and two stage least square techniques in its analysis. The finding shows that the impact of corruption on human capital through its effects on infrastructural investment is higher than its adverse effect on public spending on education. Ortega *et al.* (2016) investigated corruption and convergence in human development in sixty-nine emerging economies.

The study posited that human developments in developing economies are required to "Catch Up" with the prevailing rates in developed economies. The study disaggregated the human development index into three compartments: gross national income per capita, life expectancy at birth, and average years of schooling. The study used ordinary least square estimation techniques to analyse the relationship between corruption and human development and the result shows that corruption is detrimental to human development because it encourages the diversion of resources from the social welfare system and thereby impedes economic growth. More so, the economies with the higher corruption incidence had the slowest rate of convergence in human development and vice versa. Thi (2019) examined the impact of human capital accumulation in sixty-three Vietnamese regions. The study used dynamic ordinary least square approach to assess the effect of corruption on the nation's educational processes, the effect on educational outcome and how it transforms into a positive labour productivity. The result revealed that corruption adversely affected secondary school enrolment rate because of the declining public investment in education. From the above empirical review, this proposes to the hypothesis stated below.

Hypothesis 1 (H_0): Corruption has no significant impact on human capital development in Nigeria.

Human Capital Development and Economic Growth

In the economic and social literature, human capital was adjudged to be a critical determinant of economic performance. Mankiw *et al.* (1992) and Barro (2001) investigated human capital and economic performance nexus and revealed that economic performance has a plethora of determinants. However, human capital is considered as one of the most critical determinants of performance.

Most of the existing empirical studies on the human capital–economic growth nexus focused only on the one-to-one relationship between education and economic growth on the one hand, and health and economic growth on the other (Aka and Dumont, 2008). Boachie (2015) assessed the growth effect of health in the Ghanaian economy from 1982 to 2012 using an auto-regressive distributed lag (ARDL) bound test approach as its analytical tool. The study revealed that economic growth is significantly accelerated by the health sector's performance in the short and long-run. It also indicated that the effect was significantly lower in the short-run than the long-run. Bloom *et al.* (2004) posited that human capital and economic performance is directly cointegrated, employing the two stage least square technique in its analysis. The study found that life expectancy and schooling (primary and secondary) education are essential factors that speed up economic performance. Omotayo (2015) assessed the link between human capital and economic growth in Nigeria using ordinary least square technique to analyse the

data covering the period 1980 to 2012. The study showed that human capital exerts a positive impact on Nigeria's economic growth. Siddiqui and Rehman (2017) investigated human capital and economic growth nexus in nine selected East and South Asian economies. The study used the empirical Bayesian methodology, which focuses not only on heterogeneity issue but also deployed the common structural prior of regional countries to generate efficient estimates of the effects of human capital on the stock and rates of economic growth. The study revealed that primary and secondary education was more relevant in explaining the instability in the economic growth of East and South Asia. Wang and Liu (2016) examined education, human capital and economic growth relationship using different proxies of human capital for a panel data of selected European nations between 1995 and 2009. The study used a random effect model and indicated that the chosen education variables exert a significant positive impact on economic growth.

Nowak and Dahal (2016) empirically affirmed that high school and tertiary education contributed significantly to Nepal's economic performance by employing the ordinary least square regression approach to assess the time series data spanning 1995 and 2013. It also posited that elementary education had a positive effect on economic performance, although such effect was adjudged to be insignificant. Obialor (2017) studied the impact of human capital investment on the economic performance of the South African, Nigerian, and the Ghanaian economies. The study used a vector error correction model and cointegration techniques for testing the relationship among variables. The finding shows that human capital has varying effects on the growth of the three economies and posited that the impacts of human capital investment on economic growth are country-specific. Ogundari and Awokuse (2018) revisited the debate on the contribution of human capital to economic growth in thirty-five selected Sub-Sahara African economies from 1980 to 2008. The study used a dynamic model based on the system generalised method of moments (SGMM) as its analytical techniques. The empirical finding revealed that the two measures of human capital have a direct impact on economic growth, although the reported impact of health is relatively higher than that of education. The finding implies that the relevance of both indicators of human capital and conforms to the ongoing debate in the literature that neither health nor education are superior substitute for the other as an indicator of human capital. From the above empirical review, hypothesis 2 is proposed.

Hypothesis 2 (H_a): Human capital development does not have a significant effect on Nigeria's economic growth.

Corruption and Economic Growth

There is a 'chicken and hen paradox' in the relationships between corruption and economic growth in the economic literature. The "sand in the wheel" school of thought considers corruption as a phenomenon that leads to theft and embezzlement by public officials, leading to a net capital loss (Alam, 1989). Because of this institutionalised corruption, governments' direct tax revenues to non-productive sectors, where bribes are very abundant. As a result, government expenditure on productive projects, such as health care provision and public education may nosedive as they offer fewer possibilities for rent-seeking for public servants (Cieślik and Goczek, 2018; d'Agostino *et al.*, 2016; Shleifer and Vishny, 1993). Several empirical studies support this point of view. Nguedie (2018) examined the channels of transmission of corruption to growth. They concentrated on the human capital channel and show that corruption diverts resources from education investments to power-seeking activities or political capital investments, thus jeopardising long-term growth.

In a recent study, Truong (2020) analysed the relationships between corruption and economic growth by using linear regressions. They reported a similar conclusion as Mauro (1995). According to these authors, the harmful impact of corruption on economic growth is 81% through indirect effects. The study also investigated the channels of transmission of corruption on economic growth, and the results obtained show that investment would be the most critical channel with a contribution of 32%. Ugur (2014) found 327 estimates of corruption's direct effect on per capita GDP growth from 29 studies. The findings of the inquiry show that corruption has a negative effect on per capita GDP growth, but the severity of the effect is small and more adverse in low-income countries. Campos *et al.* (2016) employed meta-regression analysis to a sample of 41 empirical studies comprising 460 comparable estimates of the effect of corruption on economic growth. About 32% of those estimates support a significant and negative impact of corruption on growth, 62% suggest a statistically insignificant relationship, while approximately only 6% support a positive and significant relationship. Kurniawan *et al.* (2020) examined the impact of corruption on the economic growth of 14 Organisation of Islamic Cooperation (OIC) from 2003 to 2010.The study employed endogenous growth theory and economic freedom index for analysis. The findings revealed that corruption had a negative impact on the economic growth of the selected OIC countries.

Leff (1964) argued that corruption can have positive effects on economic growth. According to this school of thought, corruption would act as a "fat needed for the squeaking of wheels of a rigid administration". It is used to "oil the wheels" of economic growth in a context where regulation is omnipresent and cumbersome (weak governance). Bureaucratic corruption is second-best solutions that can effectively reduce the burden of excessive regulation and therefore have positive effects on growth (Egunjobi, 2013; Sharma and Mitra, 2019). In a context of imperfect competition where several market failures prevail because of weak governance measures, corruption can induce positive change by distorting the distorted market, thus bringing dynamic and allocative efficiency (Erum and Hussain, 2019). Proponents of this theory of "functionalism" opine that corruption can be socially beneficial and promote economic growth through multiple mechanisms (Gans-Morseet *al.*, 2018). First,

corruption can raise bureaucratic efficiency by decreasing barriers to economic growth. In countries characterized by complex state regulation and demotivated bureaucrats, corruption sometimes serves as a solution to reduce bureaucracy. It would help entrepreneurs to circumvent expensive delays, circumvent heavy and rigid government regulations and reduce waiting costs (Leff, 1964; Trabelsi and Trabelsi, 2015; Bitterhout and Simo-Kengne, 2020). Ahmed and Asmaa (2016) examined the link between corruption and economic growth among Arab countries. The study used a model with random effect panel data to find out the impact of corruption on economic growth in 15 selected Arab economies between 1998 and 2009. The outcome of the study suggests that the direct effect of corruption on economic growth strongly depends on other variables such as governance. Therefore, the effect of corruption on economic growth seems to be positive, which aligns with the "grease the wheels" hypothesis. From the empirical evaluation of corruption-growth nexus, hypothesis three is proposed to test if corruption is a grease to the wheels of economic performance or otherwise.

Hypothesis 3 (H_a): Corruption has no significant effect on Nigeria's economic performance.

Methodology

Sample and Data

The study employed annual time series data spanning 38 years between 1982 and 2020 for the empirical analysis. The independent variables for this study include corruption, human capital development measured as human development as a percentage of gross national income, investment measured as capital formation as percentage of gross domestic product, government expenditure measured as Government consumption expenditure as a percentage of gross domestic product and trade openness measured as Sum of trade in goods and services measured as a share of GDP. The dependent variable Gross Domestic Product, which represented economic performance in this study, was proxied by the annual growth rate of the real GDP. The data on GDP was extracted from the Central Bank of Nigeria statistical bulletin for the real and external sectors. The data on corruption was obtained from the Transparency International (TI), while the data on human capital development, gross fixed capital formation, government expenditure and trade openness were obtained from the World Development Indicator of the World Bank.

Data Analysis Techniques

The empirical analysis in this study includes the preliminary analysis, estimation and post estimation. The preliminary analysis includes descriptive statistics, unit-roots test and co-integration test. Regarding the co-integration test (bounds co-integration test) and estimation, the study employed Autoregressive Distribution Lag (ADRL) to examine the short-run and long-run relationships. There is evidence of a long-run relationship if the computed F-statistics exceed the upper bound critical value. However, there is no co-integration if the F-statistic is below the lower bound, while the result will be considered inconclusive for a value within lower and upper bounds. The post estimation tests, which include serial correlation test, heteroscedasticity test, normality test and structural stability CUSUM test, were conducted to examine the adequacy and reliability of the specified model.

Model Specification

The theoretical foundation upon which the regression estimation and model is specified is based on Barro (1990) endogenous growth model, popularly referred to as 'Barro Regression Framework' which is an off-shoot of the extended version of the Solow neoclassical growth model (Lucas, 1988; Romer, 1990; Becker *et al.,* 1994). The extended version of the neoclassical growth theory incorporates human capital, permits international mobility of capital and technology, and also permits the inclusion of other wide range of policy variables such as corruption in the econometric model.

Barro (1990) emphasises the role of corruption as it affects growth which possible enter through and is expressed thus:

$$Y = AK^{\beta} G^{(1-\beta)} Lgt \ldots\ldots\ldots\ldots\ldots\ldots (1)$$

Where Y=output a proxy economic growth which is measure in per capita income, A= Total factor productivity, K=investment measures by the gross fixed capital formation and G= government expenditure which is disaggregated into health, education and ICT as an improvement over Barro (1990) model. Thus, the study extends equation 1 above by incorporating other variables to produce the proposed model for estimation. Thus, the functional form is given as:

$$GDPG_t = f(CORPT_t, HCD_t, GFCF_t, GEXP_t, TOP_t,) \qquad (2)$$

In growth literature, the effect of corruption on growth is expressed in terms of the time lag it takes for corruption to affect growth through relevant channels. Where *GDPG* = growth rate of GDP, *CORPT* = corruption, *HCD* = human capital development, *GFCF* = gross fixed capital formation, *GEXP* = government expenditure, *TOP* = trade openness. Hence, the specific ARDL model for this study is expressed as follows:

$$GDPG_t = \theta + \sum_{i=1}^{p} \alpha_i \, GDPG_{t-i} + \sum_{i=0}^{q_1} \beta_{1i} \, CORPT_{t-i} + \sum_{i=0}^{q_2} \beta_{2i} \, HCD_{t-i} + \sum_{i=0}^{q_3} \beta_{3i} \, GFCF_{t-i} + \sum_{i=0}^{q_4} \beta_{4i} \, GEXP_{t-i} + \sum_{i=0}^{q_5} \beta_{5i} \, TOP_{t-i} + \varepsilon_t \quad (3)$$

where p, q_1, q_2, q_3 and q_4, are the respective maximum lags of the dependent variable (*GDPG*) and the explanatory variables (*CORPT*, *HCD*,*GFCF*,*GEXP*, *TOP*) while α_i, β_{1i}, β_{2i}, β_{3i},β_{4i} and β_{5i} are the respective coefficients associated with the dependent variable (*GGDP*) and the explanatory variables at the respective lags.
The ARDL Error Correction Model (ECM) specification is given as:

$$\Delta GGDP_t = \theta + \sum_{i=1}^{p} \alpha_i \, \Delta GDPG_{t-i} + \sum_{i=1}^{q_1} \beta_{1i} \, \Delta CORPT_{t-i} + \sum_{i=1}^{q_2} \beta_{2i} \, \Delta HCD_{t-i} + \sum_{i=1}^{q_3} \beta_{3i} \, \Delta GFCF_{t-i} + \sum_{i=1}^{q_4} \beta_{4i} \, \Delta GEXP_{t-i} + \sum_{i=1}^{q_4} \beta_{4i} \, \Delta TOP_{t-i} + \emptyset ECM_{t-i} + \epsilon_t \quad (4)$$

In equation (3.3), the coefficient ($\emptyset$) of the ECM term called the speed of adjustment is expected to be negative in order to restore the model to equilibrium, *i.e.*$\emptyset < 0$.

Given equation (3.4), the long run form of the ARDL is specified as follows:

$$GDPG_t = \lambda_0 + \lambda_1 CORPT_t + \lambda_2 HCD_t + \lambda_3 GFCF_t + \lambda_4 GEXP_t + \lambda_5 TOP_t \quad (5)$$

Where $\lambda_1 < 0, \lambda_2 > 0, \lambda_3 > 0, \lambda_4 > 0, \lambda_5 >< 0$

Results

This section presents the results of the empirical analysis involving descriptive analysis, unit root test analysis, co-integration test, estimation, and post estimation tests.

Descriptive Statistics

This sub-section provides the descriptive or summary statistics of the variables being examined in the study, such as growth rate of GDP (*GDPG*), corruption (*CORPT*), gross fixed capital formation (*GFCF*), government expenditure (*GEXP*), human capital development (*HCD*) and trade openness (*TOP*).

Table 1 reports the summary statistics of the variables in the study. Reiterating the measurement units of the variables, *GDPG*, *GFCF*, *GEXP* and *TOP* are expressed as percentages while *CORPT* and *HCD* are given in indices. The mean values or averages recorded for *GDPG*, *CORPT* and *HCD* are 3.150%, 0.2299 and 0.438 respectively, for the given sample period over the period of 50 years. Similarly, the means of *GCFC*, *GEXP* and *TOP* obtained for the sample period considered are 0.159%, 3.730% and 32.30% respectively. Apparently, *TOP* appears to have the largest average proportion when expressed as the percentage of GDP as compared with *GFCF* and *GEXP*.

The maximum *GDPG* 15.33% was recorded in 2002, while the minimum of -13.13% was recorded in 1981. The minimum GDP growth rate observed suggests the highest growth retardation (a negative growth rate) in economic performance witnessed in Nigeria in 1981. The maximum (1.685) and minimum (0.0020) *CORPT* were observed in 2019 and 1988. This suggests that Nigeria had witnessed a considerably growing level of corruption during the period under consideration. Similarly, the maximum (0.539) and (0.311) *HCD* were recorded in 2019 and 1981. The series *CORPT*, *GFCF* and *GEXP* appear to be positively skewed (long right tail) having positive coefficients of skewness (2.670, 0.056 and 0.795, respectively). However, *GDPG*, *HCD* and *TOP* appear to negatively skewed (long left tail) having a negative coefficient of skewness (-867, -0.241 and -0.369 respectively). Series such as *GDPG*, *CORPT* and *GFCF* appear to have peaked distributions (leptokurtic) having coefficients of kurtosis (4.635, 9.783, and 3.995 respectively) greater threshold level of 3.

Table 1 Summary Statistics

Sample Period: 1981 – 2019

	Variables:					
Statistics	**GDPG**	**CORPT**	**FCF**	**GEXP**	**HCD**	**TOP**
Mean	3.1499	0.2299	0.1593	3.7294	0.4379	32.3006
Median	4.1960	0.10000	1.8680	2.0910	0.4410	34.0240
Maximum	15.329	1.6810	40.389	9.4480	0.5390	53.2780
Minimum	-13.1280	0.0020	-30.1720	0.9110	0.3110	9.1360
Std. Dev.	5.4674	0.3766	13.5865	2.8378	0.0684	12.4041
Skewness	-0.8665	2.6704	0.0563	0.7952	-0.2412	-0.3686
Kurtosis	4.6352	9.7831	3.9948	2.1658	1.9434	2.2507
Jarque-Bera	9.2250	121.1200	1.5869	5.2415	2.1922	1.7953
P-value	0.0099	0.0000	0.4523	0.0728	0.3342	0.4075
Obs.	39	39	38	39	39	39

Source: Authors' computation Using EViews.

However, *GEXP*, *HCD* and *TOP* appear to be flat-topped distribution (platykurtic) relative to the normal distribution, having coefficients of kurtosis (2.166, 1.943 and 2.251 respectively) less than the threshold level of 3 with moment distribution. Corruption (*CORPT*) appears to have the highest peak relative to GDP growth rate and human capital development for the given sample period. The Jarque-Bera statistics for normality test indicate that the series *GFCF*, *GEXP*, *HC* and *TOP* are normally distributed since their respective p-values (0.4523, 0.0728, 0.3342 and 0.4075 respectively) are greater than the 5% level of significance. However, *GDPG* and *CORPT* are not normally distributed, having their p-values (0.0099 and 0.0000) are below the 10% level of significance.

Pre-Estimation Tests

In this section, pre-tests such as unit root and cointegration tests are provided to evaluate the statistical healthiness (stationarity and linear combination) of the variables being examined in the study.

Unit Root Tests

The unit root tests were conducted prior to model estimation to ascertain the stationarity status of the variables in being investigated. Thus, the Augmented Dickey-Fuller (ADF) test was employed to evaluate the stationarity status of the series.

Table 2: Unit Root Test Results Sample Period: 1982 – 2020

		ADF- Statistics			Order of integration (*d*)
Variable	**Test form**	**Constant**	**Constant & Trend**	**None**	
GDPG	***Level***	-4.1581***	-3.9822**	-1.9192*	***I(0)***
	1st Difference	-	-	-	
CORPT	***Level***	-0.8978	-0.2869	1.6497	***I(1)***
	1st Difference	-8.0196***	-8.3627***	-7.7633***	
HC	***Level***	-1.6661	-2.3488	6.2628	***I(1)***
	1st Difference	-5.1874***	-5.2353***	-3.1067***	
GFCF	***Level***	--5.1334***	-5.5622***	-5.1900***	***I(0)***
	1st Difference	-	-	-	
GEXP	***Level***	-1.1130	-2.8549	-0.1761	***I(1)***
	1st Difference	-5.6976***	-5.6169***	-5.7276***	
TOP	***Level***	-2.3082	-2.3666	-0.4981	***I(1)***
	1st Difference	-7.4776***	-4.6560***	-7.5467***	

Source: Authors' computation Using EViews.
*Note: ***, ** and * denote statistical significance at 1%, 5% and 10% respectively*

Table 2 presents the result of the unit test using the ADF unit root test. Thus, series such as *GDPG* and *GFCF* appear to be integrated of order zero, that is, they are *I(0)* series. This also implies that they are stationary in their level forms. However, other series such as *CORPT*, *GEXP*, *HC* and *TOP* are integrated of order one, that is, they are *I(1)* processes. This suggests that the series had to be differenced once in order to become stationary. Thus, the combinations of *I(0)* and *I(1)*) orders of integration of the variables validate the use of bounds co-integration test to examine the existence of a linear combination among the variables as proposed by Pesaran *et al.*(2001).

Bounds Cointegration Test

Since the variables under consideration have different orders of integration, it is therefore paramount to test for possible linear combination or long-run relationship among the variables. Thus, having different orders of integration suggests the use of bounds co-integration test (the ARDL bounds test) to examine the existence of long-run equilibrium among the variables.

Table 3: Result Bounds Co-Integration Test
Sample Period: 1982 – 2020

F – Statistic:	3.7920	
Level of significance	**Lower bounds – *I(0)***	**Upper bounds – *I(1)***
1%	3.06	4.15
5%	2.39	3.38
10%	2.08	3.00

Source: Authors' computation Using EViews.

The table 3 presents the results of the bounds co-integration test of the ARDL approach. Thus, since the F-statistic (3.792) exceeds the critical value upper bounds at 5% and 10% levels of significance. This suggests that there is evidence of long run relationship or linear combination among the variables. Growth rate of GDP (*GDPG*), corruption (*CORPT*), gross fixed capital formation (*GFCF*), government expenditure (*GEXP*), human capital (*HC*), and trade openness (*TOP*) appear to have a long-run relationship despite having different orders of integration among the variables.

Model Estimation

Since there is the evidence of cointegration among the variables, the model estimation includes both long-run and short-run estimates.

Estimation of ARDL Short-run coefficients

Table 4: Estimated ARDL Short Run Coefficients
Sample Period: 1982 – 2020
Dependent Variable: *GDPG*

Independent Variable	**Coefficient**	**Std. Error**	**t-Statistic**	***p*-value**
$\Delta CORPT$	-5.9406	1.9207	-3.0929	0.0050
$\Delta CORPT_{t-1}$	7.3672	2.5980	2.8358	0.0091
$\Delta GFCF$	0.0144	0.0384	0.3760	0.7102
$\Delta GEXP$	0.1894	0.6858	0.2762	0.7847
ΔTOP	0.0351	0.0694	0.5056	0.6178
ΔTOP_{t-1}	0.2761	0.0721	3.8287	0.0008
ECT_{t-1}	-0.7755	0.1346	-5.7602	0.0000
R-squared	0.6136			
Adjusted R-squared	0.5364			

Source: Authors' computation Using EViews.

Table 4 presents the results of the serial correlation test, Heteroscedasticity test, normality test and linearity test. For the serial correlation test, since the p-values (0.1692 and 0.0633 respectively) of both the F-statistic (3.1058) and LM statistic (33.2175) are greater than 5% level of significance, the null hypothesis of no serial correlation cannot be rejected since the test statistics are statistically insignificant. Thus, the model estimated does not suffer from a serial correlation for the considered sample period.

The result of the heteroscedasticity test suggests the acceptance of the null hypothesis of homoscedasticity (i.e. absence of heteroscedasticity) since the p-values (0.2745 and 0.2606) of both the F-statistic (1.3124) and LM statistic (14.6598) respectively are greater than 10% level of significance. Thus, the model estimated does not suffer from heteroscedasticity for the considered sample period. Similarly, the normality test result reveals that the residuals of the estimated model are normally distributed as the p-value (0.9900) of the Jarque-Bera statistic (0.0201) is greater than 10% level of significance (statistically insignificant). The linearity test using Ramsey RESET test examines whether there is an existence of a linear relationship between the dependent variable (*GDPG*) and the explanatory variables (*CORPT*, *GFCF*, *GEXP*, *HCD* and *TOP*) as well as whether the model is correctly specified. The null hypothesis is that the model is linear and correctly. Thus, since the t-statistic (1.2773) and F-statistic (1.6315) are not statistically significant (that is, having their respective p-values above 10% level of significance), the null hypothesis for linearity cannot be rejected. This suggests that the estimated model in this is linear and correctly specified.

Meanwhile, the CUSUM test result is presented in figure 1 below:

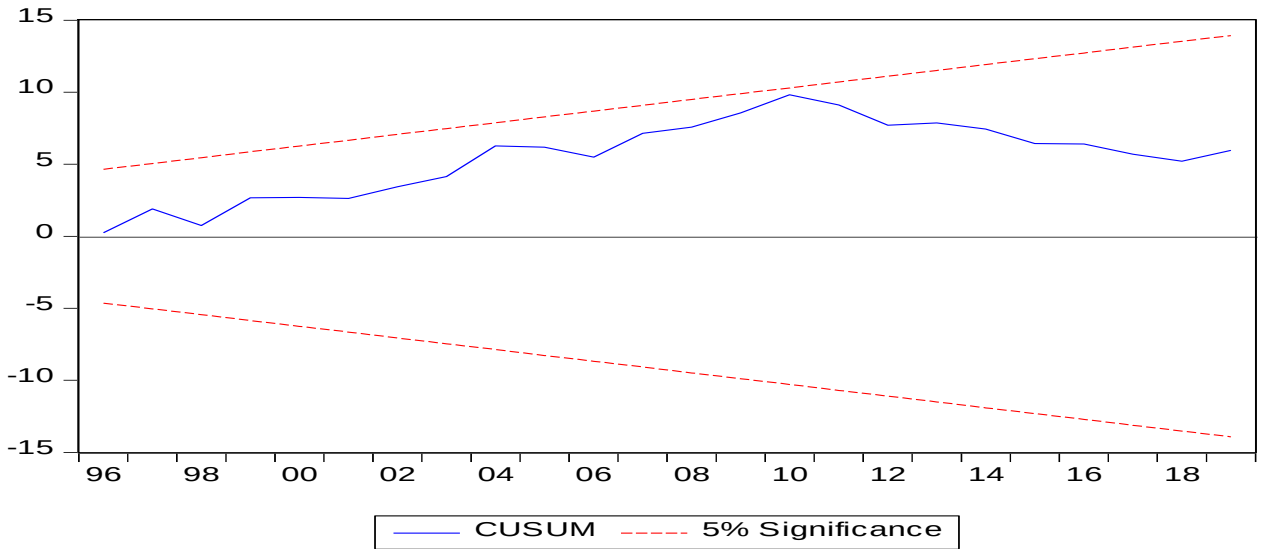

Figure 1: Plot of Cumulative Sum (CUSUM) of Recursive Residuals

Figure 1 presents the result of the test of stability using CUSUM criterion. Since the plot remains within the critical bounds at 5% level of significant, thus, the model is structurally stable. The estimated ARDL model parameters are stable and appropriate for long run decision making. Therefore, all the post estimation test results suggest that the short-run and long-run estimates from the estimated ARDL model are valid and reliable for forecasting and policy making.

Discussion

This study focused on examining the mediating role of human capital development in the corruption and economic performance nexus and to answer some questions linked to empirical data reported in the extant economic and social literature. It used the Auto regressive distributed lag (ARDL) technique to test the research framework built on the Barro (1990) endogenous growth theory. To realize the objective of this study, a preliminary descriptive analysis of data was conducted using annual times data spanning 1982 to 2020. Stemming from the empirical results, the short-run estimates revealed that human capital development, gross fixed capital formation, and government expenditure exert a positive and statistically significant impact on Nigeria's economic performance, which aligns with the empirical findings of (Omotayo, 2015; Wang and Lui, 2016; Siddiqui and Rehman, 2017). However, the long-run estimation results indicate that corruption, government expenditure and trade openness exert a negative impact on economic performance. Although the adverse impact of government expenditure and trade openness on economic performance is statistically insignificant. Nevertheless, the changes in human capital development exert a positive and significant long-run impact on economic performance (Nowak and Dahal, 2016). In the nutshell, economic performance responds negatively to changes in the country's level of corruption overtime. However, it reacts positively to the changes in human capital development in the long-run. As such, unit rise (fall) in corruption leads to a fall (rise) in Nigeria's economic performance. This is consistent with the study of (Obialor, 2017; Ogundari and Awokuse, 2018).

This suggests that, with the availability of appropriate policies and resources, human capital development has the potential to massively enhance Nigeria's economic performance in the long-run.

Conclusion

This study examined the relationship among corruption, human capital development and the performance of the Nigerian economy with the motivation to answer questions linked to empirical data reported in recent literature. It revealed that human capital development exerts a positive and statistically significant impact on Nigeria's economic performance. However, it indicated that corruption exerts a negative impact on economic performance. This implies economic performance responds negatively to changes in the country's level of corruption overtime. Regrettably, the poor performance of the economy reflects a low investment in human capital development and mismanagement of human and natural resources, which are attributable to the high level of corruption. Intuitively, this indicates that corruption also has an adverse impact on human capital development stemming from the inherent low investment in education and health sectors, which are linked to the magnitude of embezzlement by the bureaucrats in both sectors of the economy. The hydra headed menace of corruption in Nigeria is pervasive through all levels of society, from homes, small businesses, and large corporate entities to state institutions. Until Nigerians re-orientate themselves to fight corruption from home to the highest level of government and corporate society, any battle against the scourge may be a wishful thinking.

References

Ahmed, F. G., & Asmaa, M. E. (2016). Growth and corruption in Arab countries: What type of relationship connects them?. *Journal of Economics and International Finance*, 8(5), 44-55. https://doi.org/10.5897/JEIF2015.0675

Aka, B.F. and Dumont, J.C. (2008). Health, education and economic growth: Testing for long-run relationships and causal links in the United States. *Education and Economic Growth: Testing for Long-Run Relationships and Causal Links in the United States (December 22, 2008). Applied Econometrics and International Development*, 8(2), 101-110

Alam, M.S. (1989). Anatomy of corruption: An approach to the political economy of underdevelopment. *American Journal of Economics and sociology*, 48 (4), 441-456 https://doi.org/10.1111/j.1536-7150.1989.tb02132.x

Anetor, F.O. (2020). Financial development threshold, private capital inflows and economic growth: Evidence from sub-Saharan African countries. *International Journal of Development Issues*. 19 (1),77-92 http://dx.doi.org/10.1108/IJDI-06-2019-0099

Bakare, I.A. and Edozie, K.V. (2015). The poverty-economic growth nexus in Nigeria (1981-2012). *International Journal of Research in Arts and Social Sciences*, 8 (1),242-259.

Barro, R.J. (1990). Government spending in a simple model of endogeneous growth. *Journal of political economy*, 98 (5),S103-S125. http://dx.doi.org/10.1086/261726

Barro, R. J. (1991). Economic growth in a cross section of countries. *The quarterly journal of economics*, 106 (2), 407-443. https://doi.org/10.2307/2937943

Barro, R. J. (2000). Inequality and Growth in a Panel of Countries. *Journal of economic growth*, 5 (1),5-32

Barro, R. J. (2001). Education and economic growth. *The contribution of human and social capital to sustained economic growth and well-being*, 79 (1), 13-41

Barro, R. J., and Sala-i-Martin, X. (1992). Public finance in models of economic growth. *The Review of Economic Studies*, 59 (4),645-661 https://doi.org/10.2307/136012

Becker, R., Hall, S., and Rustem, B. (1994). Robust optimal decisions with stochastic nonlinear economic systems. *Journal of Economic Dynamics and Control*, 18 (1),125-147. https://doi.org/10.1016/0165-1889(94)90072-8

Beegle, K. and Christiaensen, L. (2019). Accelerating poverty reduction in Africa. World Bank, Washington, DC.

Bitterhout, S. and Simo-Kengne, B.D. (2020). *The Effect of Corruption on Economic Growth in the BRICS Countries: À Panel Data Analysis*. Economic and Well-being Research Group 2020 (03),66-78

Bloom, D. E., Canning, D., and Sevilla, J. (2004). The effect of health on economic growth: a production function approach. *World development*, 32 (1),1-13 https://doi.org/10.1016/j.worlddev.2003.07.002

Boachie, M. K. (2015). Effect of health on economic growth in Ghana: An application of ARDL bounds test to cointegration.

Boikos, S., 2016. Corruption, public expenditure and human capital accumulation. *Review of Economic Analysis*, 8 (1), 17-45

Cieślik, A., and Goczek, Ł. (2018). Control of corruption, international investment, and economic growth – Evidence from panel data. *World Development* , 103 (1),323-335. https://doi.org/10.1016/j.worlddev.2017.10.028

Campos, N. F., Dimova, R., and Saleh, A. (2016). Corruption and economic growth: An econometric survey of the evidence. *Journal of Institutional and Theoretical Economics (JITE)/Zeitschrift für die gesamte Staatswissenschaft*, 172 (3),521-543 https://doi.org/10.1628/093245616X14616712130543

d'Agostino, G., Dunne, J. P., and Pieroni, L. (2016). Government spending, corruption and economic growth. *World Development*, 84 (1), 190-205 https://doi.org/10.1016/j.worlddev.2016.03.011

Dridi, M. (2014). Corruption and education: Empirical evidence. *International Journal of Economics and Financial Issues*, 4 (3), 476- 487

Dorasamy, N. (2021). An Overview of Public Procurement, Corruption, and Governance in Africa. *Public Procurement, Corruption and the Crisis of Governance in Africa*, 21-34, http://dx.doi.org/10.1007/978-3-030-63857-3_2

Egunjobi, T. A. (2013). An econometric analysis of the impact of corruption on economic growth in Nigeria. Journal of Business Management and Economics 4 (3), 054-065

Erum, N., and Hussain, S. (2019). Corruption, natural resources and economic growth: Evidence from OIC countries. *Resources Policy*, 63 (10), 14-29 http://dx.doi.org/10.1016/j.resourpol.2019.101429

Gans-Morse, J., Borges, M., Makarin, A., Mannah-Blankson, T., Nickow, A., and Zhang, D. (2018). Reducing bureaucratic corruption: Interdisciplinary perspectives on what works. *World Development*, 105(C),171-188. http://dx.doi.org/10.1016/j.worlddev.2017.12.015

Hope Sr, K. R. (2017). Fighting corruption in developing countries: Some aspects of policy from lessons from the field. *Journal of Public Affairs*, 17 (4), 16-83. https://doi.org/10.1002/pa.1683

Kurniawan, Y., Ratnasari, R. T., and Mustika, H. (2020). The corruption and human development to the economic growth of oic countries. *JEBIS (Jurnal Ekonomi dan Bisnis Islam)*, *6*(2), 209-220. https://doi.org/10.20473/jebis.v6i2.20472

Laajaj, R., Eslava, M., and Kinda, T. (2019). The costs of bureaucracy and corruption at customs: Evidence from the computerization of imports in Colombia. *Documento CEDE*, (2019-08).

Lawal, Y. O., and George, E. O. (2020). The Transmission Channels of Corruption and Economic Growth in Nigeria from 1987 to 2017. *KIU Journal of Social Sciences*, 6 (1), 101-112.

Leff, N. H. (1964). Economic development through bureaucratic corruption. *American behavioral scientist*, 8 (3), 8-14 http://dx.doi.org/10.1177/000276426400800303

Lucas Jr, R. E. (1988). On the mechanics of economic development. *Journal of monetary economics*, 22 (1),3-42 https://doi.org/10.1016/0304-3932(88)90168-7

Mankiw, N. G., Romer, D., and Weil, D. N. (1992). A contribution to the empirics of economic growth. *The quarterly journal of economics*, 107 (2),407-437 https://doi.org/10.2307/2118477

Mauro, P. (1995). Corruption and growth. *The quarterly journal of economics*, 110 (3),681-712. https://doi.org/10.2307/2946696

Mauro, P. (2017). The effects of corruption on growth and public expenditure. In *Political corruption* (339-352). Routledge.

Nguedie, Yan Harold Nounamo. (2018). Corruption, investment and economic growth in developing countries: A Panel Smooth Transition Regression Approach. *Socio Economic Challenges*,2 (1), 63-68

Nowak, A. Z., and Dahal, G. (2016). The contribution of education to economic growth: Evidence from Nepal. *International Journal of Economic Sciences*, 5 (2), 22-41 http://dx.doi.org/10.20472/ES.2016.5.2.002

Nwani, S.E., 2021. Human capital interaction on foreign aid-growth nexus: evidence from South Asia and sub-Saharan Africa. *International Journal of Development Issues*. 20(2), 258-279 https://doi.org/10.1108/IJDI-11-2020-0261

Obialor, M. C. (2017). Effect of government human capital investment on economic growth in Sub-Saharan Africa: Evidence from Nigeria, South Africa and Ghana (1980-2013). *International Journal of Asian Social Science*, 7 (4),328-339 https://doi.org/10.18488/journal.1/2017.7.4/1.4.328.339

Ogundari, K., and Awokuse, T. (2018). Human capital contribution to economic growth in Sub-Saharan Africa: does health status matter more than education?. *Economic Analysis and Policy*, 58 (4), 131-140. https://doi.org/10.1016/j.eap.2018.02.001

Ogunlana, O. F., Bakare, I. A. O., and Omobitan, O. A. (2016). Government spending, corruption and output growth in Nigeria. *Arabian Journal of Business and Management Review* 5 (10),55- 68.

Ojeka, S., Adegboye, A., Adegboye, K., Umukoro, O., Dahunsi, O., and Ozordi, E. (2019). Corruption perception, institutional quality and performance of listed companies in Nigeria. *Heliyon*, 5 (10),25-69. https://doi.org/10.1016/j.heliyon.2019.e02569

Omodero, C. O. (2019). Government general spending and human development: A case study of Nigeria. *Academic Journal of Interdisciplinary Studies*, 8(1)51-72. https://doi.org/10.36941/ajis

Omotayo, O. A. (2015). Impact of human capital development on economic growth in Nigeria. *International Journal of Recent Research in Commerce Economics and Management (IJRRCEM)*, 2 (1), 151-164

Ondo, A. (2017). Corruption and economic growth: The case of EMCCA. *Theoretical Economics Letters*, 1 (**7),**1292-1305 http://dx.doi.org/10.4236/tel.2017.75088

Ortega, B., Casquero, A., and Sanjuán, J. (2016). Corruption and convergence in human development: Evidence from 69 countries during 1990–2012. *Social Indicators Research*, 127 (2), 691-719 https://doi.org/10.1108/JES-05-2020-0199

Osabiyi, K. E., Oladipo, A. O., and Olofin, O. P. (2019). Corruption, Institutional Quality and Economic Growth in West African Countries (1995-2017). *Journal of Public Administration and Governance*, 9 (2),217-229

Papaconstantinou, P., Tsagkanos, A. G., and Siriopoulos, C. (2013). How bureaucracy and corruption affect economic growth and convergence in the European Union: the case of Greece. *Managerial Finance*. 39 (9), 837-847 https://doi.org/10.1108/MF-12-2009-0143

Pesaran, M. H., Shin, Y., and Smith, R. J. (2001). Bounds testing approaches to the analysis of level relationships. *Journal of applied econometrics*, 16(3), 289-326 https://doi.org/10.1002/jae.616

Rebelo, S. (1992). Growth in open economies. In *Carnegie-Rochester Conference Series on Public Policy*, 36, 5-46 https://doi.org/10.1016/0167-2231(92)90014-A

Romer, P. M. (1986). Increasing returns and long-run growth. *Journal of political economy*, Vol. 94(5), 1002-1037 https://doi.org/10.1086/261420

Sbaouelgi, J. (2019). The Impact Of Corruption On Economic Growth In Mena Region. *Romanian Economic and Business Review*, 14 (2),40-54

Seka, P. R. (2013). Corruption, croissance et capital humain: quels rapports?. *Africa Development*, 38 (1), 133-150

Sharma, C., and Mitra, A. (2019). Corruption and economic growth: Some new empirical evidence from a global sample. *Journal of International Development*, 31 (8),691-719 https://doi.org/10.1002/jid.3433

Shleifer, A., and Vishny, R. W. (1993). Corruption. *The quarterly journal of economics*,108 (3),599-617 https://doi.org/10.2307/2118402

Siddiqui, A., and Rehman, A. U. (2017). The human capital and economic growth nexus: in East and South Asia. *Applied Economics*, 49 (28), 2697-2710

Thi Hoa, Truong. (2020). The effects of corruption on the human capital accumulation process: Evidence from Vietnam. *Economics of Transition and Institutional Change*, 28 (1), 69-88 https://doi.org/10.1080/00036846.2016.1245841

Trabelsi, M. A., and Trabelsi, H. (2020). At what level of corruption does economic growth decrease? *Journal of Financial Crime*. 9 (2),217-229

Tran, O.K.T., Le, H.D. and Nguyen, A.H.V. (2021). Role of institutional quality in economic development: A case study of Asian countries. *Problems and Perspectives in Management*, 19 (2), 357-369 http://dx.doi.org/10.21511/ppm.19(2).2021.29

Truong, H. T. (2020). Corruption impacting regional economic growth: A dynamic panel data analysis for the case of Vietnam. *Pacific Economic Review*, 25 (5),601-619 https://doi.org/10.1111/1468-0106.12339

Udemba, E. N. (2020). A sustainable study of economic growth and development amidst ecological footprint: New insight from Nigerian Perspective. *Science of the total environment*, 7 (32), 139-162 https://doi.org/10.1016/j.scitotenv.2020.139270

Ugur, M. (2014). Corruption's direct effects on per-capita income growth: a meta-analysis. *Journal of Economic Surveys*, 28 (3), 472-490 https://doi.org/10.1111/joes.12035

UNESCO Institute for Statistics. (2020). Education: Percentage of female teachers by teaching level of education.

Wang, Y., & Liu, S. (2016). Education, human capital and economic growth: Empirical research on 55 countries and regions (1960-2009). *Theoretical Economics Letters*, 6 (2), 347-355 http://dx.doi.org/10.4236/tel.2016.62039

World Bank. (2020). *Poverty and shared prosperity 2020: Reversals of fortune*. The World Bank.