

THE IMPACT OF CORRUPTION ON ECONOMIC GROWTH: THE CASE OF SADC COUNTRIES

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ABSTRACT

Corruption is one of the most widespread problems, with Southern African countries ranked among the worst performing countries on the international corruption index score. The research explores the impact of corruption on economic growth in 16 Southern Africa Development Community (SADC) region over the period of 2000-2004, using the multilinear regression model. The results suggest that corruption hinders GDP growth with a 1% percent increase in control of corruption resulting in positive change in GDP by 1543.309. In addition, the different levels of corruption hinder growth at different quantile levels; from 0.1-0.4 corruption affects growth negatively and above 0.5-1 being the less corrupted countries and they have better GDP growth. Gross savings, government effectiveness, and trade openness plays an important role in economic growth in SADC countries. According to results, generally natural resource rents in the region impacts positively on economic growth.

Keywords: - *Corruption, Economic Growth, SADC Countries*

INTRODUCTION

The issue of corruption as a drag on economic development has been a recurrent motif in development literature. The discussion has been particularly heated for developing countries where corruption is reported to be highest. According to Transparency International (2018), 80% of the bottom half countries on the corruption index are countries from the developing world of which 60% of the 80 are SSA countries. In Zimbabwe corruption has become endemic with the government failing to deal decisively with it (transparency international, 2018). A number of government officials have been implicated in various forensic audit documents (auditor general report, 2019) with little or no action taken against them. For example, government handling of the NSSA audit of 2019 and the ZESA audit of 2019 has cast doubts among members of the public that justice will be served, more so given that the establishment of ZACC has failed to produce any meaningful results (OSISA report 2017). There has been a rapid growth in concern pertaining the unbearable negative economic and social impacts of corruption.

Regardless of the forceful body of literature that believe corruption to be detrimental to the economy, other economists argue to the contrary. Bardhan (1997), argues that corruption contribute positively towards economic development through diverting scarce public resources to the highest bidder in a scenario where most efficient firms are likely to pay which improves the government effectiveness. The author further argues that, corruption would also make it possible to choose effective investment projects when certain government expenditures prove to be ineffective. he postulates that corruption can grease up economic growth by counteracting government growth in the short run, under the exogenous determined implied bureaucratic rules and regulations.

Corruption can also be significant in making weak or dysfunctional institutions efficient in the sense that bribes facilitates self-enforcement. When costs of operating are too high, weak institutions can work as a black box and becomes a yardstick to show where resources are needed the most and this helps inefficient institutions to become efficient (North 1990). The efficiency effect might arise from the state of corruption which will improve the productivity of the existing stock of capital or it may result in the change of state of institutions over time. Corruption may be a useful element in the institutional web, mending or precluding other distortions.

Problem statement

Southern African countries are ranked among the worst performing countries on the world bank corruption index score. For example, Madagascar and Zimbabwe, are ranked 123 and 150 respectively, on a 176 country scale. Critics argue that the poor economic growth exhibited by the southern African countries visa vis the rest of the world can be attributed to rampant corruption and lack of accountability within government (Transparency International's 2013). Although nations across the globe face numerous challenges, corruption has been identified as a major problem both developed and developing countries continue to contend with. Corruption scandals have surfaced in countries with different political systems and varying levels of income (Ades & Di Tella, 1997). It is argued that corruption tends to slowdown economic development via reduction in human capital development in the form less spending on education and healthcare, misallocation of resources, inadequate domestic investment, less provisions of social amenities and transfers to the poor, and high inequality and poverty, among other things

Aims of the study

Main objective

- i. To assess the impact of corruption on economic growth in SADC countries

Specific objectives

- ii. To review the relationship between GDP growth and government effectiveness
- iii. To examine the general role played by institutions in combating corruption
- iv. To evaluate the general effectiveness and feasibility of Anti-Corruption bodies in fighting corruption in SADC

LITERATURE REVIEW

Theoretical literature review

Corruption theories

The literature on the relationship between corruption and economic growth is abundant and focuses on five main approaches. Which are:

Sand in the wheel approach

This approach assumes that corruption is like sand in the wheel as corruption leads to embezzlement and theft by state officials and this leads to net capital loss (Alam 1989). Likewise, it's more likely that the institutionalized corruption will direct government tax revenue to nonproductive sectors were corruption is at par. Shleifer and Vishny (1993) stated that, this will have an effect on more productive sectors such as education and the health sector due to their minimum offer to rent seeking for public servants.

Grease sand in the wheel approach

Leff (1964) postulates that there are positive effects that can be derived from corruption. The grease sand in the wheel approach homologates that corruption sometimes can work as fat required for the squeaking of wheels in a poor administration. It can be used as lubricant of economic growth where governance is poor. In a rigid economy, bureaucratic corruption can be viewed as a panacea that effectively curb the burden of too much regulation and have a positive relationship with economic growth (Banque 2006). Weak institutions cause market failures then corruption intervenes and induce positive change through distorting the distorted market and through this it brings about allocative efficiency (Mironov 2005). In countries where there are too many regulations, and demotivating bureaucrats, corruption is used as a weapon to fight bureaucracy. According to Bardhan (1997), corruption also helps to divert scarce public resources to the highest bidder in a scenario where most efficient firms are likely to pay hence improves the government effectiveness. Corruption would also make it possible to choose effective investment projects when certain government expenditures prove to be ineffective.

The other function of corruption is that it can act as a hedge against bad economic policies of a country. According to Leff (1964) corruption is significant in relieving some potential losses caused by government errors through regulating private entities to implement policies that were not approved by the state. It acts as a response of the market to state failures through preventing inefficient regulations (Campos, et.al 2010). Especial in poor countries, corruption is an instrument for quick economic growth as it brings on elasticity to stagnant bureaucracies and strengthens the private sector.

Leff (1964) suggested that corruption might raise economic growth, through 2 types of mechanisms: First, corrupt practices such as "speed money" would enable individuals to avoid bureaucratic delay. Second, government employees who takes bribes would work harder, especially in the case where bribes act as a commission

Corruption is regarded as a controversial issue to date, especially in terms of ethical and economic problems. Mauro (1995) postulates that there is a negative relationship between investment, corruption and economic growth. Brunetti and Weder (1998) also highly agrees with the results that there is a negative relationship between corruption and growth. In recent years, the impact of corruption on economic development has attracted researchers' attention mostly in developing countries. Likewise, corruption is regarded as the main quagmire to economic growth in poor countries (World Bank 2005). From the study that was carried by Vishny and Shleifer, (1993, p23), corruption was interpreted as the sale by government officials of government property for personal gain. Left (1964) argues that corruption be beneficial to economic growth as it gives individuals and companies leverages to circumvent the inefficient legal systems.

The compensation theory

Another theory that was used is the compensation theory (Becker & Stigler, 1974). The theory states that payment of wages/salaries above the market clearing wages/salaries including monitoring the activities of the state agents (government officials) from time to time can help to control corruption. If public officials are earning a good wage/salary they opt to keep their jobs and avoid corrupt activities because there are more benefits in their jobs than from the activity

Nonlinear relationship approach

This approach suggests that the effects of corruption on economic growth be nonlinear. The approach rehabilitate that corruption can be a lubricant to economic growth. With several works from different authors following this direction. According to the stylized facts in macroeconomics, corruption affects growth rate with two equilibrium emerging from the political economic game that are a 1) high balance which consist of political stability reduced corruption and improved growth; 2) a low balance equilibrium.

According to Mendez and Sepulveda (2006), postulates that the relationship between economic growth and corruption is non-monotonous and it depends more on the degree of political freedom. The author also argues that corruption can have positive impact on growth but should be kept on an optimal level that initiates growth.

The social support theory

Another theory of corruption is the social support theory (Cullen, 1994) which emanates from Lin's (1986) theory of mental illness and Braithwaite's (1989) theory of shaming and reintegration. The theory suggests that high levels of social support raise citizens' wellbeing and as a result lower crime rates (corruption) in a society. European countries with high social support from the government have recorded low levels of corruption index like Singapore, Taiwan and Belgium.

The economist approach to corruption theory

The economist's approach states that corruption can be curbed via promotion of competition among firms and/or government officials. Furthermore, the literature of criminal activity determinants (Becker, 1968) has been emphasized by authors such as Billger and Goel (2009) and Goel and Nelson (2010). Becker (1968) suggested that individuals who give and take bribes weigh the benefits and costs of participating in criminal (or corrupt) activities. Examples of the benefits of engaging in corrupt acts include the favors that monopolist-bureaucrats can give as well as reducing red tape (Guriev, 2004; Shleifer & Vishny, 1993).

On the other hand, some of the costs of corruption include arrest and punishment of corrupt individuals (Billger&Goel, 2009). Although, saddled with the responsibility of monitoring the activities of bureaucrats, anti-corruption agencies can also be corrupt (Banerjee, 1997). Recently, scholars have also borrowed the ideas of the dynamic economic interaction model of social tolerance among groups proposed by Cerqueti, et.al (2013) to suggest ways corruption can be tackled (see Shi & Pan, 2018; Shi, Pan, & Peng, 2017). In explaining the social tolerance theory, Shi and Pan (2018) opined that in an attempt to get integrated and be tolerated by the society, corrupt government officials must distribute aggregate wealth in a manner that the larger proportion share of the wealth goes to the ordinary members of the society compared to the value that corrupt government officials receive. They further advised that corruption can be reduced

via reforming economic and political institutions because weak institutions are associated with high corruption.

From the previous studies on impacts of corruption on economic growth they came up with inconclusive results, while other studies confirm the hypothesis that corruption has adverse effects on economic growth (Blackburn et.al 2006). However, Kato and Sato homologates that corruption is a panacea in greasing the wheels of growth hence improving economic development. Some studies states that every country have different level of institutional efficiency and production functions. While others (Haque and Kneller 2009) states that corruption changes from positive to negative on economic growth. In addition, corruption level that exceeds the threshold hinders economic development and vice versa. Barro(1996) states that given GDP per capita, economic growth is determined by factors such as governance indices, trade openness, inflation, control of corruption, political stability, FDI, gross savings, rule of law. Likewise, Barro (1996) postulates that the above variables and other variables have a negative impact on economic growth. In contrary Barro (1996) wrapped up by stating that good governance stimulates economic growth under a condition of full democracy but a further expansion leads to lower economic growth.

Likewise, there are endogenous growth theorists who postulates that economic growth emanates from endogenous factors rather than exogenous factors such as human capital investment and innovation while other economists argue that why do other countries produce much output than others? Some researches states that political and social reasons are behind the differences while authors like Diamond homologates that geographical location and resources endowments plays a major role in economic growth.

The growth theories

The SOLOW Growth model

Using the Solow (1956) growth model, which is an extension of the neo classical theories of economic growth will be used in this section which will explicitly include the human capital accumulation, capital stock and the public sector at large. With our main issue centered on corruption, the model will be included in the augmented model in order to show its effect on income per capita as well as other transmission mechanisms that were listed above.

Extended Solow model with public sector

In the Solow growth model, the degree of technological development of a country is determined by knowledge, physical capital, labor and output. These four variables are used to define the economic growth path of every nation. Likewise, gross savings, natural resources, population growth and technological advancement are exogenous variables. There are two inputs that are pumped in the production which are labour and capital. Therefore, a Cobb Douglass form at time (t) will be written as follows

$$Y(t) = f\{(K(t), A(t)L(t)\} = K(t)^{\alpha} (A(t)L(t))^{1-\alpha} \text{ where, } 0 < \alpha < 1 \dots\dots\dots (1)$$

Where Y is the agg level of output

K is physical capital

L is amount of labor employed

A is the productivity factor

There by time affects the total output through Capital (K), Labor (L) and multifactor productivity (A)

From the above notion above, Solow model does not include a place for the government sector (governance). But its role should not be ignored in many respects. But in developing countries like the SADC countries, the role of government in determining the allocation of resources should not be undermined. The government sector is the engine of economic growth and should be incorporated in the production as it was seconded by Kurz (1970) and Barro (1991). It can be written as follows

$$Y(t) = F \{ (K(t), G(t), A(t)L(t)) \} = K(t)^\alpha G(t)^\gamma A(t)L(t)^{1-\alpha-\gamma} \text{ where } (\alpha + \gamma) < 1 \dots\dots\dots (2)$$

Where G stands for the government sector.

The growth rate can be defined as $L(t) = L(0)e^{nt}$. There is a constant rate of growth for labor force over time. That is

$$L = n$$

Where n is the growth rate of population.

Under the assumption that the overall productivity evolves around the function:

$$A(t) = A(0)e^{wt} \text{ and it's a constant over time. That is}$$

$$A/A = w; \text{ where } w \text{ is technological progress growth rate}$$

The intensive form of the function will be written as follows

$$y(t) = k(t)^\alpha g(t)^\beta \dots\dots\dots (3)$$

where y(t) is the output per worker

k(t) is the capital stock per worker and

g(t) is the public service per worker

$$(a+b) < 1$$

In other words

$$Y(t) = Y(t)/[A(t)L(t)], k(t) = K(t)/[A(t)L(t)], g(t) = G(t)/[A(t)L(t)]$$

Assuming that R_k and R_g are shares of income invested in physical and public capital and d is the depreciation rate. The evolution of government and human capital is written as follows

$$k(t) = R_k y(t) - (n+w+d_k)k(t) \dots\dots\dots (4)$$

$$g(t) = R_g y(t) - (n+w+d_g)g(t) \dots\dots\dots (5)$$

from the equations 4 and 5 in a steady state value there are implications that all capitals per unit of labor will converge. Assuming that depreciation rate is equal for all capitals then $d = dk = dg$. All economies of different countries will converge to a steady state and, available capital is depreciating and it's supposed to be replaced to keep the capital stock from falling. the quantity of effective labor is growing. Thus doing enough investment to keep the capital stock (K) constant is not enough to keep the capital stock per unit of effective labor (k) constant.

Extended Solow model with saving rate

The savings rate is likely to be affected by the Solow model parameters. The output that is invested is likely to be affected by the government's purchases that is investment goods and consumption, revenues that is collected between taxes and borrowing and its treatment of taxes on investment and savings. From that point of view, it's important to include the savings rate in the Solow model.

Reformulating the extended Solow model by incorporating corruption

Solow model in general does not provide a deep understanding of economic growth. The growth of an economy is determined by other factors taking for instance North (1990) homologates that the long run economic performance of a country is determined by its strong institutions. The

institutions consist of governance indicators such as political stability, rule of law, control of corruption, government effectiveness, property rights to mention but just a few. From the above indices, it is possible to alter the Solow model of economic growth to explain their impact on development of a country.

Income per capita through the total factor production of a country can be directly affected by corruption. On the other side, there is an indirect influence of corruption by affecting government sector investment as well as physical capital investment and human capital. Total factor production is used to measure the changes in output that are brought about without any change in inputs. It explains the effects of efficiency improvement, technological improvements and unaccountable in measuring the direct impact of other inputs. Therefore, it's of paramount importance that we assume that corruption through its negative externalities reduces the efficiency gain brought about by technological improvements. In order to show the direct impact of corruption via total factor productivity a structural form for the evolution of total factor productivity should be assumed. Assuming that;

$$A_{(t)}(\theta) = A_{(t)}e^{-n\theta} \dots\dots\dots (6)$$

where, $0 \leq \theta \leq 1$ and $A(t) = A(t)e^{wt}$

θ is the corruption index that is used to measure the level of corruption in a country and n determines the magnitude of the impact of corruption in an economy. Assuming that

$$dA(t)/d\theta < 0 \text{ and } d^2A(t)/d\theta^2 > 0$$

from the above equation when there is no corruption or $\theta=0$ and there is the same scenario when $n=0$

the specific functional form of the above equation, will reproduce the following equation

$$\ln \{ Y(t)/L(t) \} = \ln(A_0) + w t - [(\alpha + \beta)/(1 - \alpha - \beta) \ln(n + w + \delta)] + \alpha / (1 - \alpha - \beta) \ln S_k + [\beta / (1 - \alpha - \beta)] + \ln S_g - n \theta \dots\dots\dots (7)$$

The direct influence of corruption on income per capita is explained by the model above., by changing the overall productivity of the economy, it outlays that there is a direct impact. If the corruption level is at peak according to the index (θ), the income per capita is reduced. Apart from that, a positive n shows that corruption reduces output per worker whilst a negative n shows that corruption is output enhancing.

Empirical Research

This segment is centered on a neo classical framework for corruption growth relation being generated from the hypothesis that corruption has an adverse relationship with economic growth. Previous researches fails to cater for direct and indirect impacts of corruption, which means they suffered from a theoretical framework that omits the possible effects of corruption on growth through different transmission mechanisms. There are several determinants that affects economic growth such as foreign direct investment (FDI), trade, capital stock, resource endowments, technology advancement, to mention but just a few. Of which all these factors can be a victim of corruption.

Aidt et.al (2007) came up with a model of political institutional quality centered on the link between corruption and growth. They defined corruption as an annuity that tax payers levy on tax revenue. Swaleheen (2011) carried the same model estimates on the impact of corruption on GDP growth in a nonlinear model on panel data using the generalized of momentum method (GMMS). From the outcome, the results show that corruption does not necessarily reduce economic growth but it can rather improve the GDP even if the corruption level is higher. Such a

conclusion seems to reject the Shleifer and Vishny (1993), hypothesis that corruption acts as sand in the wheels of growth.

Aidt (2007) postulates there is Corruption with a benevolent principal, corruption arises when a benevolent principal delegates decision making power to a non-benevolent agent. The level of corruption depends on the costs and benefits of designing optimal institutions. Likewise, Aidt (2003) states that, an analysis centered on the notion of a benevolent principal is considered the best thought of as a normative theory of corruption but from the study there was no practical or empirical evidence used to proof the theories provided apart from that, endogeneity test was neglected.

However, in support to Aidt (2007), Campos et.al (2010) carried 41 different studies on the effects of corruption on economic growth with 460 empirical estimates. 32% from the total estimates suggested that there is a negative relationship between corruption and growth with 62% suggesting a statistical insignificant relationship. With 6% supporting a positive relationship between corruption and growth.

More over Mauro (1995) stated that corruption contains growth through retarding investment. From the research Mauro found that an increase in the standard deviation of corruption index will result in an increase in the investment rate by a GDP percentage of 29% but the difference is just the same when regression is carried out. Mauro (1996), in another study postulates that an improvement of a standard deviation on the corruption index will give a rise on the investment by 4.2% and increase in GNP per capita by 0.6%. In lieu, the author agrees that the composition of public spending is altered by corruption. More so, corruption reduces growth through private investment.

Mauro (1997) postulates that the perception of corruption will reduce economic growth by 10% significance level. Using the data from the Business International (BI) to measure corruption and other variables and a sub-index from the bureaucratic efficiency index (BEI) which consist of an average measures of corruption, rule of law and measure of red tape. In the research, Mauro (1997) emphasizes that the above index was a better measure for corruption and using index will reduce challenges of measurement error in each index. The possibility of endogeneity was corrected by using a corruption instrument (ethnolinguistic fractionalization index) in both government institutions and growth. Taylor and Hudson (1972) calculated the ELF index. Levine and Renelt (1992) provided the data to control other variables apart from corruption and institutions that affect growth.

Svensson (2005), agrees with Mauro (1995) that corruption got an insignificant effect on growth. Using the international country risk guide index (ICRGI) from a period of 1982-2000 and GDP per capita and labor was used as independent variables but insignificant results were found again. However, the international risk guide was criticized by Lambsdorff (2006) for not measuring corruption but a good measure for perceived risk faced by investors.

Apart from that, Omrane (2016) carried a study on the effects of corruption on economic growth in Algeria from 1995-2012 and the author used the endogenous growth model augmented by corruption. The results showed that there is a negative relationship between corruption and growth.

In lieu, Mo (2001) agrees that corruption has a significant negative impact on economic growth provided GDP per capita, human capital and political stability are included. MO (2001), used data from the corruption perception index (CPI) and a panel data set was used.

Rock and Bonnett (2004) homologates that there is an adverse relationship between corruption and economic growth. But these results were found after controlling the country size and country

differences in the political world of corruption but without controlling these variables the relationship between corruption and growth is robust

Ehrlich and Lui (1999) also carried a study on the channels that are used to transmit corruption to growth. The authors mainly focused on the human capital channel and how corruption jeopardize long-term growth in education investments to fund political interests or power seeking activities. Pelligrini and Gerlagh (2004) also analyzed the link between economic growth and corruption using linear regression and they came up with the same results as the once found out by Mauro (1995). 81% of these harmful effects of corruption on economic growth is through indirect effects.

Meon and Sekkat (2005) carried a study on the effects of corruption on economic growth, critically analyzing the interaction between corruption and institutional quality. With the outcome of a weak rule of law, poor governance would aggravate the adverse effects of corruption on investment and agrees that corruption retards growth in countries suffering from poor governance. The study outcome shows that reduced level of corruption increases GDP per capita growth even if other government aspects remains in poor state.

Baliamoune-Lutz and Ndikumana (2009) examined the impact of corruption on public and private investment using 33 African countries from a period of 1982-2001. The research indicates that corruption has a direct impact on economic growth and it is transmitted through channels of investment. In addition to that, they recommended that corruption hampers economic growth and there is need for the government to implement institutional reforms so as to improve governance.

Pellegrini and Gerlagh (2004) states that there is a negative relationship between growth and corruption but when standard variables are included the outcome will be insignificant. Using the corruption perception index, causality was checked between corruption and quality of governance using a corruption instrument.

Zimbabwe has been ranked joint 163 out of 176 countries in the 2012 TI Corruption Perceptions Index. On a scale of 0 – 10 (highly corrupt - very clean), the Corruption Perceptions Index marked Zimbabwe 2.0, and this marks an increase in corruption since 1999, when the country was ranked 4.1.

In an empirical analysis of corruption that was carried by Mauro (1995) by investigating the link between corruption and investment for 58 countries. The author postulates that corruption variable is explained as the degree at which economic transactions involve corruption and questionable payments. There are some arguments that have arisen from economists as they state that government entities hinder investment, innovation and entrepreneurship. But some economists foster that efficient government institutions are associated with economic growth.

METHODOLOGY

Theoretical Model

The model used is the multiple linear regression model which was formulated by Galton (1994). The model uses multiple explanatory variables to predict the outcome of the dependent variable. This model applies to the topic since the model is a multi-linear model. It can be modeled as follows:

$$Y_i = \alpha + \beta_0 X_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \mu \dots \dots \dots (8)$$

Where Y is the dependent variable, α is a constant, while $\beta_0, \beta_1, \beta_3, \dots$ are coefficients of X_1, X_2, X_3, \dots which are explanatory variables and μ is the error term.

The econometric model.

To study the impact of corruption on economic growth, the research employed the panel data analysis from the period 2000-2018. In order to meet the demand of the research, fixed/random effects will be employed

Hausman test

The Hausman test will be used to determine on the model which is more significant between the random and fixed effects and to see on which model is better than the other. Fixed/Random effects estimator

Fixed effect estimator model examines crowd differences in intercepts. Fixed effects explains the link that exists between the dependent and the outcome variable within an entity. It explores the difference that exists between intercepts. This research will apply fixed effects model because it permits a variation of intercepts across countries.

The general formula for fixed effects model can be written as

$$Y_t = \alpha_i + \beta_1 X_{1it} + \beta_2 X_{2it} + \beta_3 X_{3it} + \dots + \beta_Z X_{Zit} + e_{it} \quad t=1, \dots, T \quad (9)$$

From the equation (1) above explains the differences that exists and the behavior of cross sectional units and time series which are captured by intercept term. The fixed intercept term was used to capture differences between inter countries. The error term was used to capture all unobserved variables that contributes to economic growth and they are captured in the countries intercepts in the fixed effects model.

We sum both sides of the equation by 1 and divide by time T, so that we average the data across time.

$$\frac{1}{T} \sum_{t=1}^T (GDP_{it} = \alpha + \beta_1 CC_{it} + \beta_2 GE_{it} + \beta_3 FDI_{it} + \beta_4 IFLA_{it} + \beta_5 TO_{it} + \beta_6 NRR_{it} + \beta_7 PS_{it} + \beta_8 GS_{it} + \beta_9 PG_{it} + \beta_{10} HC_{it} + e_{it}) \quad (10)$$

From the above equation, the fixed effect equation will be like;

$$GDP_{it} = \alpha + \beta_1 CC_{it} + \beta_2 GE_{it} + \beta_3 FDI_{it} + \beta_4 IFLA_{it} + \beta_5 TO_{it} + \beta_6 NRR_{it} + \beta_7 PS_{it} + \beta_8 GS_{it} + \beta_9 PG_{it} + \beta_{10} HC_{it} + e_{it} \quad (11)$$

Each individual country is represented by the subscript (i), with each country having unique intercept term, capturing differences existing between countries.

GDP per Capita is represented by the variable GDP, while CC is control of corruption, FDI is foreign direct investment, FLA is inflation, TO is trade openness, NRR is natural resource rents, PS is political stability and absence of violence, GS is gross savings, PG is population growth HC is human capital (secondary enrolment over a period of 18 years in this study.)

The variation of both the and the explanatory variable with individuals depend mainly on the coefficient estimates on equation 3. The variation only exists in corruption and economic growth over a certain period of time for each individual that have a contribution on estimated

coefficients. Hill et al. (2011) homologates that, different individuals with deferent corruption levels have no correlation with individual growth variations.

DATA PRESENTATION, ANALYSIS AND INTERPRETATION

In order to fulfil the research objectives that were introduced in the introductory chapter, this chapter discusses data analysis and interpretation of the results of the findings of the research. The main procedure used to answer the research questions is the Regression analysis. The results obtained were analysed using the statistical Stata and the results will answer all research questions and presented as follows:

Descriptive statistics

Table 1. Summary Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Gdp	285	1.46E+09	3.76E+09	150.149	1.86E+10
corruption~l	268	0.37643	0.138707	0	0.68
government~s	285	0.290088	0.18055	0	0.625
Fdi	285	8.93E+08	1.68E+09	93636.12	1.00E+10
Inflation	247	2.27E+07	9.06E+07	0.175	5.21E+08
Tradeopeness	277	84.40585	38.7131	33.15618	225.0231
naturalres~s	269	7.554011	9.201837	0.001134	56.60856
politicals~i	117	0.722222	0.081539	0.581439	0.869318
Grosssavings	242	20.44572	10.19168	1.218866	46.18324

The dependent variable GDP has 285 observations and an average of 1.46 and a standard deviation of 3.76, with a maximum variable of 186 and a minimum of 150.149. the corruption variable has 268 observations with a minimum of 0 and a maximum of 0.68 and a standard deviation of 0.138707. Likewise, the gross savings has 242 observations and an average of 20.44572 with a standard deviation of 10.19168 and a minimum of 1.218866 and its maximum is 46.18324.

Model Specification

Using the R-Squared, the model is significant in explaining variations of the dependent variable as the within R-squared is **0.4068 reflecting that 40.68%** variations in affecting economic growth.

The model is significant in explaining the variations in impact of corruption on GDP as the probability value of the F statistic is **0.000000** and it is less than 0.01 meaning that the model is significant at 1% level of significance and we have 99% confidence interval that the model is correctly specified.

Hausman test

After carrying out the Hausman test on which test is more significant between the random and fixed effects and to see on which model is better than the other. The Hausman test answered this question by suggesting that the fixed effects model was essential on this data. The test has examined if there is no correlation between individuals and other regressors in the model.

Diagnostic tests

Multicollinearity is a situation in which one or more of the explanatory variables are perfectly correlated, that is, they have a perfect or exact linear relationship. We cannot do away with

multicollinearity but there are acceptable limits, that is it should be below **0.8** as a result correlation matrix is used to test whether the reaction is between the acceptable limits or not. This can be shown in the table below.

Regression Model Results

Table 2. Regression Result

VARIABLES	(1) Random Effects
Corruption Control	1,543*** (520.8)
Governmenteffectiveness	2,211** (1,098)
FDI	-8.57e-09 (3.32e-08)
Inflation	-6.246 (7.901)
Trade Openness	-13.09*** (4.053)
Naturalresourcerents	16.47* (9.578)
Political instability	-2,170* (1,103)
Grosssavings	-23.77*** (8.220)
Populationgrowth	1,173** (485.7)
Grosscapitalformation	4.597* (2.324)
Constant	1.626e+09*** (1,428)
Observations	73
Number of c_id	6
R-squared	0.407
Country FE	YES

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Control of corruption

The variable is significant in explaining variations in economic growth as it has a P-value of 0.004 meaning that it is statistically significant at 1% significance level. This implies that there is a positive relationship between control of corruption and GDP per capita with a coefficient 1543.309. A percent increase in control of corruption will result in positive change in GDP by 1543.309. According to the theory by (Mookherjee&Png, 1989; Reinganum& Wilde, 1985). The theory proposes that one way to improve GDP is by reducing corruption through appropriate

levels of auditing. If corruption is contained at minimum level, then growth will automatically improve.

Government effectiveness

The results showed that the variable government effectiveness is statistically significant in explaining variations in improving economic growth at 5% significance level since it has a P-value of 0.049. The variable is statistically significantly different from zero thereby rejecting Null Hypothesis that the coefficient of government effectiveness is not equal to zero. The coefficient of government effectiveness is 2211.458. A percentage increase in government effectiveness will result in 2211.458 increase in GDP per capita. This shows a positive relationship between government effectiveness and economic growth. An increase in government effectiveness helps to attract foreign investors and initiates FDI. According to Kaufman and Kraay (1996), Good Governance Indicators do in fact imperfectly measure the levels of corruption and government effectiveness. There is need for effective comprehensive reliable and accurate indicators of good governance to achieve economic growth. Government effectiveness therefore connects adequate political institutions and practices that initiates growth and development.

Trade openness

From the results obtained, trade openness is statistically significant in explaining variations in GDP per capita at 1% significant level with a P-value of 0.002. Therefore, this means that the variable is statistically significantly different from zero. We reject null hypothesis and that the coefficient of trade openness is different zero. The variable has a coefficient of -13.08639. therefore, a negative relationship between trade openness and GDP per Capita. A percentage increase in trade openness will lead to a negative 13.08639 change in GDP. Trade openness has a negative impact in countries with low financial development. Edwards (1998) stated that the cost of imitations also matters in trade openness relationships. Benefiting from trade openness mostly depend on the ease on which foreign technologies are adopted and mastered by the host nation (Grossman and Helpman, 1991).

Natural resources

Natural resources have proved to be statistically significant in explaining variations in improving economic growth. The variable has a P-value of 0.091 showing that the variable is statistically significant at 10%. The variable has a coefficient of 16.4689 This shows a positive relationship between the natural resources and GDP per capita. A percentage increase in natural resources will positively affect GDP by 16.4689. Abundance of the natural resources endowment promotes economic growth. According to Stevens, (2003) natural resources should produce revenues to enhance economic growth and development. the revenues obtained from endowment provides capital which helps alleviate foreign exchange fluctuation, an important barrier to economic growth.

Political instability

The variable political stability is statistically significant at 10% in explaining the changes in the dependent variable. A negative relationship between political and Gross Domestic Product was discovered. This can be explained that an increase in political instability will have a negative

impact to economic growth in Sub-Saharan African countries. A percent increase in political instability and violence will slow down the economy by a negative 2169.78%

Gross savings

The variable gross savings is statistically significant at 1%, with a coefficient of -23.76587. It shows that the variable negatively affects the dependent. This can be explained by the Solow's neoclassical growth model which states that the saving rate could affect the growth rate of output for a temporary period of time (Solow, 1957). When people save they don't invest their money.

Discussion

Corruption is a multidirectional process, on the one side the provider benefits and on the other side the recipient benefits. But the results show that corruption is detrimental to economic growth and the political environment of a country. From the results it shows that corruption negatively affects the infrastructure development and investment of the region. Corruption tends to weaken the institution that exists in each country. Corruption affects total investment, the size of the investment through FDI in the sense that in countries where corruption is extreme, investors tend to cast a blind eye on those countries and invest their money in countries where corruption is at its minimum level. Summah (2017) postulates that the quality of investment decisions is centered on the level of corruption. Similarly, North (1990) agrees that least corrupt countries or those who respect the rule of law are more likely to have a better economic growth as compared to those that are corrupt. Corruption is linked with the GDP level, meaning when corruption is low the gross domestic product is high and vice versa. Corruption is related to government effectiveness. When the government is effective the average level of growth level of growth. In addition to that corruption is linked to political stability and absence of violence. Countries with less political freedom tend to develop less as compared to countries with better political freedom. The lower the country is ranked on the CPI the more the dominant is the patriarchal society. Likewise, many researchers on corruption and growth come out with the results that corruption affects growth but it's hard or not possible to determine the root cause of corruption and its consequences. In other words, it's hard to determine if whether corruption is kept low due to high GDP or vice versa because corruption depends on economic indicators and at the same time corruption affects them

CONCLUSION AND POLICY RECOMMENDATIONS

Conclusion

The research used data from the SADC countries from 2000-2018 to study the impact of corruption and economic growth panel data was used. The results support the hypothesis that corruption has a negative impact on economic growth in SADC countries. Gross savings, government effectiveness, and trade openness play an important role in economic growth in southern African countries. According to results, generally natural resource rents in the region impact positively on economic growth.

Recommendations

The empirical results show that corruption control is a factor for speeding up growth in southern African countries. Therefore, anti-corruption organizations should be put in place and little interference from the elite and government officials will help in reducing corruption. It is recommended to establish dependable institutions to provide some trustworthy information,

resulting in economic reforms in society. There is need for stronger effective and relevant institutions which are directly aligned to SADC anti-corruption frameworks such as the Zimbabwe Anti-Corruption Commission (ZACC) and the AUCPCC. Apart from that, government effectiveness should be built to enhance higher efficiency and reduction in corruption levels. Decentralization of power to local authorities and autonomous in organizations fighting corruption should be prioritized and no interventions in court rulings on officials caught misusing public funds will help to fight corruption. Heavy punishments and intense prison sentences should be given to those caught abusing public funds. Therefore, governments should remain and enhance transparency, accountability in government activities and reduce red tape in government offices. Likewise, proper and strong institutions are needed to improve economic growth. With SADC rich in natural resources, they need to have proper institutions to manage their natural resources and proper accountability to be implemented. SADC countries should build new institutions that support broad based market economy and stop exporting raw materials but rather process the raw materials regionally and export finished products. It is shown that GDP per capita is negatively influenced by corruption directly and adversely for those countries considered in this study. Reformers should expect the benefits that are limited to this direct effect. However, indirect effects of corruption reduction via FDI and trade openness are not expected to help because these transmission channels are shown to play no role. Furthermore, from the results it shows that trade openness has an adverse impact on economic growth. Some countries are using trade openness as a way of dumping and testing their outdated technology at the benefit of their countries. Trade openness causes syphoning out of resources so there is need to build strong policies that will be used in allowing the standard of goods to be allowed to enter a country and heavy fines to those who does not meet the minimum standards.

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