Understanding corruption in Zimbabwe's land sector: A structural breaks approach

Abstract

This study seeks to provide an understanding on whether land reform policies pursued by the government of Zimbabwe post-independence (1980) have an effect on the corruption in the land sector. Agriculture and corruption data from 2000 to 2017 were obtained from World Bank and Ibrahim Index of Governance website respectively. An econometric approach, the Bai and Perron multiple structural break test was employed in this study to establish the break years. Structural breaks in time series assist in understanding factors affecting the dynamics of a series. Three breaks were found in the agriculture series namely 2004, 2009 and 2011 while for corruption series one break was found in 2013. A negative effect was found in agriculture for break year 2011. We also noted that the policies pursued by the government were inefficient and unsustainable and left room for manipulation and corruption. We recommend technological innovation and adoption, inclusivity in policy formulation and political will in dealing with corruption in the land sector.

1. Introduction

An understanding of corruption in the land sector in Zimbabwe is explored through analysis of behaviour of the dynamics of growth in agriculture and corruption post-independence of 1980. A trail of the land issue in Zimbabwe dates back to the pre-independence era where a disparity in land distribution was evident. The Southern Rhodesia government enacted laws such as the Land Tenure Act of 1965, were about 6000 white settlers owned 15.5million hectares of land against 70 000 native blacks who owned 16.4 million hectares. Skewed land ownership was a cause for the liberation struggle which brought the independence of Zimbabwe. The birth of a new Zimbabwe in 1980 was a result of the Lancaster House Agreement which had some restrictive clauses that meant retention of land ownership to the white minority. In addition, the transfer of the land ownership to the blacks was to be financed by the British government under a willing seller and buyer arrangement. However, the Government of Zimbabwe (GoZ) was slowly losing patience over the Lancaster House Agreement provisions on land re-distribution. The GoZ embarked on the Land Reform and Resettlement Programme (1980-1997). The Land Acquisition Act of 1985 was enacted which armed the government to purchase land for resettlement purposes. In 1990, the Constitution was amended to allow the acquiring authority to pay a reasonable and fair compensation as opposed to the Lancaster House Constitution which promoted adequate compensation. A donor conference of 1998 to raise funds to finance the acquisition of land by the government was fruitless. Following the 1998 donor conference, the ruling party was under pressure to provide land to the black majority.

The fast track land reform in 2000 resulted in land invasion and occupation by the war veterans who were now the 'authority' in registration and allocation of land. Land governance by the invaders allowed some malpractices in form of corruption and nepotism. Chiweshe (2017) highlighted abuse of power by traditional leaders and rural district councils who were engaged in illegal land sales. Whereas, government of Zimbabwe land reform policies have been aimed at improving the welfare of its citizens, this has been hampered by the corruptive tendencies in land administration. Corruption in the land sector impacts on the sustainability of livelihood for the poor. There are no clearly defined benchmarks in terms of the roles of stakeholders involved in parcelling out land to the people, particularly the communal land. Undefined parameters have been the source of conflict between traditional leaders, local government, and rural district councils.

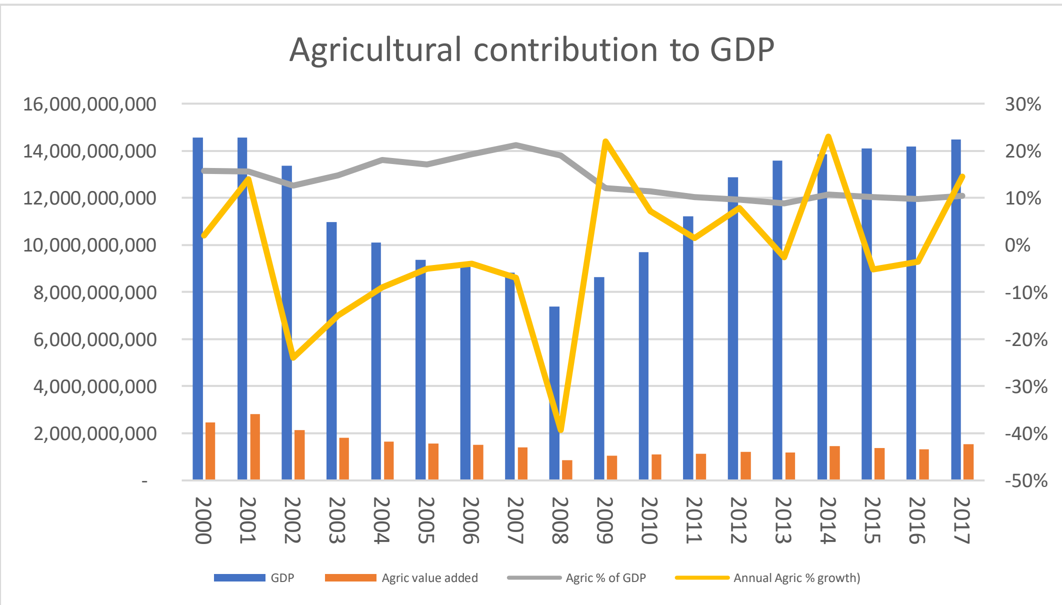
The land reform policies crafted by the government post-independence provides motivation for the current study to have an understanding on whether corruption in the land sector has been fuelled by land reform policies over the period 1980-2017. An econometric approach is employed in this study through utilisation of a structural break test methodology and results are analysed for potential causes of corruption in the land sector, amongst which the land reform policies implemented by government of Zimbabwe are a potential cause (Bai and Perron 1998; 2003). The structural break methodology unveil break years which assist in monitoring policies and strategies implemented in the land sector hence unveiling corruption issues. Tracing the root causes of corruption and addressing it is paramount for the Zimbabwean economy recovery, which according to the Ibrahim Index of African Governance (IIAG) of 2018 showed that Zimbabwe is at the lower echelons of the African governance rankings (39 out of 54 at an overall score of 44.7). Zimbabwe's 2017 IIAG overall score is below the

African average of 49.9 (IIAG 2018). Explanations of the findings is linked to the economic policies in the Zimbabwean context. The findings are crucial in informing future policy formulation in the land sector meant to promote transparency in land reform.

2. Literature review

Land is an important asset in Africa given the wealth of natural resources endowed with it. Likewise, Zimbabwe enjoys the benefits of having land in terms of food security. Agriculture has been the major economic driver in Zimbabwe. Zimbabwe was once known as the break basket of Africa before instability in macroeconomic fundamentals post the fast-tracked land reform of 2000. Some of the major crops grown in Zimbabwe are as follows; tobacco, soya beans, cotton, maize. Between 1960 and 1980, Zimbabwe's maize production accounted for about 6% of the Africa's production, and between 1980 and 2000, the country's production in relation the total continent's output fell to 5%. This decline in maize production worsened as the government embarked in a land reform strategy in which the land was redistributed to the indigenous people. In the post-2000 period, it was noted that maize production in Zimbabwe relative to the continent's total output fell sharply from 5% to 2% (Sihlobo 2017). The miscellaneous change in weather patterns have contributed a lot to the decline in agricultural productivity. However, agriculture still significantly contributes the country's GDP. Figure 1 shows that the changes in agricultural contribution to GDP for the period from 2000 to 2017. The contribution of agriculture to GDP increase to a maximum point of 20% in 2007 and to lowest point of 10% in 2017.

Figure 1: Agricultural contribution to Zimbabwean GDP



Source: World Bank Indicators (2018)

Despite the agricultural activities taking place on land allocated to smallholder, land governance is faced with a number of challenges. The recently land audit in Zimbabwe unveiled a lot of unscrupulous activities illegal sales of land, multiple farm ownership and fraudulent land allocations (The Zimbabwean, 2019). Land Portal (2019) highlighted the main problems in land governance in Zimbabwe that include disparities in land ownership, land tenure and rights are insecure, mineral resources and fertile land are controlled. The Land Acquisition Act of 2002 empowers government authorities to acquire land and other immovable property compulsory in certain circumstances for the purpose beneficial to the public but however, the word "public purpose" and what constitutes "reasonably" is not defined clearly (Land Portal, 2019).

Structural breaks methodology has been scarcely applied to the land sector. The notion behind structural breaks is testing for unit roots or stationarity after incorporating shocks in the time series. Ghosh (2010) applied the structural breaks to assess the performance of Indian agriculture. Zivot and Andrew (1992) approach was used to identify structural breaks in Ghosh (2010). Zivot and Andrew (1992) used a three-dimensional test of checking for structural changes in a time series through examining changes in intercept, trend, and intercept and trend models. Only a single break is identifiable in Zivot and Andrew (1992). Ghosh (2010) observed that there were some structural shifts in Indian agriculture due to technological innovations and reforms. Kelly and Sienko (2018) assessed the economic damages in animal farming using the Bai and Perron (1998; 2003) approach and found multiple structural breaks in production which were explained by financial stress. Jin and Miljkovic (2005) employed the structural tests in farm prices as compared to non-farm commodity prices. A total of 6 and 2 breaks were found in mean, and mean and autoregressive models respectively (Jin and Miljkovic 2005). Agricultural policies were recommended as sole tools to protect farmers from the uncertainty of the future (Jin and Miljkovic 2005). Bai and Perron (1998; 2003) econometric model is able to establish multiple unknown breaks as compared to Zivot and Andrew (1992) which focus on a single break, and both approaches enable monitoring and tracking the impact of policies.

3. Data and Methodology

The corruption and land data used was sourced from IIAG and World Bank websites respectively. The annual data for this study spans from year 2000 to 2017. The study utilised the IIAG corruption index which measures the yearly level of corruption in Zimbabwe and the value contribution of agriculture which is calculated as a percentage contribution of agriculture related activities (forestry, hunting, and fishing, as well as cultivation of crops and livestock production) to gross domestic product in Zimbabwe. We denote LNAGR and LNCORR as natural logarithms for agriculture and corruption series respectively. The two series are subjected to unit root testing. The Dickey-Fuller unit root test was used for checking stationarity of the agriculture and corruption indices, the approach is preferred because of a small sample period (Weideman and Inglesi-Lotz 2016). The structural break technique was critical in investigating unit root and accounting for breaks and hence establishing the break dates. The structural break test methodology is summarised in a three-step procedure. The first step involved investigating the unit root properties of the time series using the Dickey-Fuller test. The null hypothesis tested by the Dickey-Fuller is that there is a unit root and the alternative hypothesis is that there is no unit root which is important for data analysis and inference. The second phase of the analysis involved an assessment of unit root in the demarcated break dates, which assisted in unveiling whether structural breaks (shocks in data series) are accounted for (Bai and Perron 1998; 2003). The final step is a regression analysis with dummy variables which incorporates break dates and trends with breaks (Bai and

Perron 1998; 2003). The estimated parameters were used to ascertain the direction of the breaks (Bai and Perron 1998; 2003).

4. Empirical results and discussion

Table 1 shows the results for Dickey Fuller stationarity tests. The null hypothesis was not rejected for LNAGR and LNCORR when the intercept model was considered. We also note the similar outcome in the intercept and trend model. We arrive at the conclusion that the LNAGR and LNCORR are not stationary. When a series is non-stationary, its necessary to enquire the cause. We use Bai and Perron structural break, an econometric tool to assess the potential causes of unit root (Bai and Perron 1998; 2003).

Table 1: Dickey Fuller(DF-GLS)

Variable	Intercept	Intercept and trend	Conclusion
LNAGR	-0.87	-2.06	Unit root
LNCORR	-0.11	-1.54	Unit root

We tested for structural breaks of the time series and the results are highlighted in Table 2. The null hypothesis for the Bai and Perron (1998; 2003) allowed for a total of five breaks in UDMax and WDMax test statistics. Equal weights and asymptotic critical values are used in computing likelihood of maximum breaks in UDMax and WDMax respectively (Weideman and Inglesi-Lotz 2016). The UDMax and WDMax tests statistic were obtained from testing for the maximum number of breaks years in the series. The null hypothesis that there were no breaks was rejected and it was observed that the UDMax and WDMax were both significant at the 5% level of significance implying that the number of breaks in the LNAGR and LNCORR series were between 1 and 5. Further analysis of the LNAGR series was conducted to establish the actual break dates, the first step involved testing the null hypothesis that there are no breaks against the alternative hypothesis that there is one break date. The first step provided an F-statistic ***F(1)*** and the corresponding break date**, Break (1)**. The second step in the LNAGR series tested the null hypothesis that there is one break date versus the alternative hypothesis that there are two break dates, the result of the test is highlighted by an F-statistic ***F(2)*** and break date, **Break (2).** The final step in the analysis of LNAGR tested the null hypothesis that there are two breaks against the alternative hypothesis that there are three breaks, and key stage results are depicted by F-statistic, ***F(3)*** and break date, **Break (3)**. The analysis for LNAGR could not proceed to the four and five breaks because the tests were insignificant. In examination of the LNCORR series, we only tested for the null hypothesis that there is no break versus the alternative that there is one break date, the test provided ***F(1)*** and **Break (1)**. The two, three, four and five breaks were not considered as they were not statistically significant.

An examination of the LNAGR revealed that null hypothesis of zero break was rejected at the 5% level of significance, and we concluded that the alternative hypothesis of one break was preferred. The break year was 2009, in which F-statistic was maximised. A test of one break versus two breaks for LNAGR highlighted that the null hypothesis was rejected at the 5% level of significance and break date was in 2004, where maximisation of the F-statistic occurred. The F-statistic for testing the null hypothesis that there are two breaks versus alternative there are three breaking, was maximised in break year

2011. LNAGR series analysis provided a conclusion that there were three break years namely 2004, 2009 and 2011. A scrutinisation of the LNCORR series showed that the null hypothesis that there is no structural break year is rejected in favour of one structural break year at the 5% level of significance. The break year for LNCORR is 2013 which is maximised by the reported F-statistic of 70.11547. The findings for one break and three breaks in LNCORR and LNAGR series respectively are consistent with alternative hypothesis of breaks between one and five in UDMax and WDMax observed.

Table 2: Bai and Perron Structural Break Results

	Variable	
	LNAGR	LNCORR
F(1)	105.1918*	70.11547*
Break(1)	2009	2013
F(2)	13.08708*	-
Break(2)	2004	-
F(3)	11.66629*	-
Break(3)	2011	-
UDMax	116.6751*	72.68409*
WDMax	218.1248*	159.496*

*Denotes significance at 5% level.

One paramount question to answer is whether the structural breaks found in the LNAGR and LNCORR series are the reasons for the unit roots found in Table 1. The question of significance of structural breaks in explaining unit root is addressed by segmenting the data using the break dates and then testing for unit roots in the periods using the Dickey-Fuller generalised least squares (DF-GLS) since the subsample are small (Elliot, Rothenberg and Stock 1996; Weideman and Inglesi-Lotz 2016). Table 3 illustrates that there are four periods for LNAGR time series while for LNCORR there are two periods. The variables that relate to the periods are denoted by LNAGR(1), LNAGR(2), LNAGR(3), LNAGR(4), LNCORR(1), and LNCORR(2). The results in Table 3 shows that the LNAGR variables are stationary for most of the periods except for period 2011-2017 at the 5% level of significance suggesting that the structural breaks are possible explanation for the non-stationarity in Table 1. When the LNCORR is examined we failed to reject the null hypothesis of unit root and hence we are uncertain whether the structural breaks are possible cause. However, we further analysed the LNAGR and LNCORR to check for the direction of the breaks found.

Table 3: Stationarity for different periods

Variable	**Period**	**DF-GLS**	**Conclusion**
LNAGR(1)	2000-2003	-16.43131*	Stationary
LNAGR(2)	2004-2008	-4.53589*	Stationary
LNAGR(3)	2009-2010	-70.73857*	Stationary
LNAGR(4)	2011-2017	-2.800356	Uncertain
LNCORR(1)	2000-2012	-1.443576	Uncertain
LNCORR(2)	2013-2017	-1.776478	Uncertain

*Denotes significance at 5% level.

Equations for examining the direction of the break years were formulated for LNAGR and LNCORR. The LNAGR equation has the intercept C(0) which the series take when there are no trend or structural breaks. C(1) measures the effect of a break year 2004, D_{2004}, whilst C(2) and C(3) measures the impact of the break years 2009 and 2011 respectively. The dummy variables D_{2009} or D_{2011} takes the value one when the break year is 2009 or 2011 and a zero value otherwise. The coefficient C(4) shows the effect of the trend on the time series. C(5), C(6) and C(7) slope coefficients are for three trend structural break dates that is 2004, 2009 and 2011. LNCORR was modelled as an equation with parameters C(00) depicts an intercept, C(8) is the impact of the structural break in 2013, C(9) is the effect of the trend on the LNCORR series, and C(10) is examined the direction of the trended structural break. The estimated equations are highlighted as follows:

$$LNAGR = C(0) + C(1)D_{2004} + C(2)D_{2009} + C(3)D_{2011} + C(4)T + C(5)D_{2004}T + C(6)D_{2009}T + C(7)D_{2011}T$$

$$LNCORR = C(00) + C(8)D_{2013} + C(9)T + C(10)D_{2013}T$$

Table 4 highlighted that a positive significant effect of the base constants which are depicted Constant for the LNAGR and LNCORR series. We observed that the constant structural break coefficient in 2011 had a negative significant effect on the agriculture series at the 5% level of significance.

Table 4: Estimation results of equations

Coefficients	**Dependent Variable**	
	LNAGR	LNCORR
Constant	2.778974*	3.586292*
Constant 2004	-0.06132	-
Constant 2009	0.709464	-
Constant 2011	-0.676993*	-
Constant 2013	-	-0.122462
Trend	-0.038997	0.002209
Trend 2004	0.070524	-
Trend 2009	-0.072426	-
Trend 2011	0.038659	-
Trend 2013	-	0.017583

*Denotes significance at 5% level.

4.1 A structural break of LNAGR in 2004

In 2004 there was a structural break in agriculture series which can be explained by a total injection of Z$2.09trillion by the Zimbabwean government (Zumbika 2006). The agriculture funding strategy adopted by the Zimbabwe government in 2004 was proved to be problematic task for the government institutional administrators who had to divert from their core functions to reachout with inputs to the small-scale landholders. Unfortunately, the effort was inefficient, unsustainable and left room for corrupt activities, and abuse of funds. There were no meaningful finance repayments despite government effort to support small land farmers (Zumbika 2006). Small scale landholders suffered a major setback in accessing credit from commercial banks which insisted that the land was not bankable and the ownership rights of these farmers were not permanent. The heavy reliance on public funding by small scale landholders contaminated the fiscus and was politically manipulated (Zumbika 2006). Poor coordination of public and private financial institutions meant inequality in distribution of inputs with some corrupt powerful individual landholders obtaining more inputs that would take them to next seasons while the less powerful poor farmers failing to get adequate inputs for the 2004 season (Zumbika 2006).

4.2 A structural break of LNAGR in 2009

A break in 2009 can be explained by the Government of National Unity (GNU) which followed the much-disputed elections in 2008. Prior to the formation of the GNU there was a hyperinflation environment that ravaged the Zimbabwean economy, with annual inflation being 231 million percent (Mazviona 2013). In 2009, Zimbabwe abandoned its currency and introduced a multicurrency regime, which brought price stability. For the land sector it meant stakeholders could easily plan their production, hence. The Fast Track Land Reform resulted in decrease in hectarage for large commercial farms, that is from 11.7 million hectares to 5.4 million hectares (World Bank 2019). The land was now dominated by small scale players, which poised some challenges to the Zimbabwean government in terms of managing the risks associated with having too many small-scale landowners as well as accessibility of markets to sell the output from the land (World Bank 2019). Price stability in the GNU year brought no significant positive benefits to the land sector this suggest some other factors such as climate change, corruption, and governance of the land sector could be attributed to the structural break.

4.3 A structural break of LNAGR in 2011

The Zimbabwe government came up with the agricultural policy framework covering years 1995 to 2020 whose main objectives were to ensure land is fully put to use, to address issues of food insecurity, to ensure government agencies offer efficient services to landholders, and to develop an investment vehicle meant to support agricultural activities (Manyeruke, Hamauswa and Mhandara, 2013). The break in 2011 is attributed to agricultural policy failure, effects of climate change on the performance of the land sector coupled with land reform malpractices – recording a significant negative effect in the agriculture sector. Although the Fast Track Land Reform programme transferred land from whites to blacks, the government of Zimbabwe did not fully equip the new farmers to be as equally competitive and skilled as the white farmers who previously registered massive production and maximum utilisation of land. Government of Zimbabwe's efforts to support the new farmers involved access to cheap inputs which due to lack of proper coordination resulted in opportunists buying the inputs at a lower price and reselling them a higher price (Manyeruke, Hamauswa and Mhandara 2013). The effects of climate changes were more pronounced in less rainfall in national regions that used to receive much rains as a result this hampered production in the land sector.

4.4 A structural break of LNCORR in 2013

In 2013, Zimbabwe had its harmonised elections to elect a new government. Despite, a lot of corruption cases in the land sector, there was lack of political will to deal with this "cancer". Even in a commission mandated to fight corruption, there were reported corruption in the top management. Therefore, the break in the LNCORR series can be explained by massive spread of corruption in Zimbabwe which negatively affected economic growth (Mazviona and Bayai 2018).

5. **Conclusions and policy recommendations**

The objective of this study was to understand corruption in the land sector, particularly land for agriculture. An econometric methodology was employed to establish the breaks and their effects (Bai and Perron, 1998; 2003). The non-constant probability structure of the data emanated from three breaks that were found in the agriculture data and one break in the corruption data. We found that the breaks were explained by the land reforms, agricultural policies, corruption and climate change. We noted that the agricultural policies were not effective and they created room for abuse and other malpractices in the land sector. Climate change contributed to poor performance of the land sector.

Given the rampant corruption in the land sector, there is need for the government of Zimbabwe to introduce stiff penalties for offenders. However, the move to deal with corruption works when there is political will. Although, the government of Zimbabwe has brought in new members into the commission that is mandated to deal with corruption, there is need to ensure that there is no political interference in the functioning of the commission. There is need to modernise the land sector through ensuring proper database for landholders that should include the activities of the landholders, the assets that they own, and the land utilisation. Technological innovations and adoption have the potential to improve yields in the land sector, one good example is the Israel farming technologies. Policy makers in the land sector should incorporate all stakeholders in crafting of the policies, such inclusivity will encourage collaboration and identification of loopholes which will ensure a "water tight" policy.

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