

# An Investigation of the Relationship between Government Expenditure and Revenue in a Multicurrency Economy: A Case of Zimbabwe

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*The research was financed by the authors*

## Abstract

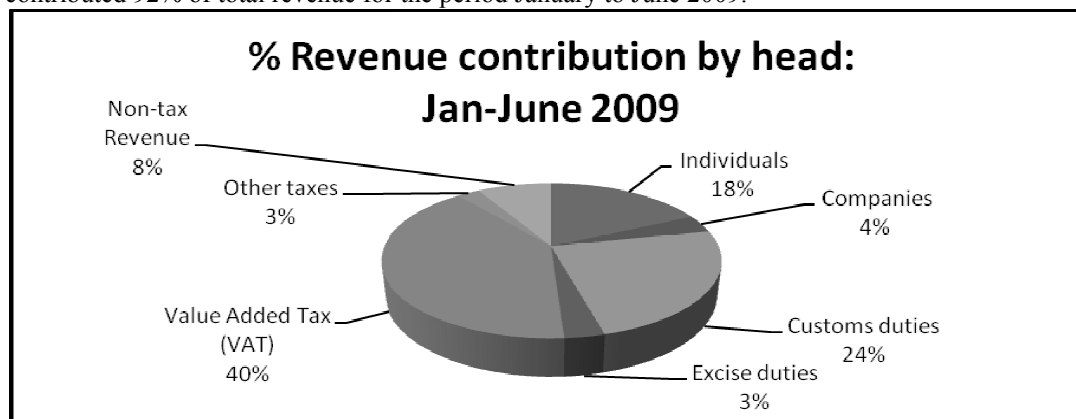
This study investigated the nature of the relationship between government expenditure and revenue for Zimbabwe for the Multicurrency period using monthly time series data covering the period 2010 to 2012. Data was analysed using Granger (1969) causality tests and Cointegration analysis. The results from this study show that there is independence between government expenditure and government revenue hence providing evidence in support of the Institutional Separation Hypothesis propounded by Wildasky (1988) and Baghestani and MacNown (1994). Hence policies to curb the budget deficit in Zimbabwe should be directed to other factors like economic growth which affect government expenditure and revenues.

**Keywords:** causality, government expenditure, government revenue, Granger

## 1. Introduction

Analysis of the causal relationship between government expenditure and revenue has received considerable attention in recent years. This is probably due to ever occurring budget deficits especially for most developing countries where government expenditure is the major tool for spearheading economic development. The Keynesians have always subscribed to the use of government expenditures in maintaining macroeconomic stability. However excessive government expenditures in most developing countries have led to high, unsustainable budget deficits. Because of this trend, studies have been conducted to try and understand the nature of the relationship between government expenditures and its revenues so as to develop appropriate policies meant to reduce these budget deficits.

For Zimbabwe, government deficits ranged between 49% and 70% of GDP for the period 2005 to 2012. These figures went as high as 88% and 91% for 2008 and 2009 respectively (World Economic Outlook October 2012). However, according to ZIMSTATS (2010-2012), the country has actually been experiencing budget surpluses that amounted to approximately US\$329million, US\$25 million and US\$982 000 for the period 2010 to 2012. These figures indicate a sharply declining trend in surpluses for the country though. This might be probably due to that the government of Zimbabwe has been relying on tax revenue to finance its expenditures in light of the loss of borrowing rights from Multilateral Organizations as well as the drying up of foreign aid. Evidence from ZIMSTATS (2009-2012) showed that domestic financing was the only contributor to total financing with nothing coming from foreign financing. In 2009, total revenue amounted to approximately US\$934million of which US\$882 million was tax revenue (ZIMSTATS 2009). A closer look at Figure 1 shows that tax revenue contributed 92% of total revenue for the period January to June 2009.

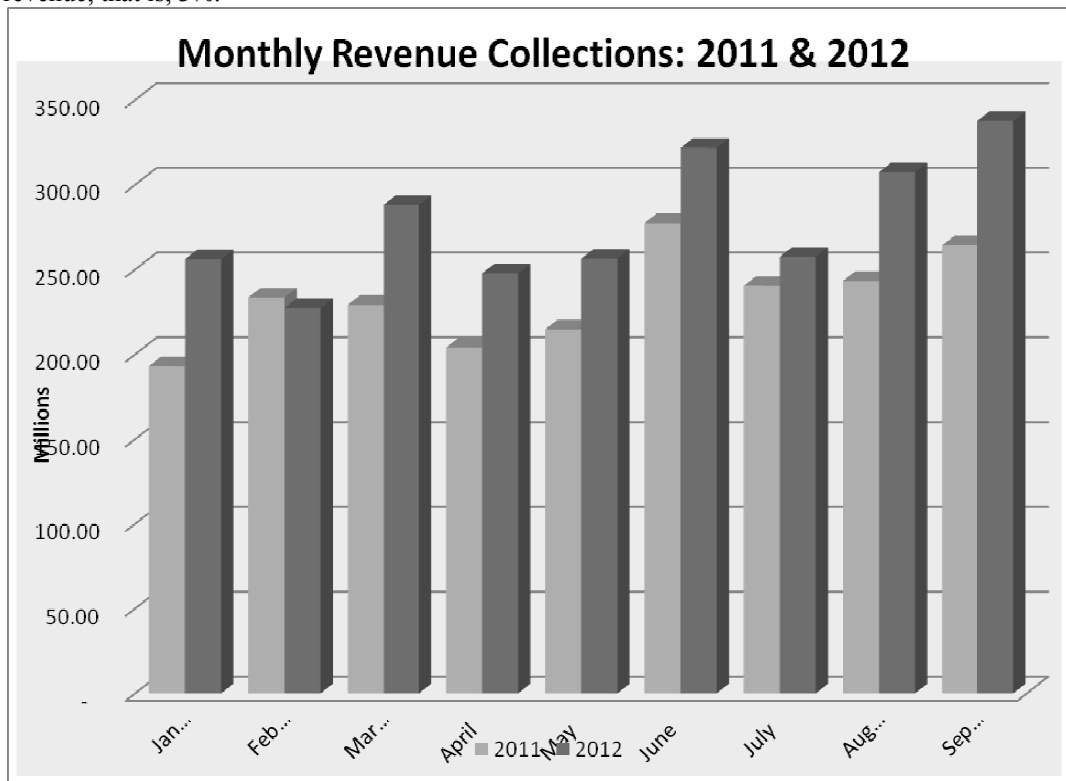


**Figure1: Percentage Revenue Contribution for Zimbabwe by Head: Jan-June 2009**

**Source: ZIMSTATS (2009)**

Figure 1 shows the percent contribution of the major revenue heads for the first half of 2009. Value added tax

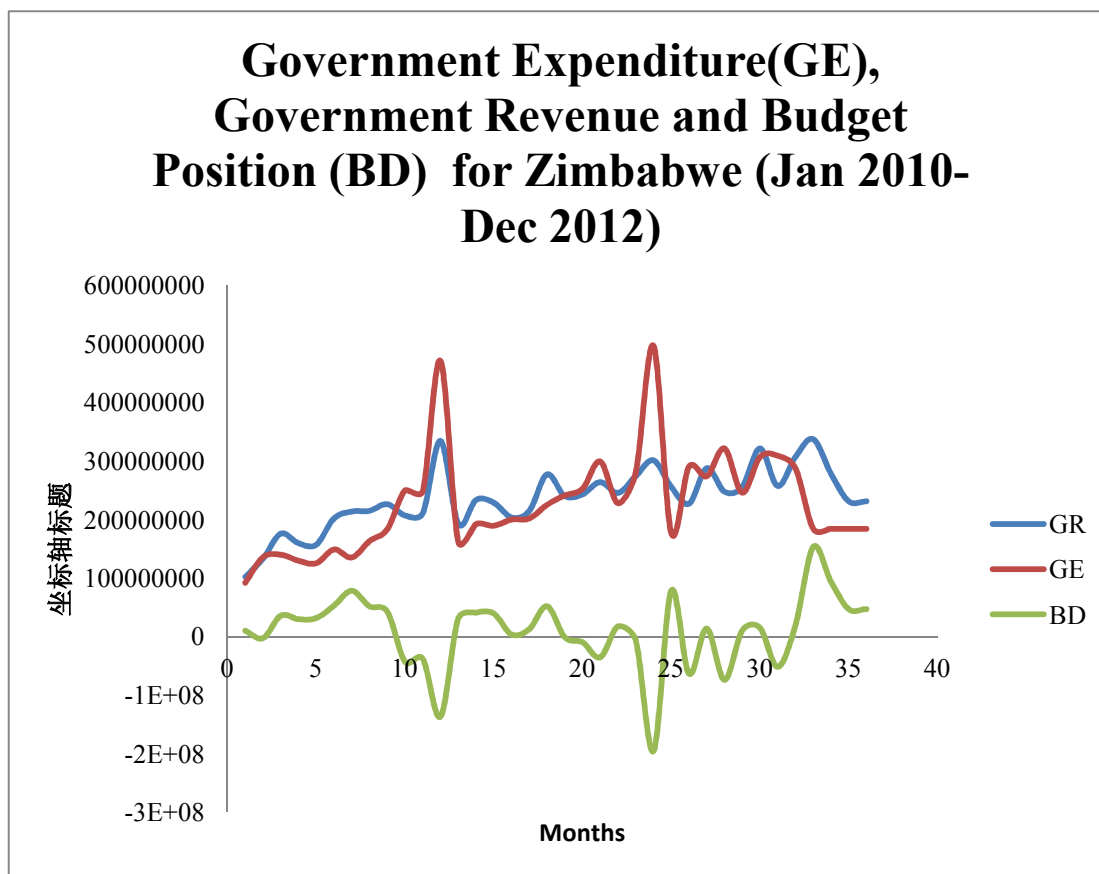
was the largest contributor, contributing 40% to total revenue while excise duties contributed the least to total revenue, that is, 3%.



**Figure 2: Monthly Revenue Collections for Zimbabwe: 2011-2012**

*Source: ZIMSTATS, 2011-12*

Figure 2 shows the monthly revenue contributions for Zimbabwe between the years 2011 and 2011. Indications are that monthly revenue collections were significantly higher in 2012 than in 2011 probably due to efficient revenue measures implemented in the year 2012. Figure 2 also shows that revenue between the years 2011 and 2012 was increasing. This was largely as a result of the good performance of tax revenue which increased by 150.9% in 2010 and 20.2% in 2011 (National Budget Statements 2009-2012). The major revenue heads which performed robustly and hence contributed to the increase in revenue for the two years are VAT, income taxes and customs duties. Moreover, for the period January to June 2012, revenue from diamonds accounted for US\$41.7million of the total non-tax revenue of US\$99.9 billion. However, for the whole period January to September 2012, diamonds revenue accounted for 90% of total non-tax revenue.



**Figure 3: Government Expenditure, Revenue and the Budget Position for Zimbabwe for January 2010-December 2012**

*Source: ZIMSTATS (2010-2012)*

Figure 3 shows the trend in government revenue, expenditure and the budget deficit for Zimbabwe from 2010 to 2012. The trend shows that government expenditure exceeded revenue for most of the months in the years under review implying that the country had a budget deficit for most of these months. Both government revenue and expenditure were fluctuating with however, government expenditure exceeding government revenue resulting in budget deficits. This was observed for the periods October-December 2010 and July to September of 2012.

During the same period, government expenditures have been generally increasing as shown in Figure 2. The persistent budget deficits are evidence that tax revenue alone is not enough to cover government expenditures. The death of the Zimbabwean dollar and the introduction of the Multicurrency System in 2009 further worsened the financing problems of the government since they could no longer rely on seignorage to finance its expenditures. In the same year, the Finance Minister introduced Cash Budgeting measures, that is, “eat what you kill”, to try and control the deficit (Budget Statement 2009). The budget position greatly improved thereafter thereby giving the indication that there is bidirectional causality between government expenditure and revenue for Zimbabwe for the multicurrency era. It is against this background that this study is conducted so as give policy makers the basis for formulating measures meant to reduce the deficit as well as to test whether there is bidirectional causality as implied by the policies being implemented currently.

## 2. Related Literature

Several theories have been put forth to try and explain the nature of the relationship between government expenditures and its revenues. These are the Revenue-Spend Hypothesis, Spend-Revenue Hypothesis, Fiscal Synchronization Hypothesis and Fiscal Neutrality Hypothesis. The Revenue-spend hypothesis was proposed by Friedman (1978), who subscribes to a positive relationship between the two variables, and Buchanan & Wagner (1978) who posits that there is an inverse relationship between the same variables. According to this hypothesis, there is a unidirectional causality between government expenditures and its revenues running from revenues to expenditures, that is, government expenditures are determined by its revenues. Friedman (1978) subscribes to the existence of a positive relationship between government expenditure and its revenue implying that raising revenue increases expenditure. Hence budget deficits can be cured by a reduction in revenue. On the other hand,

Buchanan & Wagner (1978) states that there is a negative relationship between government expenditure and revenue in the sense that any decrease in government revenue might be accompanied by an increase in the demand for public goods because it creates the perception that the cost of government programs has gone down (Dada 2013). This hypothesis implies that raising revenue leads to more expenditure (Al-Qudair 2006; Obioma & Ozunghalu 2010). Hence to solve budget deficits, the government should increase its revenues.

The second hypothesis was advocated by Peacock & Wisemen (1979) and Barro (1979) and suggests that changes in government expenditure causes changes in government revenue. This hypothesis suggests that government will determine its expenditure before its revenue. In periods of wars, natural disasters *e.t.c* the government increases its expenditures which then necessitate an increase in taxes to finance this expenditure. Hence, according to this hypothesis, there is unidirectional causality running from government expenditure to revenue implying that to solve budget deficits, the government should reduce its spending.

Fiscal synchronization hypothesis states that there is bidirectional causality between government revenue and its expenditure, that is, causality runs in both directions. This hypothesis was advocated by Meltzer & Richard (1981) and Musgrave (1966). According to this hypothesis, government revenue decisions are not made in isolation from government expenditure decisions but the decisions are made concurrently. To reduce budget deficits, the government should therefore reduce both government expenditure and revenue at the same time. Lastly, the Institutional Separation Hypothesis (Fiscal Neutrality) states that, decisions on taxation are taken independently from the allocation of government expenditures because there is no causal relationship between the two variables. This hypothesis was propounded by Wildasky (1988) and Baghestani & McNown (1994) and implies that, both government expenditure and revenue are each determined by the long run economic growth.

Empirical evidence also exist which support these various hypotheses. Owoye (1995) found a bi-directional causality in all 97 countries except Japan and Italy which supported causality running from government taxes to expenditures. Studies in support of the Fiscal Synchronisation hypothesis include studies by, Aregbeyen & Ibrahim (2012) for Nigeria and Elyasi & Ramimi (2012) for Iran, Hye & Jalil (2010) in their study of Romania, Nyamongo, Sichei & Schoeman (2007) for South Africa and Al-Qudair (2005) for Saudi Arabia. Further evidence in support of the fiscal synchronisation was provided by Alfonso and Rault (2008) who used Bootstrap panel Granger causality tests and Aladejare and Ani (2012) who used Granger causality tests through VAR methods for Nigeria. These all found evidence of bidirectional causality between government expenditure and revenue.

Dogan (2013) in a study of Turkey, Mehrara, Musai & Karsalari (2012) in a study of oil exporting countries, Petanlar & Sadeghi (2012) also in a study of oil exporting countries, Obioma & Ozunghalu (2010) in Nigeria and Wang et al (2005) for Malaysia provide evidence in support of the Revenue-Spend hypothesis. Hasan, Imtiaz and Osman (2011) also supported the presence of the revenue-spend hypothesis for Pakistan using Granger causality tests while Park (1998) also found a similar result for Korea using both Parametric and non-Parametric tests. Studies in Greece by Hondroyiannis & Papapetrou (1996), GCC countries by Fasano & Wang (2002) and Pakistan by Hussain (2004) support the presence of the Expenditure-Revenue hypothesis. Afonso and Rault (2008) used Bootstrap Panel Granger causality tests for EU countries and found evidence in support of the Expenditure-Revenue hypothesis for Italy, France, Spain, Greece and Portugal while the Revenue-Expenditure hypothesis was present for Germany, Belgium, Austria, Finland and the UK in their study of EU countries. Dada (2013) in a study for Nigeria and Ali and Sha (2012) for Pakistan found evidence in support of the Fiscal neutrality. Most of these studies utilized Cointegration approaches and Granger causality tests (Hondroyiamis & Papapetrou 1996; Ali & Sha 2012) with a few intergrating Error Correction Modelling (ECM) into the traditional Granger causality tests (Al-Qudair 2005; Obioma & Ozunghalu 2010). The fact that these empirical studies have provided different views concerning the nature of the relationship between government expenditure and revenue has motivated the author to examine this relationship for Zimbabwe for the Multicurrency era. Moreover, most of these studies except that of Nyamongo, Sichei & Schoeman (2007) used annual data but this study will utilize monthly data.

### 3. Methodology

This study uses monthly time series data for Zimbabwe for the period 2010:1 to 2012:12 so as to capture the multicurrency era. The multicurrency system was officially adopted in Zimbabwe in February 2009 [Budget Statement 2009] and data for that same year on government expenditure was not readily available at the time this study was conducted hence the use of 2010 to 2012 period. Data for both government revenue and government expenditure are in United States dollars and was collected from ZIMSTATS.

#### 3.1 Model Derivation and Specification

Wooldridge [2004] points out that in evaluating public policy, the economist's goal is to infer that one variable has a causal effect on another variable. Simply finding an association between two or more variables might be suggestive, but unless causality can be established, it is rarely compelling. Since the objective of the study is to see the nature of the relationship that exists between government expenditure and revenue and not to build a

model of government expenditure or revenue behaviour, the author will conduct Granger Causality tests as developed by Granger (1969). As postulated by Al-Qudair (2005, p.33), “Granger causality is concerned with the relevance of past information of a variable in predicting the value of the other.” Hence, the study will use unrestricted equations which include lagged values of government expenditure over and above the lagged values of government revenue.

The test will involve estimating the following pair of regressions:

$$G_t = \sum_{i=1}^n \alpha_i R_{t-i} + \sum_{j=1}^n \beta_j G_{t-j} + \varepsilon_{1t} \dots \dots \dots (1)$$

$$R_t = \sum_{i=1}^n \lambda_i R_{t-i} + \sum_{j=1}^n G_{t-j} + \varepsilon_{2t} \dots \dots \dots (2)$$

Where it is assumed the disturbances  $\varepsilon_{1t}, \varepsilon_{2t}$  are uncorrelated, G and R are Government Expenditure and R is the Government revenue.

Equation (1) postulates that Government expenditure is related to past values of itself as well as those of Government revenue (R) and (2) postulates a similar behaviour of government revenue. As suggested by Nyamongo et al (2007), the author will test for cointegration to determine if there is a cointegrating relationship between the variables as it is important for the correct specification of a model when testing for Granger causality. Cointegration was tested using the Engel and Granger (1987) 2 step procedure as also used by Al-Qudair (2005), which involves estimating the following set of equations first by OLS:

$$GE = \alpha_0 + \alpha_1 GR + \varepsilon_t$$

$$GR = \beta_0 + \beta_1 GE + \mu_t$$

The residuals from the regression are then tested for stationarity using both the ADF test and the PP unit root test as suggested by Dada (2013) and Carneiro et al (2004). If the tests indicate that the residuals are stationary, that is, I(0), then there is cointegration. According to Pasquale (2006), testing for co-integration involves two major steps, first which is the unit root test and second is the cointegration test employed to determine if the variables in the system have a long run relationship. Hence, unit root tests on GE and GR would be carried out first before conducting tests for cointegration. The author will only test for cointegration if the variables are not stationary at level but have to be differenced of the same order to be stationary. If the variables are stationary, there is no need for cointegration test (Gujarati 2004).

#### 4. Results and Discussion

##### 4.1 Unit Root Tests Results

**Table 1: Unit Root Test Results**

Variable	ADF Test Statistic	PP Test Statistic	1% Critical Value	Order of Intergration
GR	-5.041528	-4.997752	-4.2412	I(0)
GE	-4.648850	-4.721901	-4.2412	I(0)

Source: Figures adopted from ADF and PP tests generated from E-Views 4.0

Table 1 presents the unit root test results which shows evidence that government revenue and expenditure are stationary at level and hence are cointegrated. Results from both the ADF and PP tests (Table 1) show that both GR and GE are stationary at level, that is I(0), implying the absence of a unit root. Hence the author did not reject the null hypothesis of no unit root and concluded that a long run relationship exist between GR and GE.

##### 4.2 Granger Causality Results

Since the variables were stationary at level, the author proceeded to test for causality using the simplest version of Granger test. This was also used by Ali & Sha (2012), Wand et al (2005) and Hondroyiaamis & Papapetrou (1996). However, Gujarati (2004) advises first identifying the appropriate lag length using the Akaike Information Criteria (AIC) as the first step to Granger causality tests. The procedure involves conducting OLS regressions on the variables in their levels and in different lags. The appropriate lag length is the one corresponding to the lowest AIC. A summary of the lag lengths and their AICs are given in Table 2 below.

**Table 2: Alchaike Information Criterion for Different Lag Lengths**

No. Of Lags	0	1	2	3	4	5
AIC	38.81382	39.83501	38.85648	38.81943	38.54568	38.55076

Source: Computations based on data analyzed in E-Views 4.0

Table 2 shows the alchaike information criterion for different lag lengths which is used to determine the appropriate lag length to use for the model when carrying out regressions. Results from Table 2 show that the

appropriate lag length for the model is 4 which is the one which corresponds to the lowest AIC. Granger causality tests are therefore based on this lag length.

**Table 3: Granger Causality Test Results**

Hypothesis	F-prob	Decision
GR does not granger cause GE	0.79085	Do not reject
GE does not granger cause GE	0.71061	Do not reject

Source: Computations based on data analyzed in E-Views 4.0

Table 3 presents results from the Granger Causality test which forms the basis for analyzing data for this study. Results from Granger causality tests (refer to Table 3) show that government revenue does not Granger cause government expenditure evident from an F-prob of more that 0.05. Moreover, there is also evidence that government expenditure does not Granger cause government revenue since the F-prob is highly insignificant. This implies that there is independence between government revenue and expenditure in Zimbabwe for the period 2010 to 2012.

#### 4.3 Discussion of Results

The results from this study show that there is independence between government expenditure and government revenue hence providing evidence in support of the Institutional Separation Hypothesis propounded by Wildasky (1988) and Baghestani & MacNown (1994). This means that for the period under review, there was independence between government expenditure and revenue for Zimbabwe implying that changes in government expenditure did not explain changes in government revenue while the opposite is also true. Ali & Sha (2012) and Dada (2013) also had similar findings. The implications of these findings for Zimbabwe, for the period under study, are that decisions on taxation were taken independently from allocation of government expenditure. However, indications from the way the budget was conducted implied the presence of unidirectional relationship between the two variables running from revenue to expenditure. This is evident from the balanced budget approach or “Eat what you kill” approach adopted by the government for the period 2009 to 2012. During this period, government expenditure was supposed to match expected government revenue with overspending greatly condoned. Moreover, during the same period, the country actually experienced budget surpluses though the trend was a declining one. However, the findings from this study suggest that the budget position and hence government revenue and expenditure are explained by other factors like economic growth as propounded by Wildavsky (1988) and Baghestani & McNown (1994). The policy implications of these findings are that for the country to continue experiencing a favourable budget position, the government should target variables like economic growth. After the introduction of the Multicurrency system, the economy of Zimbabwe experienced its first, in decades, positive economic growth rates which might have largely contributed to positive budget position. Hence it might be necessary for the government to continue enforcing measures meant to boost the country’s economic growth for as long as the economy is using the multicurrency system.

### 5. Conclusion

The purpose of this study was to investigate the nature of the relationship between government revenue and expenditure for Zimbabwe for the Multicurrency era. Pathological tests showed that both government expenditure and government revenue were stationery at level implying that a long run relationship exists between the two variables. as a result, the relationship between the two variables was tested using the simple Granger causality tests developed by Granger (1969). Tests were done on unrestricted equations as used in Al-Qudair (2005). Results from the test provided evidence in support of Fiscal Separation (Neutrality) Hypothesis implying independence between government revenue and expenditure for Zimbabwe between the years 2010 and 2012. This means that for the multicurrency system period, government expenditure does not explain government revenue in Zimbabwe and vice versa. The implication is that the budget deficit for Zimbabwe can be cured by independently addressing government expenditure and government revenue. Hence, the government should make expenditure and revenue decisions separately and policies meant to improve the government budget position should hence target other factors like economic growth.

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