cogent
economics
& finance

GENERAL & APPLIED ECONOMICS | RESEARCH ARTICLE

Empirical test of the Ricardian Equivalence in the Kingdom of Lesotho

Teboho Jeremiah Mosikari[1] and Joel Hinaunye Eita[2]*

*Corresponding author: Joel Hinaunye Eita, Department of Economics & Econometrics, University of Johannesburg, P.O. Box 524, Auckland Park 2006, Johannesburg, South Africa
E-mails: hinaeita@yahoo.co.uk, jeita@uj.ac.za

Abstract: The objective of this paper is to test the existence of Ricardian Equivalence in Lesotho using annual data for two sample periods, 1980–2014 and 1988–2014. This proposition is important and has crucial implications for tax policy. Household consumption, government debt, government expenditure, GDP per capita, population growth and inflation are variables which are used for this analysis. The study used ARDL cointegration approach to investigate the relationship between these variables. The study found that there is long run equilibrium relationship among the variables in two sample periods. The results show that an increase in government debt or government expenditure will decrease household consumption per capita. This implies that the Ricardian Equivalence does hold for Lesotho. The results also imply that fiscal policy is an ineffective tool to stabilize the economy. Lesotho has limited fiscal flexibility, and it will be difficult or challenging to increase private consumption and economic growth, particularly during economic downturn.

ABOUT THE AUTHORS

Teboho Jeremiah Mosikari lectures at the Department of Economics, North West University (Mafikeng campus) in South Africa. He holds a degree of Doctor of philosophy in Economics from the same North West University. Mosikari's research interest is on economic growth, international trade, public finance and macroeconometric modelling. He has published in several reputable journals such as *Economia Internazionale/International Economics, Acta Universitatis Danubius, Economics and Management Engineering, Journal of Economics and Behavioral Studies, European Journal of Social Sciences*. He has also presented papers in countries such as Finland, Spain and United Arab Emirates (UAE) Dubai.

Joel Hinaunye Eita, PhD, is a professor of economics and econometrics at the University of Johannesburg, South Africa. His research areas are macroeconomic modelling, international trade, finance, and financial markets. He presented several research papers at local and international conferences. He published research papers in local and international journals, among others, *South African Journal of Economics, Journal of Developing Areas, African Finance Journal, Economia Internazionale, Agrekon, Development Southern Africa*.

PUBLIC INTEREST STATEMENT

Fiscal policy of any country is very critical in determining the well-being of its citizens. This suggests that an understanding of how people react to fiscal policy stance is very important. The purpose of this study is to investigate how citizens of Lesotho respond or react to fiscal policy stance. This study informs the society about how fiscal policy can discourage aggregate expenditure especially the household sector. The empirical literature on the relationship between government debt (and government expenditure) and household consumption in Lesotho is scanty. The results of this study show that an increase in government debt or government expenditure will decrease household consumption. This result implies that although it is believed that government can stimulate the economy during hard times, that belief does not hold for Lesotho. Lesotho's household sector is forward looking, which suggest that fiscal policy is an ineffective tool to stabilize the economy.

cogent•oa

1. Introduction

The term "Ricardian Equivalence" hypothesis has been a subject of too many macroeconomists since it was pioneered by Ricardo in the 1820s. The proposition simply states that rational consumers are forward looking and internalize government budget constraint when making their expenditure decisions. Ogba (2014) explained that there are two dimensions to deal with government debt effect. The first one is the Keynesian view, which posits that an increase in government debt due to tax cut raises disposable income and stimulates the demand side of the economy. The second one is the Ricardian Equivalence, where consumers reduce their current consumption in order to pay for future tax increase. These result in aggregate demand to be the same as if government had chosen to increase tax now and not later.

The empirical test of the Ricardian Equivalence is appropriate for the Kingdom of Lesotho because in recent years there has been a major concern about government debt as a % of GDP. Lesotho is classified as a country with low debt to GDP ratio. However, after the global financial and economic crisis of 2007–2009, the economic outlook remains depressing (Nseera, 2013). Although government debt decreased from 50.6% of GDP in 2009 to 35% in 2011(driven mainly by significant appreciation of the Loti/Dollar exchange rate for the period 2009 and 2010), it is still a concern in Lesotho. Government debt increased from 40.8% of GDP in 2012, to 45.8% of GDP in 2013. Total government debt in 2011 was US$846 million. External debt accounted for US$730 million (86% of total government debt), while domestic debt accounted for US$116 million (14% of total government debt). This indicates that external creditors dominate total government debt in Lesotho. In an open economy like Lesotho, an unstable public debt sector has a potential damaging effect on aggregate demand. Although empirical research on testing the existence of Ricardian Equivalence in Lesotho is limited, there is one notable study by Thamae and Macheli (2013). This study indicates that Ricardian Equivalence does not hold in Lesotho. It further shows that the country can stimulate economy through fiscal flexibility without discouraging aggregate demand. Given these findings and the important role played by fiscal policy in a small economy like Lesotho, it is necessary to revisit an investigation on Ricardian Equivalence. In light of the above, the objective of this paper is to test the Ricardian Equivalence for Lesotho. The paper contributes to the literature by using more robust econometric techniques and by applying more extended time span than the previous study. The rest of this paper is structured as follows. Section 2 presents empirical literature on Ricardian Equivalence studies. Section 3 provides the empirical model specification of the study. Section 4 discusses the data and methodology of the study. Section 5 reports the results. Lastly, Section 6 outlines the conclusion of the study.

2. Literature review

Empirical work on the relationship between the household spending and fiscal policy (government debt) has been rather inconclusive. A study by Becker (1995) described that it is important when testing the Ricardian Equivalence hypothesis to augment the standard analysis in deterministic models to stochastic models. The study mentioned that in a stochastic model, agents have to make predictions about future levels of government expenditure, and that public debt might be a useful predictor for this purpose. In addition, the study recommended that empirical studies should distinguish between debt as a potential source of net wealth. This is the main part of the Ricardian Equivalence proposition that debt is a signal of future levels of government revenue collection. Berben and Brosens (2005) found that OECD countries with high government debt have less private consumption. These results imply that within the OECD a fiscal expansion which results in an increase in the level of government debt, will partly be crowded out by a fall in household consumption. Gogas, Plakandaras, and Papadimitriou (2014) examined the responsiveness of real private

spending to changes in the level of public debt which commonly known as Ricardian Equivalence for 15 OECD countries. The study failed to detect a cointegration between consumption and public debt in the long run. This implies that the Ricardian Equivalence proposition is rejected.

Bhattacharya and Mukherjee (2010) investigated the relationship between private expenditure, government expenditure and debt in OECD economies. The results from the study indicate that the relationship between private expenditure and government debt become negative during periods of high government indebtedness specifically for Australia, Belgium, Canada and Spain. Drakos (2001) explored the long run relationship between government domestic borrowing and private savings for a small EU country Greece. The study found that contrary to the Ricardian Equivalence hypothesis, households, to some extent, perceive government bonds as net wealth and consequently stimulate their private consumption. Nickel and Vansteenkiste (2008) studied the relationship between the current account and fiscal policy in 22 eindustrialized countries to check whether consumers react in a Ricardian or Keynesian approach to fiscal imbalance. The study used a dynamic panel threshold model to shed light on the relationship between the current account and the fiscal balance. The study found that in highly indebted countries with debt ratio above 90% of GDP the association with current account is negative. The results of the study suggest that private consumers have become Ricardian, which implies that fiscal deficit offset private consumption. Although there has been much empirical studies on testing the validity of Ricardian Equivalence in advanced economies, there is still no consensus in the existing literature. The work of and Drakos (2001) and Gogas et al. (2014) reject the existence of Ricardian Equivalence in some advanced economies. However, the studies by Berben and Brosens (2005), Bhattacharya and Mukherjee (2010), Nickel and Vansteenkiste (2008) detect the presence of Ricardian Equivalence.

Waqas and Awan (2012) investigated the Ricardian Equivalence Hypothesis in Pakistan by using annual data for the period of 1973–2009. The results of the study indicate that there is no evidence in favour of Ricardian Equivalence hypothesis in Pakistan. This implies that in Pakistan, there is a positive relationship between government debt and private consumption. The empirical study by Ismail (2010) analysed the relationship between government expenditure and private expenditure in Malaysia. Although the study used government expenditure as the main variable, the study also used government debt as an additional control variable. The results of the study revealed that there is a negative association between government debt and private expenditure. The study by Haris and Mohammad (2015) assessed the role of government debt in explaining changes in private expenditure. The study used Autoregressive Distributive Lag (ARDL) method to investigate the relationship between government debt and private expenditure in Malaysia. The study found that government debt has a positive and significant effect on household expenditure at 5% significant level. The above studies by Waqas and Awan (2012), Ismail (2010) and Haris and Mohammad (2015) investigated the validity of Ricardian Equivalence in Asian economies. Evidence from empirical studies indicates that most studies such as Waqas and Awan (2012) and Haris and Mohammad (2015) reject Ricardian Equivalence hypothesis. This suggests that consumers in Asian economies are forward looking in their spending. That is in relation to fiscal policy reactions.

Ogba (2014) examined the validity of the Ricardian Equivalence hypothesis using Nigeria data from period 1980–2010. The results of the study revealed that government debt has a positive and significant effect on household consumption. This is contrary to the proposition that the effect should be either zero or negative for the pure Ricardian hypothesis to hold. Pantaleo and Karamagi (2012) examined the determinants of private savings, in order to establish the existence of Ricardian Equivalence in Tanzania. The study applied Engle-Granger econometric technique for the period 1970–2005 using two empirical models. The study revealed that results differed between the two models. It was found that the Ricardian Equivalence hypothesis did not hold with respect to the budget deficit model. However, the savings model revealed evidence of the Ricardian Equivalence hypothesis.

Empirical studies on Ricardian Equivalence in Lesotho are limited. However, there is one study by Thamae and Macheli (2013). Thamae and Macheli (2013) studied the effects of public spending on private consumption in Lesotho. The study used the multivariate cointegration techniques of Johansen (1995) for the period 1980 to 2010. The study found that there is a positive relationship between private consumption and government expenditure. This study did not confirm the existence of Ricardian Equivalence since there was a positive relationship between consumption and government expenditure. This current study differs from Thamae and Macheli (2013) in several ways. Firstly, the study uses two methods to investigate unit root instead of one used by latter study. This approach is necessary because of low power and size of unit root methods. As Sjo (2008) recommended, the use of more than one method to test the existence of unit root ensures that the results are robust. Secondly, the study employs recent ARDL cointegration test compared to the Johansen methodology used by Thamae and Macheli (2013). The reason for not using the Johansen econometric method is that it requires more observations compared to ARDL technique. Lastly, the study uses two sample periods in order to ensure that the results are robust, compared to only one sample period that was used by the previous study of Thamae and Macheli (2013). Therefore, this study contributes to the limited empirical studies in Lesotho, by testing whether the Ricardian Equivalence holds. It also tests whether there is substitution effect between household spending and government debt.

3. Empirical model specification

Following a review of the literature, this study adopts an extended empirical model of Thamae and Macheli (2013) to estimate the Ricardian Equivalence for the economy of Lesotho. The empirical model (household consumption function) for Lesotho is specified using two variations. The first variation of the model uses government expenditure as a measure of fiscal policy. The second variation of the empirical model uses government debt as a measure of fiscal policy. These two variations of the empirical model are specified in Equations (1) and (2) as follows:

$$lnhhex_t = \mu_0 + \gamma_1 lngeg_t + \gamma_2 lngdpp_t + \gamma_3 lntpopg_t + \gamma_4 lninf_i + \pi_t, \tag{1}$$

$$lnhhex_t = \mu_0 + \gamma_1 lndebt_t + \gamma_2 lngdpp_t + \gamma_3 lntpopg_t + \gamma_4 lninf_i + \pi_t, \tag{2}$$

where $lnhhex_t$ is household consumption per capita, $lndebt_t$ is government debt, $lngdpp_t$ is GDP per capita, $lntpopg_t$ is population growth, $lninf_i$ is inflation (consumer price index) and $lngeg_t$ is government expenditure. The variables μ_0 and π_t represent the intercept and white noise, respectively. The Ricardian Equivalence hypothesis predicts that the relationship between government debt and household consumption per capita should be negative ($\gamma_1 < 0$). The relationship between household consumption and GDP per capita is expected to be positive ($\gamma_2 > 0$). The expected relationship between population growth and household consumption is positive ($\gamma_3 > 0$). Lastly, the expected theoretical relationship between consumer inflation and household consumption is negative ($\gamma_4 < 0$). All the variables included in Equations (1) and (2), are selected following empirical studies on Ricardian Equivalence. The inclusion of government debt and income in is adopted from studies such as Ogba (2014) and Drakos (2001). The effect of government debt on household consumption is expected to be negative. The study also includes population growth in the equation. This variable was also used by Barro (1989). Lastly, the study also uses inflation as a one of the determinants. This is based on household demand theory.

4. Data and methodology

4.1. Data

To examine the existence of Ricardian Equivalence in Lesotho, the study uses two sample periods. These sample periods are 1980–2014 and 1988–2014. This breakdown of samples is due to unavailability of data from 1980 until 1988 for government debt in Lesotho. Therefore, the study estimates two of the empirical model into two variations. This study uses the annual time series data were sourced from *International Monetary Fund* (IMF) and World Bank's *World Development Indicators* (WDI). Variables used for the study are as follows. Household consumption per capita (constant

2005 US\$) is used as a proxy for $hhex_t$. General government gross debt as a percentage of GDP is a proxy for $debt_t$. Government expenditure as a percentage of GDP (constant 2005 US\$) is proxy as geg_t, while GDP per capita (constant 2005 US\$) is used as proxy for $gdpp_t$. The variable $popg_t$ is proxied by population growth, and inf_i is proxied by consumer price index. All the variables were transformed into logarithms in order to interpret the coefficients as elasticities. The study uses statistical package *eviews* version 9 for analysis.

4.2. Estimation methodology

Prior to the estimation Equations (1) and (2), it is important to subject all the variables to unit root testing. The purpose of this test is to avoid spurious results from the estimated model. The study uses Augmented Dickey–Fuller (ADF) test invented by Dickey and Fuller (1979), Dickey and Fuller (1981) and Phillips–Perron (P-P) test created by Phillips and Perron (1988) to establish the stationarity of variables in the model. The null hypothesis of both tests is that the variables contain the unit root, which implies that they are nonstationary.

To estimate Equations (1) and (2), the study adopts the ARDL or bound cointegration technique developed by Pesaran, Shin, and Smith (2001). The ARDL bound cointegration technique for the first variation (Equation [1]) of the empirical model is specified in Equation (3). The ARDL bound cointegration technique for the second variation (Equation [2]) of the empirical model is presented in Equation (4).

$$
\begin{aligned}
\Delta lnhhex_t = \delta_0 &+ \sum_{i=1}^{n} \mu_{1i}\Delta lnhhex_{t-i} + \sum_{i=1}^{n} \mu_{2i}\Delta lngeg_{t-i} \\
&+ \sum_{i=1}^{n} \mu_{3i}\Delta lngdpp_{t-i} + \sum_{i=1}^{n} \mu_{4i}\Delta lnpopg_{t-i} + \sum_{i=1}^{n} \beta_{5i}\Delta lninf_{t-i} \\
&+ \gamma_1 lnhhex_{t-1} + \gamma_2 lngeg_{t-1} + \gamma_3 lngdpp_{t-1} + \gamma_4 lnpopg_{t-1} + \gamma_5 lninf_{t-1} \\
&+ \pi_t
\end{aligned} \tag{3}
$$

$$
\begin{aligned}
\Delta lnhhex_t = \delta_0 &+ \sum_{i=1}^{n} \mu_{1i} lnhhex_{t-i} + \sum_{i=1}^{n} \mu_{2i} lndebt_{t-i} + \sum_{i=1}^{n} \mu_{3i} lngdpp_{t-i} \\
&+ \sum_{i=1}^{n} \mu_{4i} lnpopg_{t-i} + \sum_{i=1}^{n} \mu_{5i} lninf_{t-i} \\
&+ \gamma_1 lnhhex_{t-1} + \gamma_2 lndebt_{t-1} + \gamma_3 lngdpp_{t-1} + \gamma_4 lnpopg_{t-1} \\
&+ \gamma_5 lninf_{t-1} + \pi_t
\end{aligned} \tag{4}
$$

where δ_0 represents the intercept, and μ_i are short run parameters, γ_i are long run coefficients and Δ is delta representing variables that are in first difference form. All other variables in Equation (3) are as previously defined. The most important part of Equations (3) and (4) is to test the null hypothesis of no cointegration as follows:

null hypothesis: $\gamma_1 = \gamma_2 = \gamma_3 = \gamma_4 = \gamma_5 = 0$

alternative hypothesis: $\gamma_1 \neq \gamma_2 \neq \gamma_3 \neq \gamma_4 \neq \gamma_5 = 0$

Failure to reject the null hypothesis suggests that there is no cointegration. Rejection of the null hypothesis indicates that the variables in the equation are cointegrated. ADRL cointegration technique identifies the long run relationship among the variables in the models. The technique uses the Wald or F-statistics to test for joint significance of γ_1, γ_2, γ_3, γ_4 and γ_5. After establishing the long run relationship between the variables, the next step is to estimate the long run coefficients and make relations inference with their values. The study adopts a well-renowned approach by Narayan (2005) to estimate the coefficients of long run by using Dynamic Ordinary Least Square (DOLS) method. The estimator was developed by Stock and Watson (1993). The technique DOLS is used on the grounds

☀ cogent ·· economics & finance

that it asymptotically eliminates the sample bias and correct for endogeneity and serial correlation in the model. Therefore, it is quite evident in the literature that the use of such an estimator it requires the precondition of cointegration among the variables of interest. DOLS specification is expressed as follows:

$$X_t = \beta_0 + \beta_1\Psi_t + \sum_{j-p}^{p} \Delta\Psi_{t-1} + \Phi_t \tag{5}$$

where X_t household consumption is per capita, Ψ_t is a vector of explanatory variables discussed in Equations (1) and (2) and Δ is a lag operator. The use of DOLS suggests that it is not necessary to estimate short run or error correction model.

5. Estimation results

5.1. Unit root test results
Table 1 presents the results for unit root test for sample period 1980–2014. The study assessed stationarity of variables using two models, which are constant only and constant and intercept. The ADF test statistic indicates that most variables (household consumption per capita, government expenditure and GDP per capita population growth) are $I(1)$, except inflation which is $I(0)$.

P-P test results also show that most variables in the study are I(1), except inflation which is stationary in levels.

Table 1. Unit root results for sample period 1980–2014					
Variable	**Equation**	**AIC lag length**	**ADF test— probabilities**	**Bandwidth: using Bartlett kernel**	**P-P test probabilities**
LNHHEX	Intercept	3	0.237	3	0.607
LNGEG		8	0.652	4	0.507
LNGDPP		0	0.980	1	0.685
LNTPOPG		3	0.666	3	0.716
LNINF		0	0.000***	1	0.001***
LNHHEX	Intercept and trend	0	0.975	3	0.936
LNGEG		8	0.952	1	0.558
LNGDPP		4	0.091	2	0.111
LNTPOPG		6	0.322	4	0.648
LNINF		2	0.022***	17	0.000***
ΔLNHHEX	Intercept	1	0.000***	4	0.000***
ΔLNGEG		8	0.016**	6	0.000***
ΔLNGDPP		2	0.000***	4	0.000***
ΔLNTPOPG		1	0.001***	1	0.001***
ΔLNINF		8	0.018**	17	0.000***
ΔLNHHEX	Intercept and trend	1	0.000***	1	0.000***
ΔLNGEG		8	0.081**	8	0.000***
ΔLNGDPP		2	0.000**	0	0.000***
ΔLNTPOPG		1	0.009**	1	0.007***
ΔLNINF		8	0.052*	31	0.000***

*10 % statistically significant.

**5 % statistically significant.

***1 % statistically significant.

Table 2. Unit root results for sample period 1988–2014					
Variable	**Equation**	**AIC lag length**	**ADF test—probabilities**	**Bandwidth: using Bartlett kernel**	**P-P test probabilities**
LNHHEX	Intercept	3	0.288	3	0.607
LNDBT		1	0.223	3	0.236
LNGDPP		0	0.675	1	0.685
LNTPOPG		3	0.732	3	0.716
LNINF		0	0.001***	1	0.001***
LNHHEX	Intercept and trend	0	0.958	2	0.944
LNDBT		1	0.529	4	0.944
LNGDPP		0	0.663	2	0.559
LNTPOPG		3	0.371	3	0.765
LNINF		0	0.000***	7	0.000***
ΔLNHHEX	Intercept	0	0.020**	1	0.023**
ΔLNDBT		0	0.000***	5	0.000***
ΔLNGDPP		0	0.002***	1	0.002***
ΔLNTPOPG		1	0.002***	1	0.001***
ΔLNINF		4	0.002***	14	0.000***
ΔLNHHEX	Intercept and trend	0	0.023**	1	0.023**
ΔLNDBT		0	0.001***	8	0.000***
ΔLNGDPP		0	0.013**	1	0.013**
ΔLNTPOPG		1	0.012**	1	0.009***
ΔLNINF		4	0.008***	14	0.000***

*10 % statistically significant.

**5 % statistically significant.

***1 % statistically significant.

Table 2 presents the results for unit root test for sample period 1988–2014. The ADF test statistic indicates that most variables (household consumption per capita, government debt and GDP per capita population growth) are $I(1)$, except inflation which is $I(0)$.

5.2. Estimation results

5.2.1. Cointegration test results

The calculated F-statistics for the cointegration test for first and second variations (model 1 an model 2) of the empirical model are reported in Table 3. The critical values are also reported in the same table. The computed F-statistic for model 1 is 5.672. This computed F-statistics is greater than the upper bound critical values at 5% level. Therefore, the study rejects the null hypothesis of no cointegration. The computed F-statistics for model 2 is 54.771. Since the calculated F-statistics is greater than the upper bound critical values at 1% level, the null hypothesis of no cointegration is rejected. This means that there is long run economic equilibrium relationship between the variables in both model 1 and model 2.

In line with Pesaran and Shin (1999) and Narayan (2005), the following structure ARDL (1, 1, 2, 3, 3) for Model 1 was chosen and for Model 2 is ARDL (3, 2, 3, 3, 3). That is because this current study uses annual data. Therefore, 3 was chosen arbitrarily as the maximum number of lags in the ARDL model selection based on Akaike Information Criterion (AIC). After confirming the existence of cointegration, the next step is to estimate the long run coefficients. The long run coefficient results are presented in Table 4.

Table 3. ARDL cointegration test results

	F-statistics	10% Critical value	5% Critical value	1% Critical value
Model 1	5.672**	*I*(0) 2.578	*I*(0) 3.125	*I*(0) 4.537
ARDL(1,1,2,3,3)		*I*(1) 3.858	*I*(1) 4.608	*I*(1) 6.370
Model 2	54.771***	*I*(0) 2.508	*I*(0) 3.037	*I*(0) 4.257
ARDL(3,2,3,3,3)		*I*(1) 3.763	*I*(1) 4.443	*I*(1) 6.040

Notes: Null hypothesis: no cointegration; Alternative hypothesis: cointegration; Rejection rule: reject null hypothesis if *F*-statistics is greater than the upper limit.

*10% significance level.

**5% significance level.

***1% significance level.

5.2.3. Long run coefficients results

The results of the long run coefficients are presented in Table 4. As explained earlier, the use of DOLS estimator implies that it is not necessary to estimate short run or error correction model. Hence, only long run results are presented here.

Table 4 presents the long run coefficients results using DOLS estimator. The results indicate that in both models the estimated coefficients are all consistent with economic theory. In model 1, the results indicate that there is a negative relationship between government expenditure and household consumption per capita. A 1% increase in government expenditure will cause household consumption per capita to decrease by 0.393%. The negative relationship between government expenditure and household consumption per capita indicates that the Ricardian Equivalence exists in Lesotho. The association between government expenditure and household consumption per capita is statistically significant at 1% significance level. The results also show that the relationship between GDP per capita and household consumption per capita is positive and statistically significant

Table 4. DOLS long run estimation results Dependent variable: LOGHHEX

Sample period	1980–2014	1988–2014
Independent variables	**Model 1 coefficient**	**Model 2 coefficient**
LNGEG	−0.393	......
	(−3.476)***	......
LNDEBT	......	−0.134
	......	(−9.075)***
LNGDPP	0.868	0.470
	(1.901)*	(3.041)***
LNINF	−0.001	−0.059
	(−0.015)	(−1.524)
LNPOPG	0.433	0.360
	(2.153)**	(5.422)***
C	2.248	4.034
	(0.827)	(3.923)***
R-squared	0.850	0.971
Adjusted *R*-squared	0.691	0.905
S.E. of regression	0.053	0.027

Note: *T*-statistics are in brackets.

*10 % statistically significant.

**5 % statistically significant.

***1 % statistically significant.

at 10% significance level. A 1% increase in GDP per capita will increase household consumption per capita by 0.868%. In addition, the results of the study show that there is a positive relationship between population growth and household consumption per capita. A 1% increase in population growth will increase household consumption per capita by 0.433%. This coefficient is statistically significant 5% level. The results also show that there is negative association between consumer inflation and household consumption per capita. A 1% increase in consumer inflation will reduce household consumption per capita by 0.001%. However, this coefficient is not statistically significant.

The results of model 2 are also consistent with economic theory. They are also in line with those of model 1. An increase in government debt to GDP causes household consumption per capita to decrease by 0.134%. This coefficient is statistically significant. The negative effect of government debt to GDP on household consumption confirms that the Ricardian Equivalence hypothesis holds for Lesotho. For control variables, the results show that there is a positive relationship between GDP per capita and household consumption per capita. Population growth has a positive impact on household consumption per capita. It implies that as population grows, the demand for consumable goods will increase. Lastly, the study found that as expected from the law of demand theory, the relationship between consumer inflation and household consumption per capita is negative. However, this coefficient is not statistically significant. The R^2 for the two models is more than 80%. This indicates that more than 80% of the variations in the dependent variables is explained by the independent variables. This indicates that the two models are good fit.

The negative effect of government expenditure on household consumption per capita in model 1, and negative impact of debt to GDP in model 2 indicate that the Lesotho does not enjoy fiscal flexibility. Fiscal flexibility is normally useful in stimulating private spending and economic growth particularly in periods of economic downturn. However, the results indicate that this is not the case for Lesotho. The results also suggest that the Ricardian Equivalence holds for Lesotho. These results are contrary to those of Thamae and Macheli (2013).

6. Conclusion

This study examined the existence of the Ricardian Equivalence in Lesotho. The empirical model was estimated using two variations. The first variation used government expenditure as measure of fiscal policy. The second variation used debt to GDP as a measure of fiscal policy. The study applied annual time series data for two variations of the empirical model, and used two sample periods (1980–2014 and 1988–2014). The empirical models were estimated using ARDL cointegration approach to determine the long run relationship between the variables in the empirical models. The study found that there was a long run economic equilibrium relationship between the variables in both variations of the empirical model (models 1 and 2). The results for model 1 (which used government expenditure as measure of fiscal policy) show that there is a negative relationship between government expenditure and household consumption per capita. The results of model 2 (which uses government debt to GDP as a measure of fiscal policy) also confirm that there is negative association between government debt and household consumption per capita. The implication of these results confirms the existence of Ricardian Equivalence for the economy of Lesotho. This implies that consumers in the economy of Lesotho are forward looking in their expenditure decision in relation to government budget constraint. These results are consistent with the proposition of Ricardian Equivalence, and empirical studies of Bhattacharya and Mukherjee (2010) and Berben and Brosens (2005). However, the results are inconsistent with those of Thamae and Macheli (2013). The results also suggest that fiscal policy is an ineffective tool to stabilize the economy. In addition, the existence of Ricardian Equivalence implies that policy-makers do not need to be concerned that deficit financing may deteriorate aggregate demand. Future studies should consider using multiple measures of fiscal policy. For example, variables such as tax revenue and government borrowing criteria and other fiscal instruments can serve as measures of fiscal policy. Future studies can also apply threshold level determination to examine how household consumption reacts to government debt in the long run.

Author details
Teboho Jeremiah Mosikari[1]
E-mail: tebohomosikari@gmail.com
Joel Hinaunye Eita[2]
E-mails: hinaeita@yahoo.co.uk, jeita@uj.ac.za
ORCID ID: http://orcid.org/0000-0002-5859-7132
[1] Economics Department, North West University (NWU), Mafikeng 2735, South Africa.
[2] Department of Economics & Econometrics, University of Johannesburg, P.O. Box 524, Auckland Park 2006, Johannesburg, South Africa.

References
Barro, R. (1989). The Ricardian approach to budget deficits. *Journal of Economic Perspectives, 3*, 37–54. https://doi.org/10.1257/jep.3.2.37

Becker, T. (1995, October). *Government debt and private consumption: Theory and evidence* (Working Paper No. 71). Stockholm: Stockholm School of Economics: The Economic Research Institute.

Berben, R. P., & Brosens, T. (2005, June). *The impact of government debt on private consumption in OECD countries* (Working Paper No. 45). Amsterdam: DNB.

Bhattacharya, R., & Mukherjee, S. (2010). *Private sector consumption and government consumption and debt in advanced economies: An empirical study* (Working Paper WP/10/264). Washington, DC: International Monetary Fund.

Dickey, D., & Fuller, W. (1979). Distribution of estimators for autoregressive time series with a unit root. *Journal of the American Statistical Association, 84*, 427–431.

Dickey, D. A., & Fuller, W. A. (1981). Likelihood ratio statistics for autoregressive time series with a unit root. *Econometrica, 49*, 1057–1072. https://doi.org/10.2307/1912517

Drakos, K. (2001, June). Testing the Ricardian equivalence theorem: Time series evidence from Greece. *Journal of Economic Development, 26*, 149–160.

Gogas, P., Plakandaras, V., & Papadimitriou, T. (2014). Public debt and private consumption in OECD countries. *The Journal of Economic Asymmetries, 11*(2014), 1–7. https://doi.org/10.1016/j.jeca.2014.03.001

Haris, A. B., & Mohammad, A. K. (2015). Federal government debt and private consumption: The Malaysian experience. *Journal of Scientific Research and Development, 2*, 64–69.

Ismail, N. A. (2010, December). Does government spending crowd out private consumption in Malaysia. *Jurnal Kemanusiaan, 16*.

Johansen, S. (1995). *Likelihood based inferences in cointegrated vector autoregressive models*. Oxford: Oxford University Press.

Narayan, P. K. (2005). The saving and investment nexus for China: Evidence from cointegration tests. *Applied Economics, 37*, 1979–1990. https://doi.org/10.1080/00036840500278103

Nickel, C., & Vansteenkiste, I. (2008, September). *Fiscal policies, the current account and Ricardian Equivalence*. (Working Paper Series No. 935). Frankfurt: European Central Bank.

Nseera, E. (2013). *Medium-term sustainability of fiscal policy in Lesotho* (Working Paper Series No. 176). Tunis: African Development Bank.

Ogba, L. (2014, June). Econometric test of ricardian equivalence hypothesis: Results for Nigeria. *JORIND, 12*(1). ISSN 1596-8308.

Pantaleo, I. M., & Karamagi, I. J. (2012). Private saving behaviour and Ricardian equivalence theorem: The case of Tanzania. *Business Management Review, 16*, 119–139.

Pesaran, H., & Shin, Y. (1999). An autoregressive distributed lag modelling approach to cointegration analysis. In S. Strom (Ed.), *Econometrics and economic theory in the 20th century: The Ragnar Frisch centennial symposium*. Cambridge: Cambridge University Press.

Pesaran, M. H., Shin, Y., & Smith, R. J. (2001). Bounds testing approaches to the analysis of level relationships. *Journal of Applied Econometrics, 16*, 289–326. ISSN 0883-7252. https://doi.org/10.1002/(ISSN)1099-1255

Phillips, P. C., & Perron, P. (1988). Testing for a unit root in a time series regression. *Biometrica, 75*, 335–346. https://doi.org/10.1093/biomet/75.2.335

Sjo, B. O. (2008). *Testing for unit roots and cointegration. Lectures in modern econometric time series analysis*. Retrieved from www.iei.liu.se/nek/ekonometrisk-teori-7-5-hp730a07/labbar/1.233753/dfdistab7b.pdf

Stock, J. H., & Watson, M. (1993). A simple estimator of cointegration vectors in higher order integrated systems. *Econometrica, 61*, 783–820. https://doi.org/10.2307/2951763

Thamae, R. I., & Macheli, M. V. (2013). The effects of public spending on private consumption in Lesotho. *African Journal of Business and Economic Research, 8*, 25–37.

Waqas, M., & Awan, M. S. (2012). *Are Pakistani consumers Ricardian?* (MPRA Paper No. 35375, posted 25. January 2012 15:55 UTC). Munich: Munich Personal RePEc Archive.

cogent ·· economics & finance

cogent ·· economics & finance