Education and economic growth in post-Apartheid South Africa: An ARDL approach

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EDUCATION AND ECONOMIC GROWTH IN POST-APARTHEID SOUTH AFRICA: AN ARDL APPROACH

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ABSTRACT: Using annual data collected between 1994 and 2014, this current study investigate the long-run and short-run cointegration relations between education and economic growth in South Africa using the bounds approach to ARDL model. Our empirical results obtained in the study point to an insignificant relationship between education and economic growth in South Africa, a finding which goes contrary to both existing theoretical and empirical postulations. These obtained results hence imply that the issue with education may not so much with the quantity of existing education but rather the quality. Therefore, our study advises policymakers to place much emphasis on quality of education is such education is likely to promote economic growth.

Keywords: Education, economic growth; ARDL model; cointegration, South Africa.

JEL Classification Code: C32; C51; I25; O40.

1 INTRODUCTION

Achieving quality education is a problem for many developing countries in the world and South Africa is no exception to this problem. The effects of apartheid in South Africa had a great impact on the educational sector. According to Jansen and Sayed (2001) South African education system during the apartheid era was bureaucratically centralised, racially exclusive and politically authoritarian and this led to many unrest in state schools especially during the 1970s and 1980s. Since the democratic elections of 1994, the South African government has been preoccupied with addressing the social imbalances inherited from the former apartheid rule. One of the pillars of government's strategy has been on increasing public expenditure on domestic education. However, one of the biggest challenges to South Africa's education system was creating an environment that favours inclusive education as most of the people of South Africa were racially marginalised due to years of neglect and inequality that the country had experienced (De Wet and Wolhuter, 2009).

From an academic perspective, education has been long considered a fundamental factors of human capital, which in turn, is used in conjunction with accumulated capital as factors of production in creating output. Henceforth many researchers have engaged in examining the empirical relationship between education and economic growth. A bulk majority of these studies have established a positive relationship between education and growth (Barro (1991), Fischer (1993), Mankiw et al. (1992), Levine and Renelt (1992), Easterly and Levine (1997)) even though there exist exceptional cases studies which an insignificant relationship between the two variables (Hoeffler (2002)). Nevertheless, there appears to very little empirical research conducted on the South African economy, with most of the existing literature being attributed to panel studies (Barro (1991), Fischer (1993), Mankiw et al. (1992), Levin and Renelt (1992), Easterly and Levin (1997), Hoeffler (2002), Gyimah-Brempong et al. (2005), Glewwe et al. (2012) and Kocourek and Nedomlelova (2017)). One notable problem with these panel studies is that they generalize the obtained empirical results for a large number of countries with different economic characteristics. In this sense, country-specific studies present a more convenient alternative to investigating the education-growth relationship.

In our study, we examine long-run and short-run cointegration relations between education and economic growth for the South African economy using the autoregressive distributive lag (ARDL) model of Pesaran et al. (2001) which is applied to empirical data spanning from 1994 to 2014. In realization of the lack of country-specific studies on the subject matter for South Africa, our study is thus presents a valuable contribution to the literature and bears important implications for policymakers.

Against this background, we structure the remainder of the manuscript as follows. The next section of the paper presents the associated theoretical and empirical review. Section three outlines that methodology of the study whilst the empirical data and results are presented in section four of the paper. The paper is then concluded in section 5 in the form of policy recommendations.

2 LITERATURE REVIEW

2.1 Theoretical review

From a theoretical perspective, neoclassical and endogenous growth theorists are accredited for highlighting the importance the importance of human capital development contributions to steady-state dynamic economic growth. According to Latif (2009) human capital via education plays an important role in the process of economic development because it is the key factor for increasing the long-term competitiveness of an economy. Therefore, higher education attainment means more skilled and productive workers, which in turn, promotes growth and development.

Human capital theory particularly accounts for certain mechanisms through which education can influence economic development such as though skill formation; education and work experience enhance the individual's skills and thereby raise their market value to employers, and contribute to economic growth and development. Human capital investment

will thus yield private returns in the form of greater employment opportunities and higher lifetime earnings because they increase the workers' productivity in human capital investment (Hoeffler, 2002).

Generally speaking, the theoretical growth literature emphasizes at least three mechanisms through which education may influence economic growth. First, education can increase the human capital inherent in the labour force, which increases labour productivity and thus transitional growth toward a higher equilibrium level of output as augmented in neoclassical growth theories (Mankiw et al., 1992). Second, education can increase the innovative capacity of the economy, and the new knowledge on new technologies, products, and processes promotes growth (as in theories of endogenous growth (Lucas (1988) and Romer (1990)). Third, education can facilitate the diffusion and transmission of knowledge needed to understand and process new information and to successfully implement new technologies devised by others, which again promotes economic growth (Benhabib and Spiegel, 1994).

However, Pritchett (1996) argues that schooling may not be associated with higher growth rates because educated workers may be motivated to participate in socially unproductive activities such as 'piracy'. A surplus of skilled labour has suppressed wages and dampened growth and poor quality of schooling has not translated into any increase in human capital. Furthermore, Glewwe et al. (2012) argue that an insignificant relationship between educational attainment and economic growth is plausible for less developed countries whose main concern is quality as opposed to quantity of educated persons.

2.2 Empirical review

The calibrations from dynamic growth theories has prompted many researchers to investigate the empirical relationship between education and growth. Typically these studies estimate growth equation which are supplemented by school enrolment as a measure of education and are regressed with other growth determinants. This section of the paper presents a brief review of some of the associated literature.

Zivengwa, (2006) investigates the cointegration relationship between education and economic growth in Zimbabwe during the period 1980 to 2008 using a vector autoregression (VAR) modelling process. The findings confirmed a positive relationship between education and economic growth with physical investment being a channel of transmission of these positive effects. For Turkey, Beskaya et al. (2010) conducted a study on the impact of education on economic growth in Turkey using the ARDL model applied to data spanning between 1923 and 2007, and the results suggested a significant long-run relationship between school enrolment and economic growth.

On the other hand, Afzal et al. (2010) investigated the short-run and long-run linkage between school education and economic growth in Pakistan using annual data for the period 1970-71 to 2008-09. The study employed the Autoregressive Distributed Lag (ARDL) bounds testing approach to cointegration and found evidence of cointegration between school education and economic growth. The results of the study showed a direct relationship between school education and economic growth in Pakistan, in both the short- and the long-run positive relationship between education and growth. Also for Pakistan data collected between 1981 and 2010, Reza and Valeecha (2012) investigate the education-growth relationship using a simple OLS regression analysis. In differing from the results obtained in Afzal et al. (2010), the authors are unable to establish any relationship between the two variables in the short-run but find a significant long-run relationship. .

Pegkas and Tsamadias (2014) apply the vector error correction model (VECM) to investigate the cointegration relationship between education and economic growth in Greece over a period spanning from 1960 to 2009. The study examines a positive link between education attainment and economic growth for the data. Using similar VECM modelling techniques, Mariana (2015) investigate the relationship between education and economic growth for the Romanian economy between 1980 and 2013. The empirical results indicate the education exerts a positive influence of long-term economic growth.

Shaihani, Haris, Ismail and Said (2011) examined the impact of education level on economic growth in Malaysia for the period 1978-2007 using the ARDL modelling approach. The results of the study showed that primary and tertiary education showed a negatively significant relationship with economic growth but secondary education had a positive significant effect on economic growth. Nevertheless, in the long run, only tertiary education showed a positive and significant impact on economic growth. Finally, Nowak and Dahal (2016) investigates the long run relationship between education and economic growth in Nepal between 1995 and 2013 using OLS and VECM estimation techniques. The results confirm that secondary and higher education contributes significantly to real per capita GDP.

Gyimah-Brempong et al. (2005) used panel data for the period 1960-2000 to investigate the effect of higher education human capital on economic growth in African countries. The results of the study showed that all levels of education human capital, including higher education human capital, have a positive and statistically significant effect on the growth rate of per capita income in African counties. The estimated growth elasticity of higher education human capital was found to be about 0.09, which was twice as large as the growth impact of physical capital investment. Although this result is seemingly an overestimate of the impact of higher education on growth, it is robust to different specifications and points to the need for African countries to use higher education human capital effectively in growth policies.
Other studies considered the difference between the quantity and quality of education as an additional caveat.

3 METHODOLOGY

3.1 Unit root testing procedures

Before estimating an ARDL cointegration model, it is important that one test for unit roots. To recall, this is an important step since the ARDL model can only be used if all the time series variables being modelled are not integrated of an order higher than I(2), hence meaning that a combination of I(0) and I(1) variables are desirable. The most commonly used unit root tests found in the literature is the ADF test. The test regression is specified as follows:

$$y_t = \beta D_t + \phi y_{t-1} + \sum_{j=1}^{p} \alpha_j \Delta y_{t-j+e_t} \quad (1)$$

Where is a first difference operator, D is a deterministic trend and e_t is a well-behaved disturbance term. From regression (1), the unit root null hypothesis is formulated as H_0: $\phi = 0$, and this null hypothesis is tested against the alternative of an otherwise stationary process. The second unit root test used in our study is the PP unit root test. According to Phillips (1988), the PP test addresses the issue that the process generating data for time series might have a higher order of autocorrelation than is admitted in the test equation making thus invalidating the Dickey–Fuller test statistic. This is accomplished by making a non-parametric correction to the test statistic. Therefore, the PP test statistic is more robust with respect to the unspecified autocorrelation and heteroscedasticity in the disturbance process of the test equation (Phillips, 1988). Pragmatically, the PP test regression may be formulated as:

$$y_t = \beta D_t + \phi y_{t-1} \quad (2)$$

In similarity to the ADF test, the null hypothesis of a unit root is tested as H_0: $\phi = 0$, which is tested against the alternative of stationary process.

3.2 Empirical specifications

In investigating the debt-growth relationship the simplest estimation regression found in the literature involves estimating a bi-variate empirical regression between the time series. Typically such regressions assume the following function form:

$$GDP_t = \alpha + \beta_1 EDU_t + e_t \quad (3)$$

Where GDP is a measure of economic growth, EDU is a measure of education and e_t is a normally distributed disturbance term. However, bi-variate regressions like that represented by equation 1 can be criticized on the premise of the omitted variable bias. Therefore, multivariate regression specifications presented a more safer alternative in modelling the education-growth relationship. The multivariate regression may ttypically be specified as:

$$GDP_t = \alpha + \beta_1 EDU_t + \beta_2 X_t + e_t \quad (4)$$

Where the vector X_t represents a matrix of growth factors that are include in the mode to ensure robustness. In our study we include, investment, inflation, government size, terms of trade as plausible control variables which are all considered relevant variables in the South African context. For instance, inflation is an important variable since it is representative of monetary policy which is currently embarked on an inflation target programme to ensure price stability in the interest of promoting economic growth. Similar, government size is another important variables in the South African context since, the New Growth Path (NGP) and the New Development Plan (NDP), both which represent large-scale spending programmes aimed at improving long-term economic welfare through improved economic growth. By tradition, domestic investment has been considered the engine of growth is hence represents a standardized growth determinant in the empirical literature. Finally, terms of trade as a measure of openness is assumed to be positively related with economic growth. Therefore in including this group of growth determinants in equation 2, our final multivariate regression model can be specified as:

$$GDP_t = \alpha + \beta_1 EDU_t + \beta_2 GOV_t + \beta_3 INV_t + \beta_4 INF_t + \beta_5 TOT_t + e_t \quad (5)$$

Where GOV is government size, INV is investment, INF is inflation and TOT is terms of trade.

3.3 ARDL models

As mentioned earlier on, we employ the ARDL model of Pesaran et al. (2001) as our choice of econometric modelling. This study uses the ARDL modelling approach as originally introduced by Pesaran et al. (2001). The ARDL cointegration approach has numerous advantages in comparison with other cointegration methods. Unlike other cointegration techniques, the ARDL does not impose a restrictive assumption that all the variables under study must be integrated of the same order. In other words, the ARDL approach can be applied regardless of whether the underlying regressors are integrated of order I(1), order zero I(0) or are fractionally integrated. Secondly, while other cointegration techniques are sensitive to the size of the sample, the ARDL test is suitable even if the sample size is small. Thirdly, the ARDL technique generally provides unbiased estimates of the long-run model and valid *t*-statistics even when some of the regressors are endogenous. In formulating our ARDL empirical specifications, we firstly re-specify the bi-variate as represented in equations 1 as the following ARDL and error correction model (ECM) specifications:

$$\Delta GDP_t = \sum_{i=1}^{n} \phi_1 \Delta GDP_{t-i} + \sum_{i=1}^{n} \phi_2 \Delta EDU_{t-i} + \beta_1 GDP_{t-i} + \beta_2 EDU_{t-i} + \varepsilon_t \qquad (6)$$

And the associated error correction model (ECM) specifications is given as:

$$\Delta GDP_t = \sum_{i=1}^{n} \phi_1 \Delta GDP_{t-i} + \sum_{i=1}^{n} \phi_2 \Delta EDU_{t-i} + \gamma_1 ECT_{t-i} + u_t \qquad (7)$$

Whereas the multivariate regression (3) is re-specified as the following ARDL specification:

$$\Delta GDP_t = \sum_{i=1}^{n} \phi_1 \Delta GDP_{t-i} + \sum_{i=1}^{n} \phi_2 \Delta EDU_{t-i} + \sum_{i=1}^{n} \phi_3 \Delta GOV_{t-i} + \sum_{i=1}^{n} \phi_4 \Delta INV_{t-i} + \sum_{i=1}^{n} \phi_5 \Delta INF_{t-i} + \sum_{i=1}^{n} \phi_6 \Delta TOT_{t-i} + \beta_1 GDP_{t-i} + \beta_2 EDU_{t-i} + \beta_3 GOV_{t-i} + \beta_4 INV_{t-i} + \beta_5 INF_{t-i} + \beta_6 TOT_{t-i} + \varepsilon_t \qquad (8)$$

And the associated error correction model (ECM) specifications is given as:

$$\Delta GDP_t = \sum_{i=1}^{n} \phi_1 \Delta GDP_{t-i} + \sum_{i=1}^{n} \phi_2 \Delta EDU_{t-i} + \sum_{i=1}^{n} \phi_3 \Delta GOV_{t-i} + \sum_{i=1}^{n} \phi_4 \Delta INV_{t-i} + \sum_{i=1}^{n} \phi_5 \Delta INF_{t-i} + \sum_{i=1}^{n} \phi_6 \Delta TOT_{t-i} + \gamma_1 ECT_{t-1} + u_t \quad (9)$$

Where β_i's are the long-run regression coefficients, ϕ_i's are the short-run coefficients and ECT's are the error correction terms which measure the speed of adjustment back to steady-state equilibrium in the face of external shocks to the economy. The error correction terms are assumed to lie within an interval (0, -1) although there are some exceptional cases where the coefficient can be allowed to be lie between -1 and -2. Incidentally, significant negative error correction terms indicates long-run causality from the regressor to the regressand variable. However, prior to estimating our ARDL models it is imperative that one tests for cointegration effects.to his end, the study uses the bounds test for cointegration effects which tests the joint null hypothesis as:

$$H_0: \beta_1 = \beta_2 = \ldots = \beta_i = 0 \quad (8)$$

And this is tested against the alternative hypothesis of significant ARDL cointegration effects i.e.

$$H_0: \beta_1 \neq \beta_2 \neq \ldots \neq \beta_i \neq 0 \quad (9)$$

The test is tested with an F-statistics which is compared to the non-standard critical bounds values reported in Pesaran et al. (2001). If the computed F statistic exceeds the critical upper bounds value, then the null hypothesis of no cointegration is rejected. If the computed F-statistic falls below the critical lower bounds value, then the null hypothesis of no cointegration is not rejected. And if the computed F-statistic falls between the critical lower and upper bounds values, then the test are considered as being inconclusive.

4 METHODOLOGY

4.1 Data description and unit root tests

The data used in our study has all been sourced from the World Bank online database and consists of 6 variables collected on an annual frequency between 1994 and 2014. The dataset consist of the GDP growth rate (i.e. GDP), the secondary school enrolment (i.e. EDU), the growth in government consumption expenditure (i.e. (GOV), the CPI inflation rate (i.e. INF), the gross domestic fixed capital accumulation expressed as a share of GDP (i.e. INV) and the terms of trade (i.e. TOT). The summary statistics and the correlation matrix of the time series has been respectively summarized in Panel A and B of Table 1 below.

Based on the summary statistics, it can be seen that the average growth rate over the sample period has been 1.38, a figure which is below the 6 percent growth target as envisioned by fiscal policymakers in their efforts to eradicate long-term unemployment and poverty. Aloes note that the average inflation rate is 6.36 percent, which is a figure which slightly exceeds the upper bound of the current 3 to 6 percent range currently target by the Reserve Bank. We are also able to find that, on average, domestic investment have accounted for approximately 18 percent of total GDP. This latter figure highlights the low levels of domestic invest, an observation which may be a direct result of historically low savings rates.

In turning our attention, to the correlation matrix as shown in Panel B of table 1, we find that the reported figures produce a number of mixed results. For instance, whilst the positive correlation between government size and growth, the positive correlation between terms of trade and growth as well as the negative inflation-growth correlation are expected as they concur with standard growth theory, the negative education-growth and investment-growth correlation contradict contemporary economic theory. Nevertheless, it is still to be confirmed whether our ARDL estimates will support these preliminary correlations.

Table 1: Summary statistics and Correlation matrix of the variables

	GDP	EDU	GOV	INV	INF	TOT
Panel A: Summary statistics						
Mean	1.38	89.33	2.78	18.15	6.36	83.44
Std.dev	1.61	4.04	2.81	2.26	1.39	12.53
J-B	1.74	1.09	16.59	1.48	0.16	2.28
Prob.	0.42	0.58	0.00	0.48	0.92	0.32
Panel B: Correlation matrix						
GDP	1					
EDU	-0.09	1				
GOV	0.39	0.17	1			
INV	-0.09	0.57	0.19	1		
INF	-0.28	-0.29	-0.22	0.24	1	
TOT	0.04	0.69	0.29	0.74	-0.21	1

As previously mentioned, the ARDL methodology is only suitable for time series which are mixture of I(0) and I(1) variables hence testing for unit roots is an imperative step in our empirical analysis. Henceforth, we perform the ADF and PP unit root tests, with i) a drift and ii) an intercept, on the time series and report the empirical results of this exercise on Table 2. As can be observed from the reported findings, in the levels of the time series variables, the results are mixed, with the ADF test statics completely rejecting the unit root null hypothesis

in favour of stationarity only for education, inflation and terms of trade whilst concerning the PP tests, stationarity in the levels of the variables is established for economic growth, inflation and terms of trade. However, in their first differences, all the time series manage to reject the unit root null hypothesis at all critical levels regardless of whether the tests are performed with a drift or trend.

Table 2: Unit root test results

		ADF		PP	
		drift	trend	drift	trend
Levels	GDP	-4.10***	-4.15***	-2.07	-1.85
	EDU	-2.18	-2.04	-4.14***	-4.17***
	GOV	-3.14**	-3.27*	-4.87***	-4.95***
	INV	-2.69*	-2.54	-3.06**	-2.89
	INF	-1.69	-0.74	-1.35	-2.60
	TOT	-0.08	-1.15	-0.24	-1.34
First Differences	GDP	-8.25***	-5.29***	-6.57***	-9.69***
	EDU	-5.66***	-5.71***	-7.47***	-7.15***
	GOV	-7.65***	-7.84***	-7.14***	-6.84***
	INV	-3.89***	-3.91**	-3.72***	-3.69**
	INF	-4.51***	-5.65***	-8.27***	-7.90***
	TOT	-4.03***	-4.04**	-3.98***	-3.89**
Critical values	1%	-3. 67	-4. 30	-3. 64	-4. 26
	5%	-2. 96	-3. 57	-2. 95	-3. 55
	10%	-2. 62	-3. 22	-2. 61	-3. 20

4.2 Empirical results

In light of the evidence of the time series being either stationary of first differences stationary variables, we conduct the bounds test for cointegration on our two empirical specifications, the first being the bi-variate education-growth model and the second being the multivariate specification which models economic growth and education alongside other growth determinants (i.e. inflation, government size, inflation, investment and terms of trade). The results of bounds test on both regressions are reported in Table 3. The estimated F-statistics of 3.67 and 5.14 are obtained for the bi-variate and multivariate specifications, respectively, and both statistics manage to reject the joint null hypothesis of no cointegration since they exceed the upper critical bound albeit at different significance levels. This evidence permits us to proceed with estimating our empirical ARDL models specifications.

Table 3: Bounds test for cointegration

Regression function	F-statistic	Significance	I(0)	I(1)
f(GDP|EDU)	3.67	10%	2.2	3.09
f(GDP|EDU,GOV,INF,INV,TOT)	5.14	5%	2.56	3.49
		2.5%	2.88	3.87
		1%	3.29	4.37

Table 4 present our empirical estimates of both of our regression models. Panel A presents the long-run estimates whereas Panel B reported the short-run and error correction estimates of the estimate regressions. Beginning with the long-run results reported in Panel A, we firstly note that for both regression functions, the coefficient on education produces a negative and yet insignificant statistics on the variable. This implies that there is no distinct relationship between education and economic growth under the sample period. On the other hand, the coefficient on the government expenditure variable as being positive and statistically significant at a 10 percent critical level. We consider this finding as being credible since the positive relationship between government size and economic growth, finding which complies with Wagner's law and further advocated for in the works of Odhiambo (YEAR) and Phiri (YEAR). Similarly, the negative coefficient and statically significant coefficient on the

inflation variable is plausible since it adheres to traditional economic theory which hypothesis on a negative inflation-growth relationship. Furthermore, such a negative inflation-growth relationship is empirical found in the study of Hodge (2006) for similar South African data. In browsing through the short-run estimates shown in Panel B of Table 4, we note that government size is the only variables which produces a statistically significant coefficient estimate, which is positive at all critical levels. Similarly, the error correction terms produce correct negative and statistically significant estimates of -0.74 to -0.89 for the f(GDP|EDU) and f(GDP|EDU,GOV,INF,INV,TOT) regressions, respectively. The latter result implies that between 74 and 89 percent of deviations from the steady-state are corrected in each period.

Table 4: Long-run and short-run ARDL estimates

	f(GDP|EDU)		f(GDP|EDU,GOV,INF,INV,TOT)	
	Coefficient estimate	p-value	Coefficient estimate	p-value
Panel A: Long-run estimates				
EDU	-4.96	0.47	-4.11	0.68
GOV			1.03	0.06*
INF			-0.47	0.05*
INV			2.27	0.28
TOT			0.16	0.92
Panel B: Short-run estimates				
ΔEDU	-11.51	0.10	-4.01	0.66
ΔGOV			1.16	0.00***
ΔINF			0.01	0.98
ΔINV			0.10	0.97
ΔTOT			6.06	0.16
ECT(-1)	-0.74	0.00***	-0.89	0.00***

Notes: "***", "**" and "*" denote the 1%, 5% and 10% significance levels.

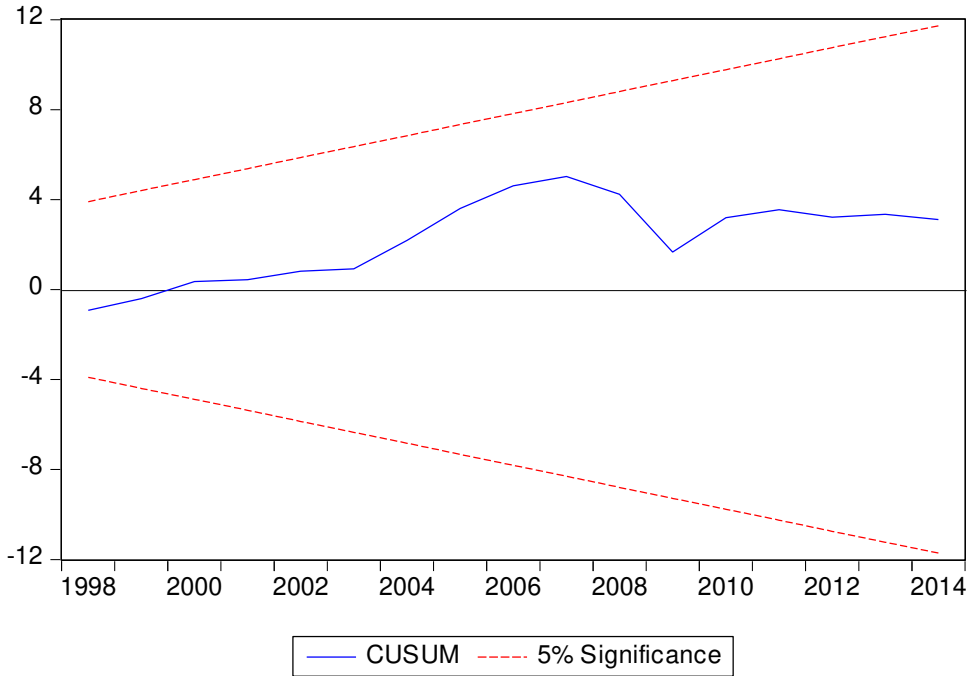
4.3 Diagnostic results and stability analysis

Having estimated our empirical ARDL models, the final stage of the empirical analysis involves performing diagnostic test on the estimated regressions. In particular, we perform the Jarque-Bera test for normality, the Breusch-Godrey test for serial correlation, the ARCH test for heteroscedasticity as well as Ramsey's RESET test for functional form. Based on the results reported in Table 5, each of the test statics fail to reject the null hypotheses of diagnostic test, a result which offers support in notion of the absence of non-normality, serial correlation, heteroscedasticity and incorrect functional form within all estimated regressions. Moreover, the CUSUM and CUMSUM square plots as depict in Figures 1 and 2, for regressions f(GDP|EDU) and f(GDP|EDU,GOV,INF,INV,TOT) respectively.

Table 5: Diagnostic test on estimated regressions

Test	Null hypothesis	f(GDP|EDU)		f(GDP|EDU,GOV,INF,INV,TOT)	
		Test statistic	p-value	Test statistic	p-value
Jarque-Bera	The regression is normal	4.02	0.13	1.06	0.59
Breusch-Godfrey	There is no autocorrelation	0.39	0.72	0.11	0.90
ARCH	There is no heteroscedasticity	0.01	0.98	0.42	0.53
Ramsey RESRET test	The mode is well-specified	1.66	0.12	1.78	0.12

Figure 1: CUSUM and CUMSUMSQ plots for f(GDP|EDU)



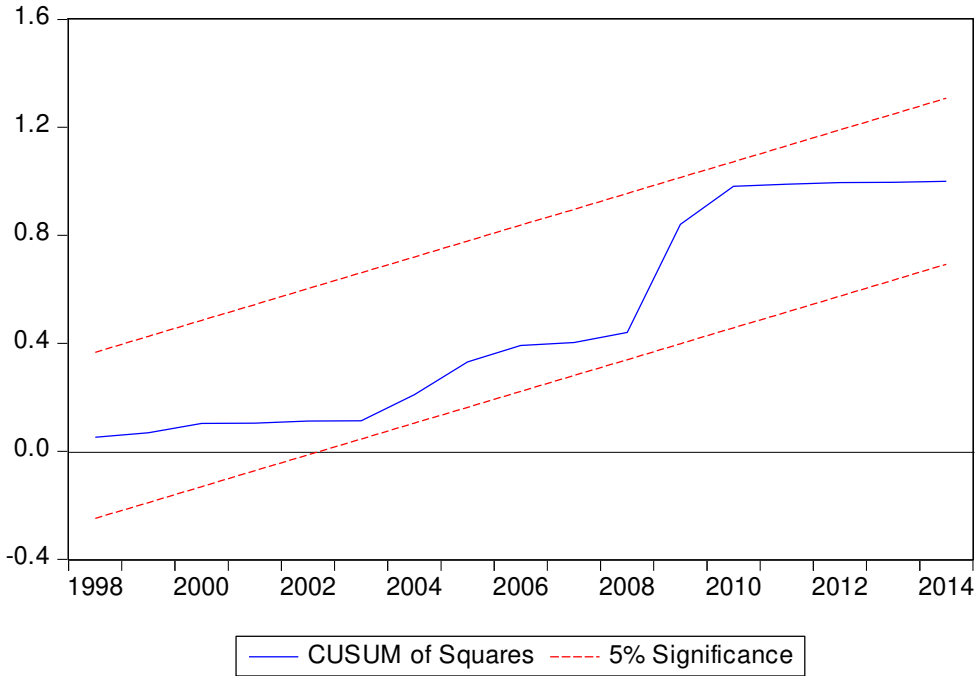
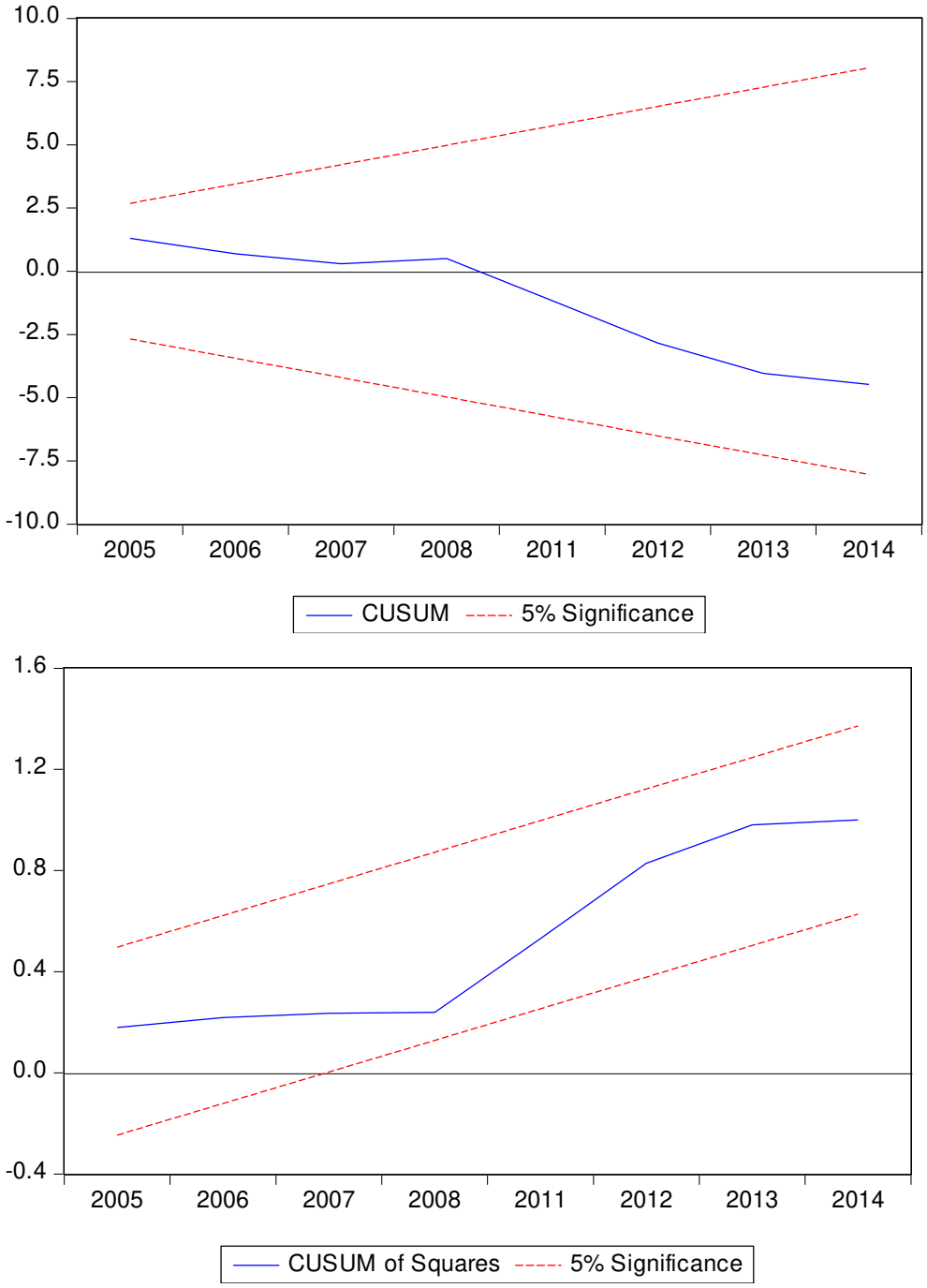


Figure 2: CUSUM and CUMSUMSQ plots for f(GDP|EDU,GOV,INF,INV,TOT)



5 CONCLUSION

Following the democratic transition of the South African economy in 1994 much emphasis has been placed by policymakers in attempts to correct social imbalances inherited

the past Apartheid regime. Part-an-parcel of government's efforts in designing policies which addresses these issues, is the specific focus on the role which education can play in improving the economy. In our study, we specifically examined the relationship between education and economic growth for South Africa using annual post-democratic data spanning from 1994 to 2014. Our mode of empirical investigation is the ARDL model which is applied to two empirical specifications, the first being a bi-varaite education growth model and the second being a multivariate model consisting of education, economic growth and other control variable like government size, inflation, investment and terms of trade. Our empirical results imply that education insignificantly impacts economic growth in both models whereas government size and inflation are the only variable which produce significant and theoretically correct coefficient estimates.

The obtained empirical results in our study can provide some much needed advice to policymakers. For example the significant negative inflation-growth relationship implies that the Reserve Bank's efforts in keeping inflation within a low target band is in the best interest of economic growth. Our results further highlight the importance of government spending in improving economic growth, and as is well-known, a major part of government's budget is dedicated towards education. However, the insignificant link between education and economic growth implies that an increase in school enrolment numbers will not necessary benefit the economy in terms of improved growth. Henceforth, our study implies that government should be rather concerned with deeper fundamental education issues such as improved quality of education. In suggesting direction for future research, we encourage academics to direct their efforts towards examining the effects of government expenditure on education towards economic growth for the country to examine whether such expenditure has played a role in improving economic growth.

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