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Rule of Law and Income Inequality in Bulgaria: An Empirical Approach

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Abstract: *The current paper examines the impact of income inequality on rule of law in Nigeria. In governance, Bulgaria was and is having a poor quality of institutions for the past two decades. In this study, we consider rule of law to be the indicator for governance. We posit that like any other nation whether developed, emerging or underdeveloped, inequality in the distribution of income is said to occur; this is said to undermine the socio-economic wellbeing of the people. This will in turn undermines the growth process of a nation. We employ the Autoregressive Distributed Lag (ARDL) approach on semiannual data spanning from 1996-2015. The control variable included in this study are trade liberalisation, level of education attainment and unemployment level. Our results reveal that education attainment and unemployment both show negative relationship with the quality of rule of law in Bulgaria.*
Keywords:*Rule of law, Income inequality, Unemployment, ARDL, Bulgaria*

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I. Introduction

A good quality of rule of law guarantees sustainable growth and stabilizes the economy; this is because it ensures the protection of lives and properties. Countries that possess this quality usually experience improvements in their economic and social activities. A feasibly planned constriction that outlines the interaction between people according to North (1990) is good governance. It explains the wayin which government manages public resources and affairs (The United Nations Economic and Social Commission for Asia and Pacific (UNESCAP 2009)). Therefore, good governance broadly captures law and individual right, besides protection of investors, good quality of contract enforcement, commitment to economic development among others. North (1990) suggested that good governance is an instrument that distinguishes between successful and unsuccessful countries. On the view of the classical economists, institutional situation changes in the institutional quality is among the factors that influence the developmental pattern of any economy. This means that beside interaction of resources, technology as well as comparative advantage, the quality of institutions is equally needed for developmental process of an economy.

The range of indices used, in measuring institutional quality (rule of law) by the World Governance Indicators (WGI) is between -2.5 and 2.5, the highest value means the rule of law is excellent. Countries with negative index are considered as having poor quality of rule of law. The effectiveness of rule of law will have a significant effect on the protection of property rights, well-being and development of an economy. Low quality of rule of law has a tendency to shrink the trust of the people on the government, it affects the poor who rely more on government services and supports (Harrison and Rodriguez, 2009). In 2013, the average quality of rule of law index in Southeast Europe stood at 0.1, Bulgaria, one of the countries in Southeast Europe has been recording a negative index of rule of law for about two decades, (WGI, World Bank report, 2015). The average quality of rule of law in Bulgaria between 1996 and 2015 was -0.16872; this explained how poor the quality of rule of law in Bulgaria. What is then the reasons behind the poor quality of rule of law in Bulgaria? Alonso and Garcimartin (2013) revealed that a situation of high social inequality leads to bad institutions.

In Bulgaria, the level of income inequality is currently high compared to most emerging countries of Europe. Mihaylova and Bratoeva-Manoleva suggest that social transfers in form of pensions triggered much effect on income inequality in Bulgaria. Income inequality as defined by the United Nation Human Development (UNHD) is an unequal distribution of household or individual income across the various participants in an economy. It is often presented as the percentage of income to a percentage of population. For instance, a statistic may indicate that 70 per cent of a country's income is controlled by 20 per cent of that country's population. Though, there are other methods of measuring income inequality, this study uses the Gini index; it is measured from 0 - 1, with 0 having perfect equality, while a Gini coefficient of 1 enunciates highest inequality. As of 2014 Bulgaria was among the countries with high income disparity in Europe. The Eurostat

(2016) reports that the richest 10 percent in Bulgaria earn about 13.69 times more than the poorest 10 percent. Between 1994 and 2014, the Gini index in Bulgaria has increased by 45.68 percent from 0.243 in 1994 to 0.354 in 2014, (WDI, 2015). Is the rising income inequality among citizens of Bulgaria over the last two decades behind the poor quality of rule of law in the country? This study is conducted to examine this relationship. Therefore, the objective of this study is to examine the effect of income inequality on rule of law in Bulgaria. The choice of Bulgaria as area of study is due to the fact that the country has been experiencing poor quality of rule of law for about two decades, which no other Balkan nation or emerging country of Europe had experienced.The study is important as to authors' knowledge, there are little literature that used rule of law and income inequality as variables of interest, especially, in this current area of study. The remnants of this paper are arranged as follows: section 2 reviewed related literature; section 3 explains the method used in this study, section 4 discusses the results and findings of the study, and finally section 5 concludes the study.

II. Literature Review

Most of the early works on institutional quality are done by North D. According to North (1990) institutions provide the incentives needed to develop, stagnate or even decreasethe growth process. Here, we review findings on the relationship between income inequality and institutional quality. Dobson and Dobson (2010) have found the existence of trade-off between corruption and inequality using ordinary least squares estimates. It states that an increase in the improvement of institutional quality will worsen inequality in the case of informal sectors in Latin America. This could be explained to the fact that reforms have to do with changes in the redistributive measures, this helps aggravate inequality. Chong and Gradstein (2007) use OLS, instrumental variable approach to analyse the dynamic relationship between inequality and institutions; they found that institutions (governance) is negatively related to inequality (Gini index). This means that higher quality of institutions enhances better distribution of income. Levy and Temin (2007) argue that the United States' policies of 1970's and 1980's basically led to wide income disparity currently prevailing among citizens of the country; and not the variables they considered in their study.

Chong and Calderon (2000) have found that institutional quality raises inequality in the beginning; however, subsequent improvement in institutions lowers inequality just as in Kuznets's curve. The study applies GMM estimators, the institutional quality is measured by the composite index as corruption of government, quality of bureaucracy, risk of rejection of contract, risk of taking privately own property by the government and law and order tradition. The relationship according to their findings revealed a negative relationship when institutional quality is squared in the regression and positive when on linear institutions. On the other hand, Krieger and Meierrieks (2016) quoted Jong-Sun and Khagram (2005) that income inequality undermines rule of law, this is because the rich are more likely to bribe for a favourable legislations and court decisions.

A study undertaken by Alonso and Garcimartin (2013) has considered variables such as level of development, income distribution, tax system and level of education to examine how they determine the quality of institutions in various countries across the world. The empirical findings of the study suggest that the determinants of institutional quality are within the reach of the government; level of development is positively associated with institutional quality, income distribution determines institutional quality. A sound tax system is also correlated positively with institutional quality. Lastly, level of education is also an important determinant of institutional quality. Levchenko (2007) in a study institutional quality and international trade has uncovered using an empirical analysis, that variations in the quality of institutions significantly determine trade flows between countries. Torgler and Schneider (2009) have examined the relationship between tax morale & institutional quality and the shadow economy using multivariate analysis. The authors found, after controlling for possible factors that higher tax morale and a higher institutional quality lead to a reduction of shadow economy.

III. Methodology

This paper examines the impact of income inequality on rule of law in Bulgaria. The basis for this study is on the assertion made by Vieira (2009) "that extreme and persistent social and economic inequality erodes reciprocity, both in the moral and the mutual advantage sense, thus impairing the integrity of the Rule of Law" and Glaeser, et al. (2003).We extended the model to incorporate trade liberalisation (Rigobon and Rodrik 2004), education level (Evan and Rauch 2000, Alonso and Garcimartin 2013). However, employing rule of law and the use of time series data expressively discern this study with existing literature. The study uses semi-annual data that covered a period of 20 years (1996-2015) thus, having 40 observations. The data for rule of law wascollected from the World Bank's World Governance Indicator (WGI), while data for inequality, trade liberalisation, education level and unemployment were collected from the World Bank's World Development Indicator (WDI). The WGI and the WDI provides annual data on the variables of interest, data for rule of law available from the period 1996-2015. In order to have larger number of observations thatoutfitour

estimationtechniques, the data have been resampled to semi-annual so as to have more number of observation; hence the relevance of semi-annual data.

Following these authors (Vieira (2009), Glaeser, et al. (2003), Rigobon and Rodrik (2004), Evan and Rauch (2000) and Alonso and Garcimartin (2013)), the functional form for quality of the rule of law in Bulgaria can be specify as per Equation (1) below,

$$ROL_t = f(Ineq_t, X_t) \quad (1)$$

where, ROL_t represents quality of rule of law, $Ineq_t$ is the proxy for income inequality, X_t is a set of control variables, namely $Tl_t, Edu_t \; and \; Une_t$, which indicate trade liberalisation, education level and unemployment level respectively. Specifying Equation (1) in a stochastic form, we will have the following specification, which will be linking the quality of rule of law to the explanatory variables:

$$ROL_t = \gamma_0 + \gamma_1 Ineq_t + \gamma_2 Tl_t + \gamma_3 edu_t + \gamma_4 Une_t + \mu_t \quad (2)$$

Parameters γ_4' are coefficients to be estimated, and μ_t is the stochastic error term, expected to be normally distributed with zero mean and constant variance. Equation (2) states the long-run relationship between rule of law and its determinants (income inequality, trade liberalisation, education level and unemployment level). It is expected thatγ_1, γ_2, γ_3, $\gamma_4 > 0$. However, higher level of income inequality and higher level of unemployment could mitigate rule of law then we would expect that $\gamma_1, \gamma_4 < 0$.

In this study we adopt the autoregressive distributed lag (*ARDL*) modelling approach to cointegration proposed by Pesaran, et al. (2001). The *ARDL* approach is employed to establish long-run equilibrium relationship between the independent variables of income inequality, trade liberalisation, education level, unemployment and the dependent variable, quality of rule of law. Some of the justification for the adoption of this method includes: Firstly, the *ARDL* approach could be used when variables are stationary at *I*(0),*I*(1) or combination of both, which other cointegration approaches lack. Secondly, the *ARDL* approach has a good property for small sample size. Thirdly, according to Sulaiman and Abdul-Rahim (2015) both the short run and the long run parameters can be estimated simultaneously without losing much degree of freedom. Based on this advantages, we create an unrestricted error-correction model (UECM) to reflect the relationships of the variables used in this study as in Equation (3), which can be used to test for cointegration.

$$\Delta ROL_t = \varphi_0 + \sum_{i=1}^{n} \varphi_{1i} \Delta ROL_{t-i} + \sum_{i-0}^{n} \varphi_{2i} \Delta Ineq_{t-i} + \sum_{i=0}^{n} \varphi_{3i} \Delta Tl_{t-i} + \sum_{i=0}^{n} \varphi_{4i} \Delta edu_{t-i} + \sum_{i=0}^{n} \varphi_{5i} \Delta Une_{t-i} + \alpha 1ROLt-1+\alpha 2Ineqt-1+\alpha 3Tlt-1+\alpha 4Educt-1+\alpha 5Unet-1+\varepsilon t \quad (3)$$

To test for cointegration among the variables, we test the combine null hypothesis of no cointegration on the level variables in Equation (3), which is $H_0: \alpha_1 = \alpha_2 = \alpha_3 = \alpha_4 = \alpha_5 = 0$ against the alternativehypothesis $H_a: \alpha_1 \neq \alpha_2 \neq \alpha_3 \neq \alpha_4 \neq \alpha_5 \neq 0$, which suggests the presence of cointegration among variables. The existence or non-existence of cointegration depends on the outcome *F*-statistics test obtain from *OLS*framework of the *UECM-ARDL* as per Equation (3). The value of the *F*-statistics is then compared with critical values of Narayan (2005) table, which are lower critical bound and upper critical bound. If the estimated *F*-statistics is lower than the lower bound then we fail to reject the null hypothesis, hence cointegration does not exist. If the *F*-statistics is greater than the upper bound value, we can accept the alternative hypothesis, hence cointegration exist. If the F-statistics falls between the lower and the upper bound, the outcome is inconclusive.

The long-run model in Equation (2) can be derived from the following short-run *ARDL* model, (Pesaran, et al. 2001).

$$ROL_t = \beta_0 + \sum_{i=1}^{n} \beta_{1i} ROL_{t-i} + \sum_{i=1}^{n} \beta_{2i} Ineq_{t-i} + \sum_{i=1}^{n} \beta_{3i} Tl_{t-i} + \sum_{i=1}^{n} \beta_{4i} Edu_{t-i} + \sum_{i=1}^{n} \beta_{5i} Une_{t-i} + \epsilon_t \quad (4)$$

From equation (4) we can have the long-run model as per Equation (2) above.

$$ROL_t = \gamma_0 + \gamma_1 Ineq_t + \gamma_2 Tl_t + \gamma_3 edu_t + \gamma_4 Une_t + \mu_t$$

with$\gamma_0 = \frac{\sum \beta_0}{1-\sum \beta_{1i}}, \gamma_1 = \frac{\sum \beta_{2i}}{1-\sum \beta_{1i}}, \gamma_2 = \frac{\sum \beta_{3i}}{1-\sum \beta_{1i}}, \gamma_3 = \frac{\sum \beta_{4i}}{1-\sum \beta_{1i}}, and \gamma_4 = \frac{\sum \beta_{5i}}{1-\sum \beta_{1i}}$.

We can also assume cointegration using residuals of the long-run model from the error-correction or short-run model below.

$$\Delta ROL_t = \theta_0 + \sum_{i=1}^{n} \theta_{1i}\Delta ROL_{t-i} + \sum_{i=1}^{n} \theta_{2i}\Delta Ineq_{t-i} + \sum_{i=1}^{n} \theta_{3i}\Delta Tl_{t-i} + \sum_{i=1}^{n} \theta_{4i}\Delta Edu_{t-i} + \sum_{i=1}^{n} \theta_{5i}\Delta Une_{t-i} + \aleph ECTt-1+\mu t \quad (5)$$

where the error-correction term, ECT_{t-1}, is the residual of the long-run model in Equation (2) one period lagged.

$$ECT_{t-1} = \mu_{t-1} = ROL_{t-1} - [\gamma_0 + \gamma_1 Ineq_{t-1} + \gamma_2 Tl_{t-1} + \gamma_3 edu_{t-1} + \gamma_4 Une_{t-1}] \quad (6)$$

The parameter ℵ is the error-correction factor indicating the adjustment speed the negative sign, which ranged between 0 and 1 and significant, ECT_{t-1} would mean cointegration, therefore, the model exhibits long-run relationship between ROL_t and the explanatory variables, $Ineq_t, Tl_t,\ edu_t,\ Une_t$.

IV. Results and Discussions

One of the pre-requisite for testing *ARDL*is that it requires variables in the series to be integrated of order not more than *I*(1). Presence of *I*(2) and above infringes the requirement of using *ARDL* modelling approach and Pesaran, et al. (2001) and Narayan (2005) critical values for the bounds test will be invalid. The results and discussions section begins with explanation of results of the unit root test. The results showed that all the variables are stationary at first difference *I*(1), as indicated in Table 4.1 below. This rendered the use of *ARDL* model developed by Pesaran, et al. (2001) feasible. The co-integration bounds test of the *ARDL* is conducted to determine the existence of long run relationship between the variables of interest.

Table 1 Results of Unit Root Test

Variable	Statistic Values		Significance	Conclusion
Ineq	Augmented Dickey-Fuller	-12.03096	0.0000	I(0)
	Phillips Peron	-25.56405	0.0001	I(0)
ROL	Augmented Dickey-Fuller	-6.913405	0.0000	I(0)
	Phillips Peron	-33.49495	0.0001	I(0)
Open	Augmented Dickey-Fuller	-7.110582	0.0000	I(0)
	Phillips Peron	-31.26749	0.0001	I(0)
Unem	Augmented Dickey-Fuller	-6.292108	0.0000	I(0)
	Phillips Peron	-40.90416	0.0001	I(0)

In testing for the co-integration relationship between rule of law and income inequality, an ARDL bounds test for co-integration is used. The co-integration bound test is done to ensure the existence of long run relationship among the variables of interest. The maximum lag specification is 2 for half yearly data, (Pesaran, et al. 2001). The results revealed that the variables are co-integrated at 1% significance level which means that long run relationship exists between rule of law and the independent variables of income inequality, trade liberalisation, education level and unemployment level. This relationship can be explained to the fact that the F-statistics (7.367) being greater than the values of both the lower I (0) and the upper I (1) bounds of the Narayan (2005) table at 1% critical values; these values are 4.428 and 6.250 respectively. Since the variables are co-integrated it means that long-run relationship exists between rule of law (dependent variables) and the independent (income inequality, trade liberalisation, education level and unemployment level).

Table 2 Result ARDL bounds F-testfor cointegration

Bounds test case III: Unrestricted intercept and no trend		
Estimated equation	$ROL_t = f(Ineq_t, Tl_t, Edu_t, Une_t)$	
Optimal lag structure	(2,0,3,3,0)	
F-statistics	7.367***	
Critical Values (T=40)		
Significant level	Lower Bounds I(0)	Upper Bounds I(1)
1%	4.428	6.250
5%	3.202	4.544
10%	2.660	3.838

Note: F-statistics is greater than the upper bounds at 1% significant level, implying cointegration amongst variables.

Having confirmed the existence of co-integration relationship among our variables of interest, we move further to explain the results of the long-run coefficients and short-run effects of the independent variables on rule of law.

Long-run and Short-run Results

The results of both the long-run and the short-run are presented in Table 3 below, the results revealed the impacts of our explanatory variables of income inequality, trade liberalisation, education level and unemployment on the explained variable, which is rule of law.

Table 3. Results of long-run and short-run models

Dependent variables = ROL_t		
Variables	Coefficients	t-statistics
Long-run model	(2, 0, 3, 3, 0)	
$Ineq_t$	-0.015	-0.2271
Tl_t	-0.008	-0.2863
Edu_t	-0.565***	-3.0819
Une_t	-0.019**	-2.4709
Constant	1.404**	2.4255
Short-run model	(2, 0, 3, 3, 0)	
$\Delta Ineq_t$	-0.028	-0.2274
ΔTl_t	-0.029	-1.2242
ΔEdu_t	-1.035***	-3.2639
ΔUne_t	0.004	0.8358
Constant	2.594**	2.5223
ECT_{t-1}	-0.847***	-4.4672

Note: *** and ** indicate 1% and 5% significant level respectively.

After confirming the existence of cointegration among our variables, we proceed to test the long-run coefficients of the *ARDL* model. The result of long-run impacts were tested with an optimal lag length (4) based on Schwarz Bayesian Criterion (SBC), hence a semi-annual data was used. SBC has the capacity to select parsimonious model with the smallest possible lag length that minimizes the loss of degree of freedom. The result of the long-run shows that the coefficient of education level is significant and inversely related to the quality of rule of law at 1% level. An increase in the level of education attainment by 1 percent could reduce the quality of rule of law by 0.56 percent, suggesting that education attainment degrades the rule of law index in Bulgaria. This finding does not conform to the theoretical arguments and the expectations of this study, however, the finding also means that as people acquire more knowledge, they became aware and conscious of the law and order and often abide by them, therefore, in the long-run strengthening the rule of law will be given less emphasis as more and more are aware of it. The sociological theory of Van Gennep and Durkheim (1904) proposes that student departure may serve as a barometer of the social and intellectual health of college life as much as of the students' experiences at the college.

Furthermore, the coefficient of unemployment level is negative and significant at 5% level. Specifically, an increase in the level of unemployment by 10 percent will have the ability to decrease the quality of rule of law by almost 2 percent. This finding corroborates with the expectations of this study and the theoretical arguments in the literature that high unemployment rate undermines the quality of rule of law. Therefore, the main causes of poor quality of rule of law in Bulgaria for the last two decades was due to unemployment rate in the country. All other variables (income inequality and trade liberalisation) do not show meaningful relationship with rule of law in Bulgaria.

On the other hand, the error-correction model supports the long-run relationship between the rule of law and its determinants in Bulgaria. The parameter, $\aleph$, of the error-correction term, ECT_{t-1}, is negative, less than one in absolute terms and significant at the one percent (1%) level as in Table 3 above. The coefficient (-0.847) represents the speed of adjustment in the event of disequilibrium in the short-run. It suggests a moderate adjustment back to long-run equilibrium. Only the coefficient of education possesses power to make inference in the short, all other variables lack power to make any inference during the short-run period.

To enhance the reliability of our results, a diagnostic checks were made, the result is presented in Table 4. It passes three major tests, which are serial correlation, functional form misspecification and heteroskedasticity. This means that the error term is normally distributed with zero mean and constant variance, thus the model is robust. The model was also diagnosed for stability tests. In doing this the study uses the cumulative sum of recursive residuals (CUSUM) and cumulative sum of square of recursive residuals (CUSUMSQ). The results suggest that the coefficients of the model are stable, consistent and reliable, hence

results are within the critical bound at 5% significant level. The results therefore, can be used for policy inference. Figure 1 and 2 present the stability test results.

Table 4 Diagnostic tests

Test Statistics	LM Version	F Version
A: Serial correlation	(2) = 5.1006[0.078]	(2, 26) = 1.8470[0.178]
B: Functional form	(1) = 0.7434[0.389]	(1, 27) = 0.4956[0.486]
C: Normality	(2) = 0.5343[0.766]	Not applicable
D: Heteroscedasticity	(2) = 0.0011[0.973]	(1, 39) = 0.0010[0.974]

A:Lagrange multiplier test of residual serial correlation; B:Ramsey's RESET test using the square of the fitted values

C:Based on a test of skewness and kurtosis of residuals; D:Based on the regression of squared residuals on squared fitted values.

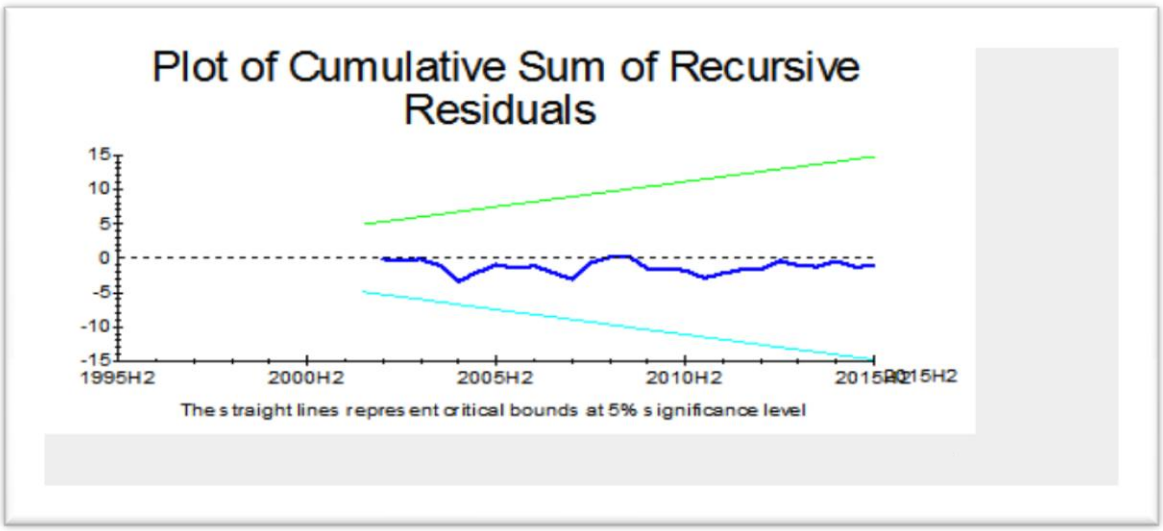

Figure 1: plot of Cumulative Sum of Recursive Residuals

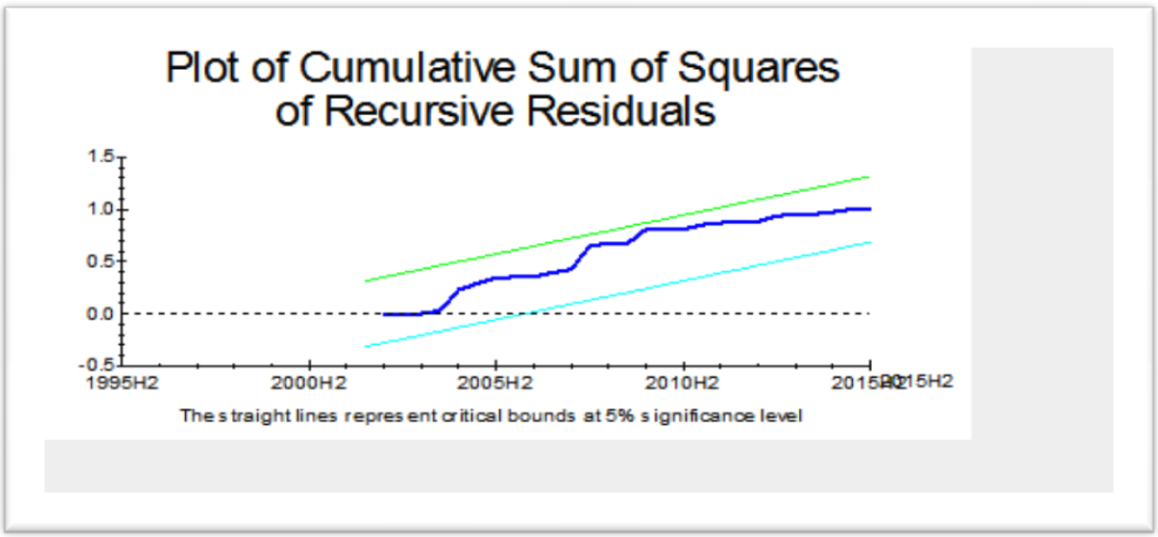

Figure 2: Plot of Cumulative Sum of Squares of Recursive Residuals

V. Conclusion

This study examines the impact of income inequality, trade liberalisation, education attainment and unemployment level on the quality rule of law in Bulgaria.We have distinguished our work with the existing literature by incorporating rule of law to capture institutional quality and income inequality as an additional variable in the case of Nigeria. The study employed *ARDL*modellingapproach developed by Pesaran, et al. (2001) in order to achieve the objective of the study. The coefficients of education attainment and

unemployment level in the long-run were both negative and significant. The negative impact of education attainment on rule of law means that as people acquire more knowledge through education, they became aware and conscious of the law and order and often abide by them. The negative impact of unemployment on rule of law in the long-run confirmed that one of the major reasons for the poor quality of rule of law in Bulgaria for the past two decades was the high rate of unemployment in the country. Income inequality and trade liberalisation do not reveal significant impact on the quality of rule of law in Bulgaria, both in the short-run and in the long-run periods.

Based on these results, it is pertinent to encourage the attainment of higher institutions of learning and provide more job opportunities. The government not necessarily provides direct employment to people but creates conducive environment for investment like the Asian Tigers did. Moreover, in the case of Bulgaria, income inequality has not in any way dwindle the quality of rule of law in Bulgaria.

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