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Abstract

In recent times there has been an increased focus on the myriad investment opportunities in Africa. According to Pricewater Coopers (2011:1) “*the continent is home to some of the world’s fastest-growing economies and offer the highest risk-adjusted returns on foreign direct investment among emerging economies.*” Sovereign credit ratings plays an imperative role in the decision-making process of where and when to invest and determine the interest that is paid to investors for sovereign debt borrowings. Sovereign credit ratings are used by investors to improve the effectiveness of investment decisions for bonds and other fixed-income instruments (Standard and Poor’s, 2014).

1 INTRODUCTION

In recent times there has been an increased focus on the myriad investment opportunities in Africa. According to Pricewater Coopers (2011:1) “*the continent is home to some of the world’s fastest-growing economies and offer the highest risk-adjusted returns on foreign direct investment among emerging economies.*” Sovereign credit ratings plays an imperative role in the decision-making process of where and when to invest and determine the interest that is paid to investors for sovereign debt borrowings. Sovereign credit ratings are used by investors to improve the effectiveness of investment decisions for bonds and other fixed-income instruments (Standard and Poor’s, 2014).

Sovereign credit ratings measure a country’s ability to meet its financial obligations. These credit measure are an indication of the economic, financial and political situation of an economy and signals important information regarding a country’s development to governments and international financial markets (Afonso, 2003). According to Afonso, Gomes, and Rother (2011) the determinants of sovereign credit ratings are important because these ratings determine the interest rate that a country qualifies for in international markets and it may

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also have a constraining effect on the ratings assigned to institutions like banks and companies in the rated country. Agencies very rarely assign a credit rating to a bank, company or local municipality that is higher than that of the home country of the issuer (Cantor & Packer, 1996). The factors and the weightings that rating agencies take into account when determining specific country ratings are subsequently very important to involved role players.

Most research on this topic identifies the determinants of sovereign credit ratings for developed and developing countries around the world (see for example Cosset and Roy (1991), Cantor and Packer (1996), Eliasson (2002), Teker, Pala and Kent (2013)). However, the research on developing countries, exclude the African continent at large. Africa is a continent characterized by a very volatile economic environment, plagued by conditions like political and labour unrest as well as civil wars on a daily basis. The economic environment in Africa is different from most developing countries and subsequently this research aims to investigate whether the determinants identified in literature are relevant for countries in this unique continent.

Furthermore the aim of this study is also to determine whether the significant determinants of sovereign credit ratings for African countries vary between different rating agencies. The study will make use of the credit ratings of two international rating agencies (S&P and Fitch) as well as the ratings of a research entity that is situated in South Africa (NKC). The advantage that NKC has, is that they are based in Africa and has a competitive advantage above the international rating agencies due to first-hand experience of African business and economic environments. Another advantage is that they rate more African countries than any of the the other international agencies which only rate a limited selection of African countries. The sovereign credit ratings of these three rating agencies are used as the dependent variables in this study. Due to the nature of ratings these variables are classified as categorical variables.

Conventional econometric methods used in identifying the determinants are not always appropriate for a model with a categorical dependent variable and is critiqued by various authors in literature. This study will employ the ordered response panel data model which allows for a categorical dependent variable and the panel framework accounts for unobserved country heterogeneity. The study is organised as follows: Section 2 covers the literature review of the determinants of credit ratings and econometric methodology used in other studies to determine the rating models. Section 3 discusses the data and methods used in this study. In Section 4 the estimation results are presented and discussed and Section 5 concludes the study.

2 LITERATURE REVIEW

Rating agencies evaluate the risk of default by assessing an extensive range of determinants that can be broadly categorised into macroeconomic, government performance, external balance and other explanatory variables (Afonso, Gomes, & Rother, 2007). Considering the vast amount of data that is used to determine

credit ratings it is useful to identify a limited selection of variables that explains a country's rating fittingly.

Sovereign credit ratings are measured by various institutions. These ratings are normally either qualitative (symbol grades) or quantitative (indices). Most of the studies mentioned below made use of one of the following qualitative ratings: Moody's Investor Service (Moody's), Standard&Poor Financial Services (S&P) or Fitch Ratings (Fitch). Quantitative ratings that were used include: Euromoney's country risk rankings (Euromoney) and Institutional Investor credit ratings (Institutional Investor).

One of the first studies that identified the determinants of country risk ratings by making use of a direct measure of creditworthiness was Feder and Uy (1985). Earlier research on the topic made use of proxy variables related to creditworthiness like risk premiums or credit volumes (see for example Sargen, 1977; Kapur, 1977 and Eaton & Gersovitz, 1981). Feder and Uy (1985) used the Institutional Investor ratings to estimate the effect of the identified variables on the creditworthiness of 55 developing countries.

Feder and Uy (1985) utilised a simple OLS model by transforming the rating data logistically. They identified debt to GNP, international reserves to imports, the average exports growth rate, the average GDP growth rate, terms of trade, export vulnerability to external shocks, GNP per capita, dummy variables for oil exporters, political turmoil and debt service difficulties as possible determinants. Their results indicate that all the proposed determinants are statistically significant with the expected signs, but that the elasticities computed from the model were quite low.

Brewer and Rivoli (1990) focused specifically on the perceptions of lenders and showed that recent political conditions played a pivotal role, at least as important as economic indicators, in the ratings of sovereigns. According to Brewer and Rivoli (1990) "*models of country creditworthiness that rely exclusively on indicators of economic performance will be misspecified.*" Lee (1993) also considered the importance of political instability in addition to economic indicators on the creditworthiness of a country. Similar to Brewer and Rivoli (1990), Lee (1993) concluded that both political instability and economic indicators are taken into account in the determination of credit ratings although bankers' place a greater emphasis on economic indicators.

Cosset and Roy (1991) extended the study by Feder and Uy (1985) by making use of the ratings by *Institutional Investor* and *Euromoney* and focusing on developed and less developed countries. Similar to Feder and Uy (1985), Cosset and Roy (1991) also makes use of logistic transformation of the data for the individual OLS estimation on each rating. They found that country risk ratings respond to some of the variables suggested by theory (GNP per capita, propensity to invest, net foreign debt to exports) and that the same variables are significant for both indicators.

In a seminal paper, Cantor and Packer (1996) present the first systematic investigation of the determinants of sovereign credit ratings by making use of two leading U.S. rating agencies, Moody's and S&P's. They identified several significant variables (per capita income, GDP growth, inflation, fiscal balance,

external balance, external debt, economic development and default history) that determine credit ratings by making use of sample correlation statistics by broad letter category as well as an OLS multiple regression with credit ratings as dependent variable. Cantor and Packer (1996) assign numerical values to specific ratings, for example S&P's credit ratings were converted as follows: B- = 1, B = 2 and so on through to AAA = 16. They also found that the same significant variables (per capita income, GDP growth, inflation, external debt, economic development, default history) determine ratings by both Moody's and S&P's although the weights of the variables for the two ratings are different.

Mulder and Perrelli (2001) also focused on Moody's and S&P and made use of pooled ordinary least square (POLS) regressions and feasible generalized least squares (FGLS) panel data regressions. FGLS was used to accommodate for high levels of autocorrelation and corrections were done for heteroskedasticity as well. They focused solely on a set of emerging market economies. Their results show that the ratio of investment to GDP has the most significant impact on rating changes across countries (Mulder & Perrelli, 2001). Other important determinants identified include the ratio of debt to exports and rescheduling history.

Eliasson (2002) made use of S&P credit ratings for emerging markets in both a static and dynamic context and used only macroeconomic indicators as explanatory variables due to the unavailability of objective socio-political variables. She used a random effect panel data model that allowed for country-specific omitted variables. The static results show that a small number of macroeconomic variables (generally the same variable as identified by Cantor and Packer, 1996) explain a significant part of the model (Eliasson, 2002).

Afonso (2003) identified GDP per capita, external debt, level of economic development, default history, real growth rate and the inflation rate as the most relevant in determining country credit ratings. A total of 81 developed and developing countries were used in this study and the ratings by S&P and Moody's were again used as measures for credit ratings. The ratings in this study were converted linearly, logistically as well as exponentially (Afonso, 2003). The author found that the logistically transformed model delivered slightly better results especially for countries on the upper end of the rating scale. According to Afonso (2003:17) this confirms "*general knowledge that rating agencies prove right evaluating developed sovereign risks, while their ability to rate developing countries is not as good.*" Furthermore, Afonso (2003) could not confirm that the two rating agencies used the same variables in their analyses.

Rowland (2004) tested for significant differences between his results and those of Cantor and Packer (1996). The author included the same variables as Cantor and Packer (1996) but focused solely on developing countries. His results are similar to Cantor and Packer (1996) indicating that rating agencies (he also made use of Moody's and S&P) use related criteria when evaluating developed and developing countries.

Bissoondoyal-Bheenick (2005) were one of the first researchers that changed the modeling framework in this field of study by incorporating an ordered response model (specifically a panel ordered probit model). The motivation of

this model was made on the basis that the dependent variable is of an ordinal nature and therefore the use of the OLS technique is not completely valid (Bissoondoyal-Bheenick, 2005). The OLS technique assumes that the dependent variable has been divided into equally spaced intervals which is not the case for qualitative credit ratings. Bissoondoyal-Bheenick (2005) found that GNP per capita and inflation was the most significant determinants when modeling ratings and that the importance of specific variables varies according to the development of a country. The weighting of variables for high rated countries are different to those of low rated countries. Additional variables that were important in low rated countries were the current account balance and the level of foreign reserves (Bissoondoyal-Bheenick, 2005).

Other studies that incorporated similar ordered response models included Afonso, Gomes and Rother (2009), Pfarr, Schmid and Schneider (2011) and Teker, Pala and Kent (2013). Afonso et al. (2006) identified the determinants of sovereign ratings by making use of an ordered probit, ordered logit and random effects ordered probit models. Afonso et al. (2006) concluded that the most efficient model turned out to be the random effects ordered probit although all three methods showed comparable results when the ratings were forecasted. Teker et al. (2013) identified 6 homogenous factor groups as determinants of ratings by eliminating less important variables by making use of factor analysis.

All research conducted in this field focus on either developed or developing countries or a combination of the two with none focusing exclusively on African countries. The lack of reliable data for African countries available might play a significant role in this shortcoming. It would be very informative to see if the same determinants are significant for African countries as for other developing and developed countries.

All rating agencies that were used in the literature were international agencies situated in other parts of the world. Ferri (2004) found evidence of absolute underinvestment of rating agencies in less developed countries. This study will compare the determinants identified in literature by making use of S&P and Fitch's credit ratings to the significant determinants identified by making use of the credit ratings supplied by a South African based research unit NKC Independent Economists (NKC).

3 DATA AND METHODS

3.1 Data

NKC is a political and economic research unit based in South Africa. They analyse the political and macroeconomic environment of the African continent. NKC has developed a sovereign risk ratings model and is able to assess countries not rated by leading credit rating agencies such as Fitch or S&P. In the case where those ratings are available from the other credit rating agencies, NKC gives its own comparative rating (NKC, 2013).

NKC has extensive access to informational resources on the continent and

rate 27 African (currently and from the sample period of 2007) countries whereas S&P rates 12 from 2007 and 17 currently; Fitch rates 12 from 2007 and 16 currently and Moody's rate only 6 from 2007 and 13 currently (NKC, 2013; Fitch Ratings, n.d.; Moody's, n.d.). In this study we will use the ratings from NKC as main source since the focus of this study is on Africa. In the case where we compare ratings we will focus only on Fitch and S&P ratings because Moody's rate only 6 African countries in the sample period (Moody's, n.d.). Fitch and S&P use the same symbols (from A to D) in assessing credit risk in their credit ratings (Fitch Ratings, n.d.; Standard and Poor's, n.d.). The top rating is "AAA" and the bottom "D" (the lower the rating the bigger the probability of default and vice versa). These rating agencies furthermore make use of arithmetical symbols (+ and -) to differentiate between sovereign states in the same category (but this is not applicable to the highest and lowest categories, AAA and D). Sovereign states rated above "BBB" are considered investment grade and those rated below are considered speculative grade (Standard and Poor's, n.d.)

This study examines what the determinants are of sovereign credit ratings in Africa. We construct a panel of 27 African countries for the time period 2005-2012 on an annual basis. The sample was selected for countries for which adequate data were available. The study will make use of qualitative ratings due to the availability of symbol grades for African countries. The data for the ratings and other explanatory variables was sourced from the NKC data base and the ratings made by Fitch and S&P were sourced from Bloomberg. Throughout the analysis the dependant variable is the sovereign credit rating.

To quantify the rating categories there is a choice between a linear or non-linear transformation. A linear transformation assumes that the distance between ratings categories are identical whereas for a non-linear transformation it is different. Technically it means that, for example, a country will experience increased difficulties on international debt markets if a country has a rating change from investment grade to speculative grade. Therefore these difficulties are captured as "uneven steps", although according to Eliasson (2002) it is unlikely that there is a difference between these categories. Some research findings don't find significant differences between the two transformations (see for example Beers & Cavanaugh, 1998 and Ferri, Liu & Stiglitz, 1999). For the purpose of this study the linear transformation will be used.

The credit ratings were transformed into a linear scale (Cantor & Packer, 1996) with D assigned a 1, through to AAA assigned a value of 26. The ratings are on a quarterly basis and the end of year ratings was used in the analysis.

This study includes a selection of explanatory variables as possible determinants of ratings in Africa. The choice of variables was based on literature by Cantor and Packer (1996); Mulder and Perrelli (2001); Rowland and Torres (2004); Mellios and Paget-Blanc (2006) and Afonso *et al.* (2011). The choice of variables was also limited to data availability. Details of the data are presented in Table 1.

3.2 Econometric framework

As a first point of departure, to build the body of knowledge around credit ratings in Africa, the purpose of this study is to determine which of the explanatory variables identified in literature determine sovereign credit ratings in Africa. For this purpose various methods as identified by literature are considered. Panel data methods are preferred since it will increase the number of observations.

As explained previously, due to the ordinal nature of sovereign credit ratings, an ordered probit model will be used for the panel of selected African countries. The ordered panel probit model is specified as follows (Tekker, Pala, & Kent, 2013):

$$y_{it}^* = x_{it}\beta + \gamma Z_{it} + \varepsilon_{it} \quad (1)$$

where y_{it}^* is an unobservable latent variable that represents the sovereign credit rating of country i in period t , x_{it} is a vector of time varying explanatory variables and β is a vector of unknown parameters, Z_{it} are time invariant regressors that are generally dummy variables and ε_{it} is a random disturbance term. According to Tekker, Pala and Kent (2013) if ε_{it} is normally distributed, equation 1 delivers an ordered probit model. It is assumed that y_i^* is related to the observed variable y_i , the sovereign credit rating, in the following way (Long & Freese, 2006):

$$y_i = \begin{cases} 1 & \text{if } y_i^* < \tau_1 \\ 2 & \text{if } \tau_1 \leq y_i^* < \tau_2 \\ 3 & \text{if } \tau_2 \leq y_i^* < \tau_3 \\ 4 & \text{if } \tau_3 \leq y_i^* < \tau_4 \\ \vdots & \\ 26 & \text{if } y_i^* > \tau_{26} \end{cases} \quad (2)$$

where τ_m are known as cutpoints or threshold parameters and are estimated.

In this study this specification will be used in three ways; pooled OLS, fixed effects and the random effects estimation. The choice of our final model will be based on a few considerations that follow. The notion is that the random effects model is more appropriate when the cross section in the sample have been randomly selected from the population, but a fixed effect model is more appropriate when the sample effectively constitute the entire population. In this situation, typically when the cross sections (N) is large and time periods (T) is small, there is a difference between the fixed effects and random effects results (Baltagi, 2008). Since there are fewer parameters to be estimated, the random effects should produce more efficient estimators than the fixed effects, however if the country specific error is correlated with the regressors, the random effects estimators are biased and inconsistent and the fixed effects more efficient (Brooks, 2008). When T is large and N small there is little difference between the random and fixed effects and then fixed effects are preferred on computational convenience (Baltagi, 2008).

The analysis will start with the pooled model as first point of reference to establish which explanatory variables are possibly the determinants of ratings in

Africa. The fixed effects model will follow and allows cross-section heterogeneity and assumes a different intercept for each country included in the sample. The F-test for fixed effects will be conducted to establish whether the fixed effects model is indeed different to the pooled OLS. This would imply whether the country dummies are significantly different from each other. The random effects model also allows for the cross section heterogeneity but the difference from the fixed effects models is that it assumes that these effects are generated by a specific distribution; therefore each effect is not modelled explicitly. This avoids the loss of degrees of freedom, such as in the case of the fixed effects model (De Wet & Van Eyden, 2005). The Hausmann test will be conducted to determine whether there is correlation between the country specific error and the regressors of the random effects model.

4 RESULTS

In this study we used a panel of 27 African countries with a sample from 2007-2012 on an annual basis. The countries included are Algeria, Angola, Benin, Botswana, Cameroon, DRC, Egypt, Ethiopia, Gabon, Ghana, Kenya, Lesotho, Libya, Malawi, Mauritius, Morocco, Mozambique, Namibia, Nigeria, Rwanda, Senegal, South Africa, Swaziland, Tanzania, Tunisia, Uganda and Zambia. The dependent variable for the first set of estimations is the NKC credit ratings with the identified explanatory variables. The pooled OLS, fixed effects, random effects and ordered probit models are presented in Table 2.

In the models all the explanatory variables were included that was identified in the literature (and available). In the pooled model the external balance, inflation, per capita income, foreign reserves and corruption were all statistically significant with the expected signs. When the fixed effects model was estimated the significance of the variables changed. The F-statistic of the fixed effects indicated that the fixed effects are not redundant and therefore the country effects are significant and confirmed heterogeneity of the countries in the sample. The coefficients for external debt (unexpected sign), per capita income, and foreign reserves were significant. The random effects model results were similar to the fixed effects model (significance and signs). The random effects model is the preferred model between the two since the Hausman test showed no correlation between the country specific errors and the regressors and the cross sections is large (N) and the time period is small.

The results from the ordered probit model is more in line with the results from the pooled model. Due to the ordinal nature of the dependent variable, the ordered probit model is the most appropriate model and a discussion of the results follows. The external balance, inflation, GDP growth, foreign reserves and corruption were all statistically significant. These determinants are in line with the findings in literature (Cantor and Packer, 1996; Eliasson, 2002; Afonso, 2003; Afonso *et al.* 2011; Mellios and Paget-Blanc 2006; Rowland and Torres 2004 and Rowland 2004) although the sign of GDP growth is different as expected, which might be attributed to the fact that the focus is on African

countries and most literature focus on developed and developing countries. According to the literature a high growth rate indicate a countries' ability to service it's debt burden. Although some African countries do experience higher growth rates it might not be at levels that can service the high debt levels that some of the African countries experience. The negative sign of GDP might be due to other dynamics such as unequal income distribution, high levels of poverty and political unrests, issues issues that affect a counties' rating in spite of high economic growth. As Cantor and Packer (1996) explains ratings may not have a clear relation to GDP growth since many developing economies tend to grow faster than developed economies. This is typically the case in Africa at the moment where some countries grow rapidly.

The external balance has a positive sign and is significant, this contrary to the findings of Cantor and Packer (1996)deeming it as an insignificant variable. According to Afonso *et al.* (2011) a higher current account deficit might mean higher ratings since it could indicate growth prospects and foreigners are willing to cover the deficit through loans and investment. Due to the growing investment opportunities in Africa it seems as a plausible explanation. The African continent is a volatile environment, politically and the two proxies for political stability i.e. inflation and corruption are significant with the expected negative signs. The foreign reserves variable is significant showing a positive sign, therefore the more foreign reserves the better the ability to service debt culminating into a higher rating.

In the second part of the analysis, three rating agencies' were compared. The same explanatory variables were used but only 13 countries were included (the countries all three rated since 2007, namely Angola, Cameroon, Gabon, Ghana, Kenya, Morocco, Mozambique, Nigeria, Rwanda, South Africa, Tunisia, Uganda and Zambia). Each rating was quantified according to the linear method and the ordered probit model was used in each case seeing that it is the most technically correct model which takes into account the ordered nature of the dependent variable. The results are presented in Table 3.

The external balance, foreign reserves and corruption are significant for all three rating agencies and inflation and income per capita is not significant for any of the agencies. The majority of significant determinants for the three rating agencies differ from each other. In addition to the three significant variables mentioned already debt to GDP, the fiscal balance and GDP growth are also significant for the NKC ratings. FDI to GDP and the fiscal balance are also significant for Fitch ratings and debt to GDP is significant for the S&P ratings. It seems that NKC takes the most variables into account when rating African countries, with six statistically significant variables followed by Fitch and then S&P.

If these results are compared to the previous sample including all 27 countries, the common determinants of the NKC ratings are the external balance, GDP growth, foreign reserves and corruption.

5 CONCLUSION

The purpose of this study was to investigate whether the determinants of sovereign credit ratings identified in literature are significant for African sovereigns as well. We made use of the ratings of two main international rating agencies (S&P and Fitch) as well as the ratings of a South African based research unit (NKC), for the period 2007 to 2012. Regarding the methodological approach, we used a static panel model (with pooled OLS, fixed effects, random effects and order probit estimation) to identify the explanatory variables that influence the sovereign credit ratings in Africa.

The evidence reveals that sovereign credit ratings in Africa respond to some of the variables suggested by the literature. According to the results from the ordered probit model (preferred model) the main determinants of sovereign credit ratings in Africa according to the NKC ratings are the external balance, inflation, GDP growth, foreign reserves and corruption. These variables, with the exception of inflation, was also significant in the NKC model, with the reduced sample for the comparative analysis with the two international agencies. The only three overlapping variables in the comparative analysis were the external balance, foreign reserves and corruption. It is clear that different credit rating agencies derive their credit ratings of the assessed African countries in slightly different ways although they agree mostly on the actual ratings of the sovereign states. This is in line with the results of Afonso (2003) seeing that it can't be confirmed if the three rating agencies used the same variables in their analyses.

The distinct negative sign of the GDP variable are contrary to the findings in literature and it can be attributed to the dynamic nature of the African continent, although Cantor and Packer (1996) do indicate a clear relation between sovereign credit ratings and GDP growth might not be evident. This could be due to the fact that developing economies tend to grow faster than developed economies. This is also true for Africa, since Africa has some of the fastest growing economies and are seen as an investment hub. Africa, however, are characterised by certain dynamics which are not evident in other developing countries. It is therefore important to do further research to account for these differences in order to expand the body of knowledge.

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Table 1: Description of explanatory variables

Variable name	Definition	Unit of measurement	Expected relationship
GDP growth	Annual real growth on a year on year basis	Percent	High economic growth implies easier service of debt burden (+)
Fiscal balance	Budget balance to GDP	Percent	Large deficit absorbs savings; inability to service debt (-)
External balance	Current account to GDP	Percent	A large deficit implies reliance on funds abroad. Leads to growing debt, over-consume (-) or rapid accumulation of investment, leading to higher growth and improved sustainability (+).
External debt	External debt to GDP	Percent	Higher debt, higher risk of default (-)
Investment	Foreign direct investment to GDP	Percent	Higher ratings attract foreign capital, showing possible future growth (+)
Inflation	Annual consumer price inflation	Percent	High inflation indicates structural problems in government finances. Dissatisfaction with high inflation from the public may lead to political instability (-) or reducing real stock of outstanding debt (+)
Foreign reserves	Foreign reserves to GDP	Percent	High foreign reserves indicate possible means to service debt (+)
Per capita income	GDP per capita	Dollar terms	Higher per capita income indicates a larger potential tax base (government income to service debt). Also a proxy for political instability (+)
Corruption	Tranparency International – Corruption Perceptions Index	Index	The more corrupt a country appears in terms of perceptions the lower will the rating of that country be (-)

Sources: Cantor and Packer (1996), Mulder and Perrelli (2001), Rowland and Torres (2004), Mellios and Paget-Blanc (2006), Afonso et al. (2011)

Table 2: Results of the panel data models (NKC rating: dependent variable)

	Pooled	Fixed effects	Random effects	Ordered probit
Variable	Coefficient	Coefficient	Coefficient	Coefficient
External balance	0.097786 **	0.000332	0.004	0.060114 ***
Inflation	-0.05458 **	-0.00725	-0.00994	-0.0326 **
External debt	-0.0003	0.014355 ***	0.013427 ***	-0.00032
Investment	0.062384	0.01906	0.016837	0.039032
Fiscal balance	-2.7E-05	-4.7E-05	-2.1E-05	-3E-05
Per capita income	7.71E-07 ***	2.60E-06 **	1.39E-06 ***	4.28E-07
GDP growth	-0.07768	0.015303	0.012499	-0.0404 ***
Foreign reserves	0.023325 ***	0.02162 **	0.031035 ***	0.013403 ***
Corruption	-0.14667 ***	0.00227	-0.02036	-0.08387 ***
Intercept	23.76345 ***	12.0686 ***	13.67207 ***	
Total panel observations	151	151	151	151
Observations	6	6	6	6
Cross sections	27	27	27	27
Adjusted R-squared	0.6256			
R-squared (overall)		0.1505	0.3340	
Log likelihood				-279.11076

*, **, *** 10%, 5%, 1% level of significance, respectively

Source: Model estimations

Table 3: Comparison between three rating agencies

	NKC	FITCH	S&P
Variable	Coefficient	Coefficient	Coefficient
External balance	0.097911 ***	0.144559 ***	0.065928 ***
Inflation	0.035809	0.03771	0.027675
External debt	0.030284 **	0.025268	0.02793 **
Investment	-0.02297	-0.33447 ***	-0.0267
Fiscal balance	-0.07042 *	-0.17871 ***	-0.02087
Per capita income	1.25E-07	6.63E-08	-1.09E-07
GDP growth	-0.08425 **	0.015917	-0.06266
Foreign reserves	0.063725 **	0.091068 ***	0.075058 ***
Corruption	-0.10901 ***	-0.21881 ***	-0.12856 ***
Total panel observations	74	74	74
Observations	6	6	6
Cross sections	13	13	13
Log likelihood	-94.83316	-77.657749	-108.54307

*, **, *** 10%, 5%, 1% level of significance, respectively

Source: Model Estimations