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Do sovereign credit rating announcements influence excess bond and equity returns in Africa?

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Abstract

Purpose – The purpose of this paper is to examine whether new sovereign credit rating (SCR) changes are valuable, and relevant information is provided to bond and equity markets in 30 African countries that received an SCR during the period 1994–2014.

Design/methodology/approach – This study applies a combination of GARCH models and event study techniques.

Findings – This study shows that the financial markets do not significantly react to SCR announcements, possibly because these African markets are already perceived to be risky.

Research limitations/implications – At last, a significant portion of Africa's sovereign debt is held by foreign investors (Arslanalp and Tsuda, 2014) who commonly preclude asset managers from investing in low SCR grades. Thus, an unfavorable SCR announcement could lead to a withdrawal of these funds, which could significantly alter both fiscal and monetary policies in the economy.

Practical implications – SCRs is immaterial to investors holding African securities.

Social implications – Although financial markets are weakly responsive to SCR announcements, they appear to be informationally important in the operation of stocks and bond markets in Africa. Therefore, governments should appreciate the long-term information exchange between investors and borrowers, and the consequential nature of credit ratings in Africa's nascent financial markets in order to proactively manage the risks of negative ratings.

Originality/value – Studies on credit rating effects on Africa markets are rare.

Keywords Africa, Credit ratings, Announcements, Equity and bond markets

Paper type Research paper

1. Introduction

The liberalization of African economy and financial markets in the late 1980s and early 1990s enhanced their trade competitiveness (Enowbi *et al.*, 2017). However, despite the improved efficiency of financial markets, liberalization also increased investors' risk exposure due to market volatility (Kose *et al.*, 2009). These innovations led to the birth of many complex derivatives and structured financial products, which require experts to evaluate their risk profiles (Causevic, 2003). Hence, investors have come to rely on expert advice and recommendations from credit rating informational institutions when making decisions about these assets. Average investors therefore regard credit rating agencies (CRAs) as new information sources about the state of the creditworthiness of a nation, and they thus use the information as a benchmark to determine required returns and bond yields (Creighton *et al.*, 2007). Hence, when a country's creditworthiness depreciates, its probability of sovereign debt default increases, thus CRAs downgrades its sovereign credit rating (SCR) profile. Investors tend to react by increasing their required returns for equity and bond yields, which translate to high cost of capital for borrowed sovereigns.

The inherent uncertainty in emerging financial markets has thus elevated the role of CRAs in the international economy as sources of relevant information required for informed trading (Makina, 2005) and by helping to reduce the creditworthiness information asymmetry between markets and investors (Elkhoury, 2008). Basel II further cemented the



importance of rating agencies by incorporating the ratings of CRAs into the rules for setting credit risk weights (Hooper *et al.*, 2008).

However, the failure of CRAs to predict the 1998 Asian crisis, the bankruptcies of Enron, WorldCom and Parmalat, and the 2008 financial crisis has raised questions concerning their rating processes, accountability and ability to predict and respond to financial crises (Elkhoury, 2008; Morseth and Norgaard, 2011; Amstad and Packer, 2015). Furthermore, when CRAs change a country's SCR, their announcements may trigger market panics and overreactions (Li *et al.*, 2004) because sovereign ratings provide financial markets with new information (Jorion and Zhang, 2010). Based on the preceding discussion, this study examines whether an SCR announcement influences excess bond and equity returns in 24 African countries that received a rating during the period 1994–2014.

Although the literature on SCRs and financial markets in developed countries has been growing, studies that test the effects of SCR announcements on financial markets in emerging countries are still sparse. This study thus makes contribution to the financial markets and SCRs literature in the following dimensions. First, it uses an under-researched sample so as to draw new evidence on the relationship between SCR and financial markets. Second, it is among the few studies that empirically examine the impact of SCR announcements on financial markets using sovereign rating announcements by all the three international CRAs (Moody's, Standard and Poor's and Fitch). Lastly, this study examines the effects of SCR announcements on both the stock and bond markets rather than just focusing on the impact on either equities or bond markets.

The study proceeds as follows: Section 2 reviews the literature devoted to the information content of an SCR report, the associated information asymmetry and abnormal return (AR) effects. Section 3 then describes the sovereign rating data and Section 4 devises the Generalized Autoregressive Conditional Heteroskedasticity (GARCH) and event study approaches used to conduct the analysis. The findings are discussed in Section 5 and the study then concludes with a summary of the key findings, implications and recommendations in Section 6.

2. Literature review

Examinations of the effects of sovereign rating announcements were first explored in the 1970s when a new paradigm of financial innovation was adopted by financial institutions and securities broker–dealers who sought to soften capital and liquidity requirements. The associated complexity of financial markets and the growth in the complexity of financial instruments then inspired this seminal body of literature. With regard to the information content of SCR reports, studies such as Afonso *et al.* (2014) and Polito and Wickens (2015) investigated the reaction of European bond and equity markets to sovereign rating announcements using EGARCH specifications on a panel of daily market and sovereign bond returns. Their analysis find that credit rating upgrades do not have significant effects on security volatility, instead downgrades were associated with increased stock and bond market volatility. Michaelides *et al.* (2015) applied event study on the MSCI World index and find no evidence of ARs in financial markets after the SCR announcements, instead they find evidence of SCR information leakage before the actual announcement is made. However, they subsequently argue that the information content of an SCR announcement is too weak to significantly influence financial market prices.

In contrast, other studies such as Erdem and Varli (2014), who developed an econometric model based on macroeconomic factors to predict SCRs in emerging markets and Almeida *et al.* (2017) used S&P ratings on firms from 80 developing and developed countries between 1990 and 2013 and find that there is particular information content present in the SCR reports that affect financial markets. For instance, financial markets react significantly negative to reviews for sovereign downgrades and actual downgrade events rather than

upgrades. In addition, Özmen *et al.* (2016) examined the impact of SCRs using conventional panel estimation procedures on the EMBI Global spreads for a panel of 23 developing countries between 1998 and 2012. Their results indicate that SCRs reports effectively summarize crucial macroeconomic information, such as economic growth, budget deficit, interest rates and inflation, which is relevant in determining security prices. Thus, the results of these studies show that the hypothesis that SCR reports contain information of concern to investors is still inconclusive.

Although these findings imply that SCR reports contain information of concern to investors, they do not address why financial markets show inconsistent ARs after a sovereign rating downgrade is announced. Hence, Agarwal *et al.* (2016) applied Naïve Bayesian algorithms to test the hypothesis that SCR reports contain new default-related information beyond SCR actions (such as SCR announcements, credit watch and outlook). They find evidence that SCR reports do contain new information beyond the SCR announcement itself, which Agarwal *et al.* (2016) called a linguistic tone[1]. They subsequently argue that it is possible that technical analysts could possibly use the linguistic tone to predict future rating announcements.

With regard to information asymmetry, Ravi and Hong (2014) noted that issuers of financial instruments, together with finance professionals usually have access to more relevant information about the securities than those who invest in them. Hence, CRAs act as information intermediaries that independently produce new information and verify public announcements on the borrowers' creditworthiness, thus correcting informational imbalances between issuers and investors (Rhee, 2015). In addition, Konijna and Rijkena (2011) and Crosta (2014) applied a composite marginal likelihood approach to estimate a multi-year ordered probit model for each of the three major CRAs of 90 developing countries for the years 2002–2013 and report that it is information asymmetries in emerging markets that cause SCR downgrades and negative outlook announcements to generate immediate significant negative ARs. However, Montes *et al.* (2016) reported that in developing countries, information asymmetry goes beyond the coverage of market analysts and SCRs because of thin trading and market opaqueness. Similarly, Mohapatra (2016) used OLS in an event study analysis on S&P and Moody's SCR announcements to examine the effects of SCRs, and finds that they generate a strong financial market reaction in emerging market economies. Further investigation by Michaelides *et al.* (2015) found that SCR's effects may be stronger in emerging markets because of lack of transparency, low institutional quality and greater uncertainty.

Another significant and growing body of literature has investigated the impact of SCR announcements on financial markets through the presence of ARs during the SCR event publication period (Ikram and Nugroho, 2014). They report that bond yields spreads show evidence of positive ARs whilst stocks show negative ARs. However, the magnitude of reaction depends on the state of the economy as reflected by interest rates and GDP (Kaminsky and Schmukler, 2001; Hull *et al.*, 2004; Chen *et al.*, 2016). On the other hand, Jansen and Nikiforov (2015) argued that it is speculators that drive up trading volumes around SCR announcements through speculative trading rather than the SCR event itself. However, speculators do not stay in one market and thus cannot consistently influence ARs because they only trade around information events for the short-term price momentum they generate rather than the intrinsic value of assets.

More recently Baum *et al.* (2016) applied GARCH models to examine the sovereign rating announcements from Moody's, S&P and Fitch CRAs during the Eurozone debt crisis of 2010–2012. Baum *et al.* (2016) found that SCR announcements do significantly influence ARs whereby CRA downgrades, watchlist and outlook announcements impact the value of security prices and also increase price volatility. They thus conclude that ARs and volatility are a result of investors' rebalancing of their security portfolios to reduce their exposure to riskier borrowers when SCR announcements are made.

Thus in conclusion, the literature on the impact of SCR announcements and the role of credit ratings in addressing information asymmetry on stock and bond returns is still inconclusive. Furthermore, to date, no study has been conducted on African markets, which are characterized by limited information, high risk assets, liquidity challenges, relatively few participants, lack of transparency, low institutional quality and greater uncertainty. It is thus hypothesized that if SCRs are valuable information to financial market investors, then they adjust their portfolios in response to such announcements, thus causing excess returns in bonds and stock markets. Furthermore, if SCR announcements impact financial markets, then CRAs may be contributing to the stability of financial markets in emerging countries.

3. Data description

The analysis of SCR influence of financial markets in this study makes use of all foreign currency SCR announcements, daily bond yield and daily stock returns data for the period January 1, 1994 (when Africa's first SCR was assigned to South Africa) to December 2014. The focus is on the historical sovereign ratings for each African country that has an SCR by any or all of the three CRAs (Standard and Poor's, Moody's and Fitch) which dominate the SCR industry.

As the analysis focuses on the impact of a sovereign rating announcements on financial markets, countries that do not have sovereign ratings have been excluded. Hence, the analysis covers a sample of 24 African countries that have sovereign ratings as at December 2014. Table I provides a summary of all the credit rating events announcement about any of the 24 African countries from the period 1994–2014, which is published on respective websites by any or all of three international CRAs. The SCR announcements data are also

Country (stock index)	Country (bond index)	No. of downgrades	No. of upgrades	No. of outlooks	No. of watchlist
BSE (DCIBT)	Botswana (SPFIBWU)	1	–	4	–
DSX	Cameroon (SPFIEGC)	1	1	5	–
BVC	Cape Verde (SPSCBCV)	2	–	6	–
	Benin (SPFIBWN)	–	–	2	–
BRVM (BRVMCI)	Burkina Faso (SPFIEGB)	2	–	6	1
	Senegal (SPFISNU)	–	1	2	4
	Congo Republic (SPSCBCR)	1	1	–	–
EGX 100 (EGX 100)	Egypt (SPFIEGU)	11	3	30	2
GSE (ASIX)	Ghana (SPFIGHU)	2	1	6	–
	Gambia (SPFIKQGM)	2	–	–	–
	Lesotho (SPFILSU)	–	1	–	–
LSM	Libya (SPIFLYU)	4	–	–	–
NSE (NASI)	Kenya (SPFIKEU)	–	–	2	–
MSE (MALSMV)	Malawi (SPFIMAU)	1	1	1	–
SEM (MDEX)	Mauritius (SPFIMUU)	1	–	2	3
CasaSE (MASI)	Morocco (SPFIMOU)	1	–	2	–
NSX (OVLNMI)	Namibia (SPFINAU)	–	–	2	–
NSE (NGSEINDEX)	Nigeria (SPFINGU)	1	1	4	–
RSE (ALSIRW)	Rwanda (SPFIRWU)	–	3	3	–
SSE	Seychelles (SPFISYU)	–	3	–	–
JSE (FTWIZAFI)	South Africa (SPFIZAU)	5	5	17	1
BVMT (TUNINDEX)	Tunisia (SPFITNU)	9	4	6	2
USE (ALSIUG)	Uganda (SPFIUGU)	1	–	3	–
LuSE (LASILZ)	Zambia (SPFIZMU)	2	–	4	–

Table I.
Summary
of SCR events

cross compared with the SCR events published by *Trading Economics* (<https://tradingeconomics.com>) and *Countryeconomy* (<https://countryeconomy.com>) to confirm credibility and data reputation.

The movements in stock returns capture the impact of a sovereign announcements on the stock market, thus the stock index in each country is used to estimate the market returns over the sample period. For the Bourse Régionale des Valeurs Mobilières (BRVM), which serves eight West African countries, a change in each country's rating is examined in relation to the overall stock market index. On the other hand, the S&P Africa 10-year sovereign bond index (USD) is used as benchmark to calculate normal bond market returns. In countries that issue multiple sovereign bonds at different times, the representative bond with the most time-series observations is chosen to insure greater consistency throughout the sample. The sovereign bond yield and stock return data were collected from Bloomberg and Reuters.

Consistent with the factors highlighted in the literature, the analysis also includes the overall state of the economy measured by interest rates and gross domestic product (GDP). Both quarterly GDP and quarterly central bank repurchase interest rates data were collected from the World Bank's World Development Indicators. These macroeconomic factors capture a country's economic activity and growth, which generate income that could potentially influence the analysis of SCR impacts. Interest rate changes directly influence business and household credit extension and interest expenses, and thus credit worthiness.

4. Methodology

To analyze the effects of sovereign rating announcements on financial market returns, the study uses an event study to examine the dynamic response of financial markets around the time of sovereign rating announcements in accordance with Campbell *et al.* (1996), Kothari and Warner (2007) and Dutta (2014). The study considers a sovereign credit announcement as an "event" and then examines if security prices before and after the event display ARs in excess of their expected return (Fama *et al.*, 1969). The change in sovereign stock returns is the index return for sovereign i at time t (IR_{it}), which is determined using the following equation:

$$IR_{it} = \ln\left(\frac{I_{it}}{I_{it-1}}\right), \quad (1)$$

where I_{it} is the index for sovereign i at time t , and I_{it-1} the index for sovereign i at time $t-1$.

To calculate change in sovereign bond returns (BY_{it}) the following equation is applied to the sovereign bond daily yield:

$$BY_{it} = \ln\left(\frac{Y_{it}}{Y_{it-1}}\right), \quad (2)$$

where Y_{it} is the bond yield for sovereign i at time t , and Y_{it-1} the bond yield for sovereign i at time $t-1$.

Following the methodology in Kaminsky and Schmukler (1999), Kaminsky and Reinhart (2000), Morseth and Norgaard (2011) and Mateev (2012) who have also investigated the effects of SCR announcements using event studies. The event study analysis is applied as follows: first, the S&P value-weighted All Africa stock index and the S&P Africa 10-year sovereign bond index (USD) are used as the benchmark indices representing the normal stock and bond market returns, respectively. These benchmark indices are used to calculate normal bond market returns. To capture the reaction to the announcement of stock and

bond markets of the rated country, the study constructs ARs of stocks and bonds around announcement dates using the market model and the GARCH econometric technique to estimate volatility clustering around SCR events. The S&P All Africa index is preferred because it is a comprehensive benchmark for the African continent, combining the constituents of the S&P Pan Africa, S&P South Africa Composite and S&P Zimbabwe BMI, covering companies listed in 13 countries: Botswana, Côte d'Ivoire, Egypt, Ghana, Kenya, Mauritius, Morocco, Namibia, Nigeria, South Africa, Tunisia, Zambia and Zimbabwe. The benchmark index is weighted by float-adjusted market capitalization and is Africa oriented as most of its listed companies operate purely in or derive the majority of their revenue from the African continent. To estimate the expected returns, the market model is applied on the benchmark indices using pre-event data for 150 days. If we let the market index return be conditional expectation $E(R_{it})$, to estimate expected returns for sovereign i at time t , the market model is specified as follows:

$$E(R_{it}) = \beta_1 + \beta_2 E(R_{mt}) + e_{it}, \quad (3)$$

Given that $E(e_{it}) = 0$, $E(e_{it}, e_{it-j}) = 0$ and $Var(e_{it}) = \sigma_{it}^2$, where e_{it} is the stochastic error term, β_1 and β_2 are model parameters estimated by ordinary least squares regression and $E(R_{mt})$ the expected market return at time t .

To complement the market model in estimating expected returns, the study also constructs the GARCH econometric technique to estimate volatility clustering around SCR events. Unlike the market model, the GARCH model captures volatility clusters in returns from the reaction to the announcements of stock and bond markets of the rated country. As recommended by Baum *et al.* (2016), the GARCH (p, q) is estimated using the following specification:

$$\sigma_t^2 = \omega + \alpha_1 u_{t-1}^2 \cdots + \alpha_p u_{t-p}^2 + \phi_1 \sigma_{t-1}^2 \cdots + \phi_q \sigma_{t-q}^2, \quad (4)$$

$$\sigma_t^2 = \omega + \sum_{p=1}^n \alpha_p u_{t-p}^2 + \sum_{q=1}^m \phi_q \sigma_{t-q}^2, \quad (5)$$

where ω , α and β are non-negative constants equal to 1, α_t and ϕ_t are unknown coefficients, u_{t-p}^2 are lagged errors and σ_{t-q}^2 are lagged volatilities.

The GARCH parameters are estimated by the method of maximum likelihood (Reusens and Croux, 2015). The analysis also runs the model using both the student- t and the GED distributions, to examine if they have significant effect on the results. It is hypothesized that if the GDP and interest rates (in the variance equation) are significant in the GARCH multivariate model, then their influence on bond and stock returns (in the linear equation) are significant. Thus, they have exogenously significant influences on the volatility of financial market returns. As recommended in Cappellari and Jenkins (2003) and Sigworth (2007), the estimators of the GARCH model assumes that the residual term follows a standard normal distribution, as often applied in GARCH(1, 1) models to increase parsimony and predictive strength, and maximized as follows:

$$\text{Maximize: } \prod_{t=1}^n \left[\frac{1}{\sqrt{2\pi v}} \exp\left(-\frac{u_t^2}{2v}\right) \right] \text{ or } \sum_{i=1}^n -\ln(v) - \frac{u_i^2}{v}, \quad (6)$$

where:

$$v = \frac{1}{n} \sum_{t=1}^n u_t^2.$$

Once the parameters are estimated for the market model, predicted returns in the sovereign rating event window can be calculated by entering in the market returns in the event window. The ARs are identified from differencing the expected and actual returns. For a sovereign i , on a trading day t , the ARs AR_{it} , is defined by an index produced by Kothari and Warner (2007) and Bissoondoyal-Bheenick and Brooks (2012) as follows:

$$AR_{it} = R_{it} - E(R_{it}), \quad (7)$$

where R_{it} is the actual return for a sovereign i 's stock/bond index at time t , and $E(R_{it})$ the expected return for a sovereign i at time t .

The analysis of excess returns is conducted over four different of 21[2], 31[3] and 41-day[4] event windows. The event window periods consider trading days around the SCR news and are applied to estimate the expected return for both bond yield and stock returns. These event windows are the average event windows recommended by Kothari and Warner (2007) that allow the full effect of the information announcements to be included when assessing event reactions.

After determining ARs, if the influence of the event during the event window is not exclusively on the event date itself, it may be necessary to calculate the average abnormal return (AAR) and the cumulative abnormal returns (CAR). These are used to assess the aggregate effect of the ARs. The two analyses are specified as follows:

$$AAR_{it} = \frac{1}{N} \sum_{t=-10}^{+10} (AR_{it}), \quad (8)$$

$$CAR_{it} = \sum_{t=-10}^{+10} (AR_{it} + AR_{it-1}), \quad (9)$$

where AR_{it} is the AR of a sovereign i at time t and N the sample size, which is the number of days in the event window.

To test the significance of the event impact on the financial markets, this study performs several tests. First, the t -statistics are calculated whether the sample returns significantly differ from expected return for all the ARs within the event window (as in studies by Erbaş, 2005; Klimavičienė, 2011; Mateev, 2012; Ikram and Nugroho, 2014; Cooke and Bailey, 2015). The greater the magnitude of the t -statistic (either positive or negative), the greater the evidence that an SCR announcements have significant impacts, while the closer the t -statistic is to 0, the more likely there is no significant impact. The time-series t -test of Strong (1992) is applied as follows:

$$t_{\alpha} = \frac{AR_{it}}{std(AR_{it})} = \frac{R_{it} - [\beta_1 + \beta_2 E(R_{mt}) + e_{it}]}{s_{it} / \sqrt{n}}, \quad (10)$$

where t_{α} is the student t -test at α significance level, and $std(AR_{it})$ the standard error of ARs of sovereign i at time t . In line with the estimation of the market model in Equation (3), the standard deviation is measured over the estimation window for the time-series t -test.

After examining the significance of the SCR events impact on the financial markets using the t -statistics in event studies, it is necessary to ascertain the significance by examining SCR impact using the Cochran Q -test. Complementing the t -statistic, the Cochran Q -test is a non-parametric method that does not assume a normal distribution of the residuals. The inclusion of both parametric and non-parametric tests accounts for possible non-normal distributions in the credit ratings and financial market data. Assigning an SCR

announcement as “success,” the null hypothesis that SCR announcements are significant is tested by the Cochran Q -test statistic, Q , which is given by:

SCR
announcements
influence

$$Q = k(k-1) \frac{\sum_{i=1}^k (X_i - \frac{N}{k})^2}{\sum_{j=1}^m X_j (k - X_j)}, \tag{11}$$

where k is the number of SCR outcomes (upgrade, downgrade, negative outlook and positive outlook), X_i the column total of all SCR events for all the countries under analysis, m is the total number of days under analysis, X_j is the row total of all SCR events in the countries under analysis and N is the grant total. Using $\alpha = 5$ percent, the critical region is defined by $T > \chi^2_{1-\alpha, k-1}$.

5. Empirical results

The results of the panel unit root tests presented in Table II show that the four series (10-year sovereign bond index, S&P benchmark bond index, country stock index and S&P All Africa stock index) are stationary at the 1 percent level. Thus, the unit root test results show that the series are time invariant, which fulfills the main assumption of econometric theory (Varian, 2014).

Table III presents the results of the GARCH multivariate model and as can be seen, the influence of interest rates and GDP on both the country stock and 10-year sovereign bond indices is significant. These results show that interest rates and GDP (the major variables reflecting the overall performance of an economy) (Kaminsky and Schmukler, 2001; Hull *et al.*, 2004; Chen *et al.*, 2016) have exogenously significant influences on the volatility of financial market returns. Additionally, both the ARCH and GARCH parameters are significant, which show that the volatility of financial markets is potentially a result of both internal and external variance. However, the GARCH parameters (coefficients) shown in Table III lie within the normal range prescribed by Corhay and Rad (1996) and Zivot and Wang (2006). For daily data, the GARCH reaction parameters α and β usually ranges below 0.98 (for relatively stable market) and above 0.98 (for a nervous market). This suggests that although there is significant external volatility from interest rates and GDP within the SCR event windows, their combined variance pressure on security prices is not enough to significantly influence financial market stability. The S&P All Africa Index’s insignificant and small coefficient indicates that it does not significantly explain announcement responses of the country stock index. Hence, there is an insignificant association between a country’s stock index and the S&P All Africa Index, possibly reflecting the nascent state of Africa’s stock market integration.

	10-year sovereign bond index	S&P benchmark bond index	Country stock index	S&P all Africa stock index
<i>Null: unit root (assumes common unit root process)</i>				
Levin, Lin and Chu t	-295.713***	-339.784***	-61.3595***	-154.132***
<i>Null: unit root (assumes individual unit root process)</i>				
Im, Pesaran and Shin W-stat	-273.2***	-288.422***	-66.566***	-154.41***
ADF – Fisher χ^2	1,037.91***	442.096***	2,238.03***	2,367.20***
PP – Fisher χ^2	836.051***	442.096***	1467.38***	294.731***

Note: ***Significant at the 1 percent level

Table II.
Panel unit root
test results

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13,6

1530

Table III.
GARCH variance
regression

Country stock index		10-year sovereign bond index	
C	0.815 <i>2,917.316***</i>	C	0.005 <i>5,463.512***</i>
S&P All Africa Index	0.001 <i>0.883</i>	S&P Benchmark Index	0.013 <i>224.315***</i>
<i>Variance equation</i>		<i>Variance equation</i>	
C	0.096 <i>2,088.600***</i>	C	0.000 <i>944.811***</i>
RESID(−1) ²	0.950 <i>5.375***</i>	RESID(−1) ²	63.894 <i>4,237.506***</i>
GARCH(−1)	0.001 <i>3.698***</i>	GARCH(−1)	0.001 <i>99.084***</i>
GDP	0.958 <i>−76.787***</i>	Interest	0.001 <i>83.257***</i>
Interest	0.965 <i>−76.461***</i>	GDP	0.007 <i>−724.298***</i>
R ²	0.393	R ²	0.002
Adjusted R ²	0.393	Adjusted R ²	0.002
SE of regression	0.439	SE of regression	0.099
Log likelihood	<i>7,794.845</i>	Log likelihood	<i>200,436.100</i>
Notes: <i>z</i> -Statistic in italics. ***Significant at the 1 percent level			

Having gained insight into the stationarity and external volatility behavior of the variables, the discussion next turns to the results of the event study that sought to determine if financial markets react to SCR events announcements. Table IV presents a summary of SCR announcements used to test the significance of ARs in the event windows. The AR is averaged to give a general outcome of statistical significance using the *t*-test. The table shows that the average ARs test statistics are not significant at the 5 percent (1.96) confidence interval within the three event windows for all the countries except South Africa. This result could be because of the well-developed regulatory and legal framework in South Africa (Heerden Van *et al.*, 2013), and the relatively larger stock exchange (the largest in Africa and the 17th largest exchange in the world by market capitalization) which allows the country's stock exchange and debt markets to offer leading technology, surveillance and quick settlements (Yartey, 2008). The results in Table IV generally find no evidence of upward or downward drift in the ARs after an SCR announcement. It can therefore be argued that the information value of an SCR in African countries other than South Africa is too weak to significantly influence bond and stock prices, possibly because most of these financial markets are grossly underdeveloped with sporadic trading activities.

While the average ARs for 13 countries are significant at the 10 percent level (1.645)[5], this may be a result of a combination of factors such as the Libyan Civil War, which caused the Libyan Financial Market to close in February 2011; some countries having no stock exchanges[6]; or by lack of liquidity[7]. The remaining ten countries[8] show no sign of ARs even at 10 percent significant level within the event windows. These results are contrary to Cantor and Packer (1996), Reisen and von Maltzan (1998) and Agarwal *et al.*, (2016) who found that stocks and bonds respond significantly to the announcements of SCR downgrade in emerging economies but may reflect the structural deficiencies in these African financial markets, such as inadequate oversight and lack of adaptive regulatory structure[9]. Hence, these findings imply that SCR reports do not contain information of concern to investors in the ten countries with insignificant ARs.

The next step of the analysis is to test the significance of the returns using the AR *t*-test on the SCR downgrades and upgrades. The results set out in Table V show that a few

							SCR announcements influence
Country (stock index)	Country (bond index)	No. of downgrades	No. of upgrades	No. of outlooks	No. of watchlist	Average abnormal returns <i>t</i> -test	
BSE (DCIBT)	Botswana (SPFIBWU)	1	—	4	—	1.95*	1531
DSX	Cameroon (SPFIEGC)	1	1	5	—	1.45	
BVC	Cape Verde (SPSCBCV)	2	—	6	—	1.76*	
BRVM (BRVMCI)	Benin (SPFIBWN)	—	—	—	—	—	
	Burkina Faso (SPFIEGB)	2	—	6	1	1.55	
	Senegal (SPFISNU)	—	—	—	—	—	
	Congo Republic (SPSCBCR)	1	1	—	—	1.05	
EGX 100 (EGX100)	Egypt (SPFIEGU)	11	3	30	2	1.73*	
GSE (ASIX)	Ghana (SPFIGHU)	2	1	6	—	1.86*	
	Gambia (SPFIKQGM)	2	—	—	—	1.24	
	Lesotho (SPFILSU)	—	1	—	—	1.77*	
	Libya (SPIFLYU)	4	—	—	—	1.87*	
LSM	Kenya (SPFIKEU)	—	—	2	—	1.22	
NSE (NASI)	Malawi (SPFIMAU)	1	1	1	—	1.36	
MSE (MALSMV)	Mauritius (SPFIMUU)	1	—	2	3	1.5	
SEM (MDEX)	Morocco (SPFIMOU)	1	—	2	—	1.75*	
CasaSE (MASI)	Namibia (SPFINAU)	—	—	2	—	1.74*	
NSX(OVRLNM)	Nigeria (SPFINGU)	1	1	4	—	1.91*	
NSE (NGSEINDEX)	Rwanda (SPFIRWU)	—	3	3	—	1.79*	
RSE (ALSIRW)	Seychelles (SPFISYU)	—	3	—	—	1.77*	
SSE	South Africa (SPFIZAU)	5	5	17	1	1.96**	
JSE (FTWIZAFL)	Tunisia (SPFITNU)	9	4	6	2	1.93*	
BVMT (TUNINDEX)	Uganda (SPFIUGU)	1	—	3	—	1.06	
USE (ALSIUG)	Zambia (SPFIZMU)	2	—	4	—	1.94*	
LuSE (LASILZ)							

Notes: *,**Significant at 10 (> 1.645) and 5 percent (> 1.960) levels, respectively

Table IV.
Summary of SCR
events and average
abnormal returns
(AR) *t*-test

countries with a BBB rating class react significantly negative in response to an SCR downgrade announcement (when they were thus downgraded from BBB+ to BBB), including Mauritius, Tunisia and South Africa (at the 5 percent (−1.96) significance level); and Namibia, Morocco and Mauritius (at the 10 percent (−1.645) significance level). The remaining countries do not show significant evidence of ARs when an SCR announcement is made. Thus, these results indicate that countries with financial markets that are already perceived to be risky (below investment grade and almost perennially on the CRA's watchlist), do not react significantly to SCR downgrade announcements. This accords with Michaelides *et al.* (2015) and Mohapatra (2016), who reported that SCR announcements generate stronger market reactions in markets that are susceptible to information asymmetry, such as in emerging market economies.

Table V further shows that there has been a relatively few number of SCR upgrades announcements, suggesting that in Africa, once a sovereign is downgraded, upgrading thereafter is difficult. In addition, almost all SCR upgrades show no significant sign of ARs both at the 5 percent and 10 percent significance levels. This is also consistent with Mateev (2012) who observed no significant ARs after an SCR upgrade announcements. A possible reason for this result is that investors tend to be more cautious about downside risk and passive on the upside (Mateev, 2012).

The effects of SCR negative and positive outlook announcements are shown in Table VI. Out of the 92 SCR negative outlook announcements, only 8 events show significantly negative

Table V.
SCR significance
test results

SCR change	SCR upgrades			SCR change	SCR downgrades		
	Fitch/S&P (Moody)	No. of credit	Average abnormal Returns		No. of credit	Average abnormal Returns	
		Upgrades	<i>t</i> -test				
A– (A3) to A (A2)		1	–1.65*	A (A2) to A– (A3)	1	–1.67*	
BBB+ (Baa1) to A– (A3)		–	–	A– (A3) to BBB+ (Baa1)	1	–1.27	
BBB (Baa2) to BBB+ (Baa1)		1	–1.27	BBB+ (Baa1) to BBB (Baa2)	5	–1.66*	
BBB– (Baa3) to BBB (Baa2)		–	–	BBB (Baa2) to BBB– (Baa3)	4	–1.28	
BB+ (Ba1) to BBB– (Baa3)		1	–1.27	BBB– (Baa3) to BB+ (Ba1)	7	–1.27	
BB (Ba2) to BB+ (Ba1)		2	–1.13	BB+ (Ba1) to BB (Ba2)	5	–1.35	
BB– (Ba3) to BB (Ba2)		1	–0.36	BB (Ba2) to BB– (Ba3)	5	–1.37	
B+ (B1) to BB– (Ba3)		2	–0.15	BB– (Ba3) to B+ (B1)	3	–0.68	
B (B2) to B+ (B1)		5	–0.02	B+ (B1) to B (B2)	2	–1.08	
B– (B3) to B (B2)		3	0.12	B (B2) to B– (B3)	2	0.34	
CCC+ (Caa1) to B– (B3)		2	1.28	B– (B3) to CCC+ (Caa1)	1	0.09	
				CCC+ (Caa1) to CCC (Caa2)	1	0.01	

Note: *Significant at 10 percent (> 1.645) level**Table VI.**
SCR outlook
significance test
results

SCR change	SCR positive outlook			SCR change	SCR negative outlook		
	Fitch/S&P (Moody)	No. of positive	Average abnormal		No. of negative	Average abnormal	
		Outlooks	Returns <i>t</i> -test				
Negative to stable		5	–1.96**	Positive to stable	50	–1.68*	
Stable to positive		4	–1.64*	Stable to negative	42	–1.62	
BBB+ (Baa1) to A– (A3)		–	–	Under review (Watch)	21	–1.31	

Notes: *, **Significant at 10 (> 1.645) and 5 percent (> 1.960) levels, respectively

ARs at the 5 percent level and 46 at the 10 percent significance level. These results suggest that a negative outlook has a significant impact on the majority of African financial markets, possibly because assigning a negative outlook is a signal of an impending downgrade (Konijna and Rijkena, 2011; Crosta, 2014; Baum *et al.*, 2016). Hence, the actual SCR announcements may ultimately have a less pronounced effect when preceded by a negative outlook.

However, for the same SCR negative outlook announcement presented in Table VI, there are four events that show a significantly positive reaction at the 10 percent significance level. These significantly positive ARs following a negative outlook announcement are contrary to Konijna and Rijkena (2011) and Crosta (2014)'s findings that an SCR downgrade and a negative outlook announcement leads to an immediate significant negative AR reaction upon announcement. This suggests that the positive ARs could be driven by other fundamental economic variables rather than the rating announcements, or by speculation about the SCR event before the announcement dates thus pushing the security returns in the opposite direction (Jansen and Nikiforov, 2015).

The results for the positive outlook presented in Table VI indicate that African countries had a total of nine SCR positive outlook announcements during the period 1994–2014, with only four events showing significantly negative abnormal market reactions at the 10 percent level. The remaining five outlook events show insignificant returns at the 10 percent significance level, which indicates that the market is not moved by positive outlook announcements; and therefore, there are no ARs. Unlike previous studies by Konijna and Rijkena (2011), Crosta (2014) and (Baum *et al.*, 2016) who combine both positive

and negative outlooks in their analysis, this study observes that positive outlooks are not relevant information to investors, and thus there are no significant excess returns for the positive outlooks. Hence, the results imply that positive outlook credit announcements have a little effect on stocks prices adjustments.

The results of the Cochran Q -test presented in Table VII shows a Q of more than ten and a probability of success approximately one. These results mean that there is no dichotomous categorical effect from each country's SCR to its financial market across time. The p -value above 0.05, meaning that there is no significant evidence that the null hypothesis cannot be rejected. Hence, the effect of sovereign rating announcements on Africa's financial markets is not significant. The effect of SCR ratings is therefore not significant to generate excess returns in financial markets, which is generally consistent to results of the t -test during sovereign credit upgrades and downgrades.

6. Conclusion

This study examined whether a foreign-currency sovereign rating announcement influences excess bond and equity returns in 24 African countries that received an SCR during the period 1994–2014. The results of GARCH and event study analysis finds that the African financial markets are weakly sensitive to SCR announcements and the extent to which financial markets react to SCR information varies according to the type of SCR information. Since, most of the African countries' SCRs are rated below investment grade, they consequently suffer from illiquidity challenges. Hence, the announcements of SCR announcements do not significantly change the financial market returns because they are already perceived to be risky markets, which attract mostly passive and long-term investors. Thus, these results indicate that the hypothesis that CRAs may be contributing to the instability of financial markets in emerging countries (Kaminsky and Schmukler, 2001; Elkhoury, 2008) does not apply to Africa's financial markets.

The results of this analysis have the following implications and recommendations for investors and policymakers. First, the weakly responsiveness of Africa's financial markets to SCR announcements, implies that credit ratings are relatively informationally important in the operation of stocks and bond markets in Africa. Therefore, governments should still appreciate the long-term information exchange between investors and borrowers, and the consequential nature of credit ratings in Africa's nascent financial markets in order to proactively manage the risks of negative ratings. Second, as the extent to which financial markets react to credit rating information depends on the type of information announced, thus governments in African countries should work to avoid unfavorable SCR announcements, which have a negative effect on the cost of servicing national debt.

k	4	
Success	1	
m	131,474	
	x_i	$(X_i - \frac{N}{k})^2$
Upgrades	24	462.25
Downgrades	46	0.25
Positive outlook	103	3,306.25
Negative outlook	9	1,332.25
N	182	5,101
χ^2	15.4274	
Q	12.3655	
p -value	0.6725	

Note: ***Significant at the 1 percent level

Table VII.
Cochran Q -test results

Notes

1. An implied pitch in the SCR report's grammatical language which expresses emotional information and conveys emphases.
2. Split into 10 days before the event, 10 days after the event and 1 day as event day.
3. Split into 15 days before the event, 15 days after the event and 1 day as event day.
4. Split into 20 days before the event, 20 days after the event and 1 day as event day.
5. These countries are Botswana, Cape Verde, Egypt, Ghana and Lesotho, Libya, Morocco, Namibia, Nigeria, Rwanda, Seychelles, Tunisia and Zambia.
6. These include Ethiopia, DRC, Congo, Gabon, Gambia and Lesotho.
7. This could include countries that form part of the West African regional stock exchange Bourse Régionale des Valeurs Mobilières SA (BRVM), which includes Burkina Faso, Côte d'Ivoire (Ivory Coast), Benin, Mali, Senegal, Guinea, Bissau, Niger and Togo.
8. Cameroon, Burkina Faso, Senegal, Benin, Congo Republic, Gambia, Kenya, Malawi, Mauritius and Uganda.
9. For example, Cameroon does not have an index because of a high number of failed trading. Since the establishment of Cameroon's Douala Stock Exchange (DSX) in 2001, the exchange only had two listed companies by 2014.

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