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## ANALYSIS OF SOVEREIGN CREDIT RATINGS ON EUROBOND YIELDS: EVIDENCE FROM AFRICA

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### ABSTRACT

Over the past decade, sovereign credit ratings and government-issued Eurobonds have gained significance in Africa. This study explores how changes in sovereign credit ratings affect Eurobond yields across eight countries from 2018 to 2023, using event study methodology. Results show that around one-third of rating actions directly influence bond yields in these nations. Notable events include South Africa and Namibia being downgraded to non-investment grade in 2021, marking significant shifts and investor reactions. The relatively low impact of a third, compared to international studies, suggests that rating changes are often anticipated, carrying little new information, possibly overestimating the influence of credit rating agencies. The findings also indicate that since 2023, the predictability of rating actions due to pre-announced review dates has reduced their impact on bond yields. Furthermore, bond investors appear to adjust to new information in real-time, relying less on credit rating agencies and more on their assessments.

**KEYWORDS:** Sovereign credit ratings, Eurobond yields, Event study, Africa.

### INTRODUCTION

Since 2019, African countries have found a new financing avenue in the international bond markets with Eurobonds. As the International Monetary Fund noted in 2023, access to international capital markets has surged. According to Smith (2021), about USD100 billion in Eurobonds issued by 21 African nations are currently in circulation. These bonds have allowed for the measurement and assessment of African sovereign credit risk. Investors gauge a country's debt repayment ability through market indicators such as bond yields, spreads, or Credit Default Swaps (CDS). The rising interest in Eurobonds by African countries warrants closer examination.

The International Monetary Fund (2023) identifies several reasons behind the issuance of Eurobonds by African nations: favorable global financing conditions, a drop in commodity prices since 2020, and substantial fiscal financing needs. With fiscal demands surpassing revenues, many governments have turned to international markets via Eurobonds. Additionally, Eurobonds expand the fiscal capacity to fund long-term infrastructure projects in these countries (IMF, 2023). To issue bonds, countries need credit ratings to facilitate price discovery. Over the past decade, African countries have increasingly sought credit ratings, enabling access to international capital markets with ratings from major agencies like S&P Global, Fitch, and Moody's.

Sovereign credit ratings aim to assess the ability of governments to repay their commercial debts by considering both macroeconomic and institutional factors. It's crucial to examine the



link between these ratings and Eurobond yields to understand sovereign credit risk, especially in Africa, where Eurobond issuance is widespread. However, the factors driving Eurobond yields are not fully understood by the issuing governments. The effect of credit ratings has been debated since the 2008 global financial crisis, particularly regarding their influence on bond yields. This paper uses the event study methodology to empirically analyze the direct impact of rating changes on bond yields and compare the results with previous studies. The impact of changes in sovereign credit ratings on Eurobond yields remains underexplored in African research. Our research provides three key contributions. First, we analyze individual rating changes using specific event windows, thereby enhancing the understanding of their impact on bond yields in Africa. The event study approach, which employs the market model, necessitates a bond index focusing on African Eurobonds. Although many bond indices mix African Eurobonds with those from other frontier and emerging markets, we utilized the S&P Dow Jones Hard Currency Index, which tracks only African Eurobonds, as a benchmark for expected bond market returns. However, this market model approach limits our empirical analysis to eight countries. Despite this, these eight nations cover the bulk of outstanding Eurobonds. For instance, Egypt, South Africa, Nigeria, Ghana, and Kenya are the top five regular African issuers with the most significant outstanding Eurobonds, making them a reliable proxy for analyzing market movements.

Not all African Eurobonds meet the size and liquidity criteria for active trading, and bond indices typically include only those that do (see Arslanalp et al., 2020). Secondly, by using Eurobond yields and international credit ratings, we provide a basis for global comparability, as highlighted by Olabisi and Stein (2019). Thirdly, our study period of 2018-2023 encompasses a new era marked by the European Securities and Markets Authority (ESMA) introducing a regulatory calendar for pre-announcing review dates each year. This development is a significant shift from the pre-2019 era when review dates were generally unknown and caught the market by surprise.

## **LITERATURE REVIEW**

Classifications of the roles of Credit Rating Agencies (CRAs) focus on market and regulatory functions. The market function approach relies on the concepts of asymmetric information and the efficient market hypothesis. On the other hand, regulatory functions pertain to the obligatory or embedded nature of credit ratings in financial instruments.

The market function relies on the concept of asymmetric information, which was first introduced by Akerlof in 1970 through his market for lemons theory related to the second-hand car market. In financial markets, particularly the loan market, lenders and borrowers often lack detailed information about each other. Borrowers tend to withhold information about their creditworthiness, while lenders are not fully informed about borrowers. Consequently, good borrowers may be pushed out of the market as lenders raise rates to offset the lack of information, leaving behind higher-risk borrowers. This is where Credit Rating Agencies (CRAs) step in as independent evaluators of creditworthiness to bridge this information gap. Deb et al. (2018), Rhee (2019), and Binici, Hutchinson, and Miao (2019)



argue that CRAs can mitigate information asymmetry between lenders and borrowers by centralizing data collection on various borrowers, achieving economies of scale and reducing costs. CRAs then provide relative creditworthiness rankings using a rating scale. The IMF (2019) notes that the Eurobond market has become a crucial funding source for many African governments, with at least 20 African countries issuing Eurobonds worth at least USD100 billion over the past decade (Smith, 2019). The issuance of Eurobonds has facilitated the measurement and assessment of sovereign credit risk in African nations, with international CRAs bridging the information gap between borrowing countries and international investors. It is believed that most, if not all, Eurobonds have been issued with credit ratings from major agencies such as S&P Global, Fitch, and Moody's.

Our review of empirical literature examines the influence of credit rating changes on bond yields, including spreads and Credit Default Swaps (CDS). This area of research is still evolving and needs further exploration, especially for African countries. Early studies by Cantor and Parker (1996) and Reisen and Maltzan (1999) focused on this topic. Cantor and Parker (1996) analyzed how credit rating announcements affected Euro Dollar bond spreads for 18 countries from 1987 to 1994. Reisen and Maltzan (1999) conducted a similar study for emerging markets, covering the period from 1989 to 1997. Both studies used the event study methodology with short event windows (2, 3, 5, and 10 days) to minimize the potential for result bias due to external factors. Cantor and Parker found that credit rating changes had a significant impact on bond spreads in 60% of the 79 announcements they studied. Reisen and Maltzan's research, conducted post-Mexican and Asian financial crises, revealed that around 64% of 152 rating announcements significantly affected Eurodollar bond spreads. These early studies indicated that changes in credit ratings generally influenced bond yields, suggesting that Credit Rating Agencies (CRAs) provided new information. Additionally, Cantor and Parker noted that rating changes had a more pronounced effect on investment-grade countries compared to non-investment-grade ones.

## **ANALYSIS AND RESULTS**

Following the rise in credit ratings, there was a notable increase in Eurobond issuances. According to data from Chart 1, Seychelles was the first African country to issue a Eurobond in 2006, with the Republic of Congo, Gabon, and Ghana following in 2007. Throughout the 2010s, more countries issued Eurobonds in larger amounts. By December 2019, at least twenty African countries had entered the international Eurobond market, collectively issuing over USD100 billion. Of the 34 African nations that have received credit ratings at some point, 12 have not yet issued Eurobonds, including Botswana, Burkina Faso, Cape Verde, DRC, Gambia, Lesotho, Libya, Malawi, Mali, Mauritius, Swaziland, and Uganda. Consequently, the sample for analysis is limited to about 22 countries that have issued Eurobonds. Moreover, five of these countries have only started issuing Eurobonds in the last four years, with Benin being the latest to issue its first in March 2019. This means there is still limited data on bond yields, further reducing the sample size to 17 countries. Additionally, our study aims to examine the impact of rating changes on bond yields during

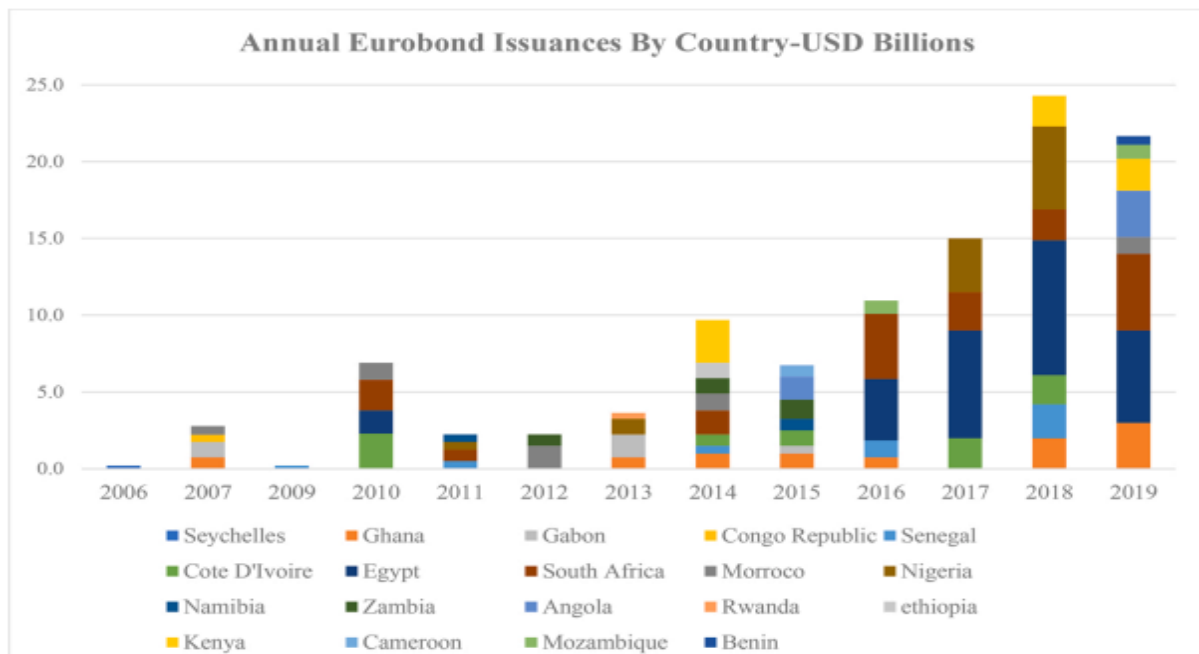
2018-2023. For instance, Ethiopia maintained the same ratings throughout this period, so there are no rating changes to assess.

**Table 1**

**Timeline of Assigning Sovereign Ratings in Africa.**

Country	Fitch	Moody's	S&P
Angola		2010-	2010-
Benin		2018-	2003–2013, 2018-
Botswana		2001-	2001-
Burkina Faso			2004-
Cameroon	2003-	2016-	2003-
Cape Verde	2003-		2003-
Congo (republic)	2013	2013-	2013-
D.R.C		2013-	2013-
Egypt	1997-	1996-	1997-
Ethiopia	2014-	2014-	2014-
Gabon	2007-	2014-	2007–2016
Gambia*	2002–2007		
Ghana	2003	2012-	2003-
Ivory Coast	2014	2014-	
Kenya	2007	2012-	2006-
Lesotho	2002		
Libya*	2009–2011		2009–2011
Malawi*	2003–2009		
Mauritius		1996-	
Mali*	2004–2009		2004–2008
Morocco		1999-	1998-
Mozambique	2003-	2013-	2004-
Namibia	2005-	2011-	
Nigeria	2006-	2012-	2006-
Rwanda	2006-	2016-	2011-
Senegal		2011-	2000-
Seychelles	2010-		2006–2009
South Africa	1994	1994-	1994-
Swaziland		2017-	
Tanzania		2018-	
Togo			2019-
Tunisia	1995	1995-	1997–2013
Uganda	2005	2013-	2008-
Zambia	2011	2012-	2011-

Source: CRAs, \* is for no longer rated, -rating is still current.



**Chart 1. Eurobond Issuances.**

Source: Own compilation from Reuters, Bloomberg, Fitch, Moody's and S&P Global Reports.



Our research uses daily data from 2018 to 2023 for eight countries: Egypt, Ghana, Kenya, Morocco, Namibia, Nigeria, South Africa, and Zambia. These countries account for about \$80 billion or roughly 80% of the total outstanding Eurobonds of African nations, as shown in Chart 1. The event study focuses on three main variables: bond yields, credit ratings history, and a hard currency bond index.

First, we used daily Eurobond yield data from Bloomberg, which aligns with previous research and shows a stronger relationship with credit rating changes compared to local currency bond yields. Table 1 outlines the Eurobond yields selected for the study. Although CDS spreads could have been added, they were not available for all sampled countries. Since the CDS market is still developing in Africa, only Egypt, Nigeria, and South Africa had CDS spreads data from Bloomberg during the study period. Additionally, no market index includes all three countries, complicating the use of the market model event study approach for bond yields.

Second, for credit rating events, we compiled the history of sovereign credit ratings from Fitch, Moody's, and S&P publications. A credit rating event was defined as any rating action, including changes in outlook or actual rating changes, by any of these agencies. Credit ratings were converted into numerical scales to assess their impact on bond yields. Different CRAs may have different ratings for each country, resulting in varying numerical values at certain times. Our goal is to measure how changes in credit ratings affect Eurobond yields.

We compiled and averaged numerical values over the sample period, using either 3 or 2 values depending on the number of CRAs rating the country. This process allowed us to generate average ratings presented in Table 2, which we used to evaluate the impact on Eurobond yields for each rating event. Our third variable was the bond index to assess market performance. Given our focus on Eurobonds as a proxy for bond yields, we selected a bond index incorporating African Eurobonds, specifically the hard currency bond index data from S&P Dow Jones Indices. The S&P Hard Currency Index served as a benchmark for calculating normal bond market returns. The selection of 8 countries was determined by the market model approach for event study analysis. By using the S&P Hard Currency Index as the benchmark for market returns, we confined our analysis to the 8 countries within the index, which represented about 80% of outstanding Eurobonds. To our knowledge, no other index tracks African Eurobond performance exclusively. Other indices, such as the JP Morgan Emerging Markets Bond Index, cover a broader range of emerging markets, including African Eurobonds.





Table 2

CRAs conversion to numerical scale.

Fitch/S&P	Moody's	Numerical
AAA	Aaa	21
AA+	Aa1	20
AA	Aa2	19
AA-	Aa3	18
A+	A1	17
A	A2	16
A-	A3	15
BBB+	Baa1	14
BBB	Baa2	13
BBB-	Baa3	12
BB+	Ba1	11
BB	Ba2	10
BB-	Ba3	9
B+	B1	8
B	B2	7
B-	B3	6
CCC+	Caa1	5
CCC	Caa2	4
CCC-	Caa3	3
CC	Ca	2
C	C	1
SD	D	0

Source: CRAs scales

Most of the empirical literature we reviewed employed the event study methodology because it is highly effective in analyzing the immediate impact of rating events on financial markets within a short timeframe. This method helps identify abnormal returns in the bond market linked to unexpected events, allowing us to directly measure the impact of CRA announcements on bond yields.

The event study methodology operates on the premise that markets are efficient and that the event in question was unforeseen. Essentially, it allows us to evaluate the semi-strong efficient market hypothesis, which posits that asset prices fully incorporate all publicly available information. If this hypothesis holds true, investors should not achieve abnormal returns through either fundamental or technical analysis. Following the approach of most previous research, we isolated credit rating events to determine if there were excess bond returns around these events. We deemed excess bond returns statistically significant if the observed t-values exceeded the critical thresholds of 1%, 5%, and 10%.

We identified our events as credit rating announcements from any of the three major CRAs. Our dataset includes 71 CRA events between June 2014 and June 2019, aligning with our benchmark index that tracks market performance. In line with previous studies, we defined a rating event as any announcement of an actual rating change, outlook adjustment, credit watch, or review notice. For instance, changing the outlook from stable to negative (or positive) is generally considered a downgrade (or upgrade). Similarly, announcements of CreditWatch and review for downgrades are treated as downgrades. Table 2 provides a breakdown of rating events by country.

The statistical review of our sample rating events reveals a few key insights. First, downgrades account for 68% of the events, with the remaining 32% being upgrades. Secondly, the events are fairly evenly distributed across the 8 countries. Four countries have between 15-20% of the events each, while the other four countries have about 5% each on



average. Zambia, South Africa, Egypt, and Nigeria hold the highest share of ratings. Of these, only Egypt has a majority of positive rating events, while the other three predominantly face downgrades. Among the three CRAs, Moody's holds the largest share of rating actions at close to 40%, followed by S&P at approximately 35%, and Fitch below 30%. Thus, Moody's and S&P predominantly influence the rating events in our sample.

We used three event windows of 3, 5, and 11 days. A 3-day event window, for example, includes one day before the event, the event day itself (day 0), and one day after the event. Shorter horizons are preferred in literature to minimize contamination seen in longer periods. After identifying the rating events, we focused on bond yields—specifically Eurobond yields for the 8 countries—and analyzed their changes relative to the rating events.

Our next step involved calculating normal returns, abnormal returns, and cumulative abnormal returns. Following the methodology of Rielsen and Maltzan (1999) and Afonso (2011), event study analysis links rating events to abnormal returns. We used the bond yields to construct daily normal bond returns for the entire sample period using a specific formula:

$$R_{it} = \ln(Y_t / Y_{t-1}) \tag{1}$$

The subsequent step involved constructing the expected returns over the estimation window using benchmark indices representing market returns. The estimation window was defined as 60 days, equating to 12 weeks or 3 months prior to a rating event. We selected shorter time horizons in line with Khotari and Warner (2006), and as Binici et al. (2018) suggest, CRAs typically incorporate all relevant information within a three-month period.

$$E(R_{it}) = E(R_m, t) \tag{2}$$

Table 3

Rating Events by Country and Rating Changes.

Country	Upgrades	Downgrades	Total events	Fitch	Moody's	S&P
Egypt	10	2	12	3	3	6
Ghana	4	2	6	1	2	3
Kenya	2	4	6	2	2	2
Morocco	2	2	4	0	3	1
Namibia	0	5	5	3	2	0
Nigeria	1	10	11	4	3	4
South Africa	1	12	13	3	7	3
Zambia	3	11	14	4	5	5
Total	23	48	71	20	27	24

Source: Own data compilation

The expected return of country i at time t, E(R<sub>it</sub>), is determined by the expected market return at time t, E(R<sub>m</sub>, t). To calculate this expected market return, we use pre-event data from 60 days before the event, known as the estimation window. This window helps determine not only the normal expected return but also alpha (α) and beta (β), which respond to market fluctuations. Both α and β are calculated using data from the event window. The sum of alpha and beta (multiplied by the market index return) per day gives the predicted or expected return over the entire sample period.

Abnormal returns are the differences between the actual return and the estimated market return. Our market return is the weighted S&P Hard Currency Index return.

$$AR_{it} = R_{it} - E(R_{it}) \tag{3}$$

AR<sub>it</sub> is abnormal return on sovereign bond i at time t and R<sub>it</sub> is the actual sovereign



bond return on security  $i$  at time  $t$ .  $E(R_{it})$  is the expected return. We proceeded to calculate the cumulative abnormal return (CAR)- where cumulative total returns during the event window- sum of country  $i$  abnormal returns during the event window. The event windows are our 3, 5, 11-day trading event windows.

$$CAR^i(t_1, t_2) = \sum_{t=t_1}^{t_2} AR_{it} \quad (4)$$

The  $t_1 - t_2$  time periods refer to our event windows 3, 5 and 11-day windows. We then proceeded to test the rating events individually over the three event windows. From our 71 rating events, we tested the following hypotheses:

**H0.** CRAs announcements do not impact sovereign bond yields

**H1.** CRAs announcements do impact sovereign bonds yields

Building on the early studies by Reisen and Maltzan (1999) and Cantor and Parker (1996), it is common to use both abnormal returns and cumulative abnormal returns. Following Binici et al. (2018), we primarily used cumulative abnormal returns for interpretation and analysis.

Our next section's analysis relied on three statistical tests: T-tests at significance levels of 1%, 5%, and 10%. We rejected the null hypothesis at the 1% level if the observed t-value was greater than 2.575, at the 5% level if it was greater than 1.96, and at the 10% level if it was greater than 1.645. This would indicate that the rating event caused abnormal returns, suggesting it provided new information to the market. Conversely, if the observed t-values were below these critical values at the respective levels, we accepted the null hypothesis, indicating that rating events no longer provided new information..

## CONCLUSION

This research investigated whether changes in sovereign credit ratings influence Eurobond yields in eight countries from 2018 to 2023. Our findings show that, on average, nearly a third of rating actions have a direct impact on bond yields in African countries, suggesting that overall, the influence of CRAs on bond yields is relatively weak. We argue that in Africa, the ratings culture is still evolving and needs further promotion. Despite being in its early stages, it is evident that not all CRA rating actions affect bond yields. This indicates that bond investors do not rely solely on CRAs for creditworthiness assessments. The growth of the fixed income market likely contributes to diminishing the effect of CRA rating changes on bond yields.

The limited impact of CRA actions might be attributed to the regulatory calendar imposed by EU regulations since 2019. With calendar dates being announced in advance and CRAs signaling outlook changes, these rating actions have become more predictable, offering less new information to the market. For example, the unexpected downgrades of South Africa in April 2019, which were outside the regulatory calendar, had the most significant impact across all event windows. To ensure rating actions have a stronger and more unexpected impact on markets, we suggest policymakers consider removing the regulatory calendar, thus reintroducing the element of surprise in rating announcements.

If regulatory guidance is crucial, we suggest implementing coordinated regulation across





African countries since currently only South Africa's Financial Services and Conduct Authority (FSCA) has such guidance linked to ESMA through regulatory coordination. The challenge with a single regulator for Africa lies in the continent's vastness, comprising 55 countries at varying stages of development and with different approaches to CRAs. Therefore, African nations should perhaps first focus on strengthening their credit fundamentals to achieve higher ratings.

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