JAES

Journal of Applied Economic Sciences

Volume XII
Issue 6 (52) Fall 2017

ISSN-L 1843 - 6110
ISSN 2393 - 5162

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Journal of Applied Economic Sciences

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A Co-Integration Analysis of Interest Rate Spread and Corporate Bond Market Development in Selected African Economies

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Suggested Citation:

Eke, P.O., Adetiloye, K.A., Adegbite, E.O, Okoye, L.U. 2017. A co-integration analysis of interest rate spread and corporate bond market development in selected African economies. *Journal of Applied Economic Sciences*, Volume XII, Fall 6(52): 1654 – 1667.

Abstract:

This paper examines the relationship between interest rate spread and corporate bond market development in thirteen African economies comprising of Botswana, Egypt Mauritius Nigeria, Tunisia, Cameroon, Kenya, Morocco, South Africa, Cote d'Ivorie, Ghana Namibia, Tanzania from 2004 and 2014 using fully modified ordinary least square (FMOLS) in an autoregressive distributive lag (ARDL) framework. Subsisting literature suggests that in bank-based economies, interest rate spread could adversely affect the potency of corporate bond market development; and thus limits the financial market competitiveness. The result provides evidence that corporate bond issue, as a proxy for financial development is negatively influenced by interest rate gap in the short and long term. The result affirms the 'group interest' theorem in these African economies leading to a deterrent in competitive financial development. The ECM coefficient satisfies a priori expectation, affirms the short run dynamic relationship, which implies long run equilibrium from the annual speed of adjustment, which is about 100 percent. The paper suggests policy recommendations for the reduction in interest rate, and thus the spread to encourage the growth of corporate bond issues for a market-led financial development.

Keywords: co-integration; corporate bond market; interest rate spread; market development; group interest

JEL Classification: C23; G10; E43

Introduction

The corporate bond market is very important for capital-scarce developing economies as a mechanism for long-term capital accumulation and allocation, but little of this potential advantage has been explored. The bond market was explored by: doctoral students from Department of Banking and Finance Covenant University Nigeria or Faculty, Department of Banking and Finance, also professors of Finance University of Lagos, Nigeria with the scope of increasing the potentials of these economies to exploit their numerous natural resources, in order to improve the people's well-being, particularly by financing sectors with a high multiplier like agriculture and industrial sectors. These sectors have positive and strategic links to poverty reduction, as they enhance inclusiveness and achieve other sustainable human development goals in several ways (UNIDO 2015). The diverse development goals may be elusive if the financial capital required to achieve the ambitions are not harnessed, possibly by exploiting the machinery of a private capital market mechanism.

In any modern economy, interest rate provides sensitive price signals to borrowers, lenders, savers, and investors; and could serve as an economic policy instrument to moderate their behaviour. Ackley (1978) opines that the mechanics of interest rate term structure is of major implications for the performance of the macroeconomy.

The behaviour of interest rate influences industrial outlook and service variables, such as what the US Fed rate does in the global financial market. In the domestic economy, high real interest rate makes debt servicing more expensive. The high-interest rate differentials in many African economies causes a deterrent to financial development, as it makes the financial system uncompetitive, unsupportive to market-based arm's length financial development. Ranjan and Zingale (2003) state that it is uneasy for the financial system to provide level ground for the average entrepreneur (in a non-connected relationship) and raise the desired capital for projects at arm-length or via a non-relationship bank-based finance. In such financial system, the investor's ease to dispose financial assets at fair returns also becomes an issue as a result of illiquidity. Going by this standard, the current bank-based financial system practice is far from promoting financial development, or near any level of perfection.

Recently, thoughts on the increasing interest rate spread, high average lending against low deposit rate in emerging and frontier markets have occupied researchers' attention. On the 'determinants of interest rate spread Tennant and Folawewo (2009) studied 33 developing economies while Akinlo and Owoyemi (2012) examined the case of Nigeria only. An issue in the analyses is if financial development promotes the economic growth of nations. Rajan and Zingale (2003) argue the 'group interest' theory as part of the structural impediment of the growth of the market-based finance system. The 'group interest' of the bank finance model is seen as limiting the competitiveness of these financial markets, hence the underdevelopment of financial system in many developing economies. In other words, a country's financial structure matters for the wide interest margin and underdevelopment of the financial market. This had led to the crowding out of bond (debt) finance.

Adelegan and Razewicz (2008) found that the sub-Sahara Africa domestic debt market is weak relative to the bank finance while attributing the lack of financial deepening to savings constraint. The average real interest rate is low and sometimes negative in the region, while with low saving interest rate the willingness and propensity to save declines. Asogwa (2005) however appraises both bank and market-based financing in Nigeria and concludes that for long-term industrial financing, the bank model template seems unsuitable, claiming that if adequate strategies are in place among the borrowers and investors, the advantages of market-based finance and growth could be enormous even in information-poor countries. Bank based finance has chiefly advanced the 'availability' doctrine, irrespective of cost, increase default risk levels exacerbates financial instability. The World Bank (2001) argues that if finance is fragile in developing countries the banking sector will be the most hit.

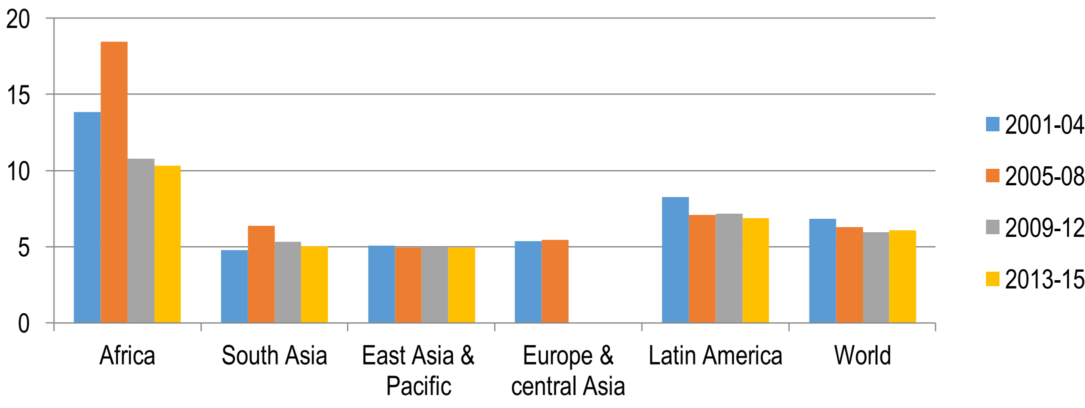
Figure1 below presents the picture of the interest rate spread in Africa relative to other regional peers. The histogram reveals that African economies record interest rate highest margin all through, while the 2005-2008 has average spread picked at 18.46%. Next to Africa is Latin America region as second highest bank margin above the global average through the period 2001-2015.

Figure 2 below shows the trend in bond issues in Africa and the Middle East economies from 2001 to 2015 with the banking institutions as the highest issue. The non-consistent growth pattern is seen from non-finance corporations, other finance corporations, and government issuers after the global financial crises in 2011.

This study conjectures that to a large extent, African countries' economic policies and initiatives have over-promoted the bank-based financing option for long-term industrial finance needs which however seems inappropriate and inadequate. WEF (2015) is uncomfortable with the relatively slow growth of corporate bond market dependence emerging and frontier economies, citing that the post-2011 credit crunch environment. This calls for acceleration of the corporate bond financing as it produces significant greater long-term benefits than bank financing. Several industrial financing in Nigeria through the bank base model have been unsuccessful (Asuquo 2005).

The hypothesis that increasing bank interest rate gap may constitute a long-term deterrent to primary corporate bond market development is worth examining. This is an idea is yet to receive much research attention, particularly in regions experiencing low bond market growth. This study, therefore, hypothesises that there is no significant long-run relationship between the interest rate structure and primary corporate bond market development. The remaining sections of the paper are structured as follows: next are the literature review, the data and methodology. These are then followed by results, discussion, recommendations and conclusion.

Figure 1. Average Interest rate spread of African Economies relative to regional peers 2001–2015



Source: Authors computation based on World Bank Financial Sector Development Indicator's database (UNTAD, 2014)

Figure 2. Bond Issue in Africa & Middle East in $ Billions, 2001-2015

Source: Authors computation based on Bank for International Settlement (BIS) database

1. Literature review

The theory underlying the relationship between interest rate spread and corporate bond development interconnects with theories of financial liberalization, the 'group interest' theory and financial structure. Mckinnon (1973) and Shaw (1973) made a case against financial repression successfully, which might have inspired the World Bank's pressure for liberalization of financial markets in developing economies, and the spur to achieve growth convergence. The intervention, however, may have resulted in high-interest rate gap regime in most developing economies (Ngugi 2001).

The financial system development debate as necessary catalyst for economic development had however been laid in arguments elicited in Schumpeter (1912), Gurley and Shaw (1955), Goldsmith (1970), Levine (2004), and many more. Each of those papers applied different methods, measurement variables, and techniques but generally concluded that finance spurs growth. On the financial structure, the arguments rest on the structure most desirable: whether bank-based or market-based or a neutral system, were proffered for developing economies. The ensuing reforms may have assisted many emerging economies on the part of relative finance–growth nexus stability. Many African economies currently operate financial structures that are largely bank-based; which is strengthened or weakened by the extent of the quality of legal and governance institutions. In the meanwhile, emerging Europe already has at least two complementary bond markets (Osipov *et al*. 2017).

The contentious debate of the market-based versus bank-based economies took a new turn recently at the instance of want of solution for financial instability following the 2008 global stock market crash and subsequent widespread economic recession. However, despite the enormous impact of the crises in the United States (US), the persistent pre-eminence of the market-based system suggests that the US has "a strong bias that markets work", while to the rest of the world, this position may be a narrow view. The neutral base system otherwise called the "financial functions view" regards financial structure classifications as secondary, as it is more interested in the economy operating an efficient financial system (Merton and Bodie 2004, Levine 2004).

Studies have also argued that in many developing economies, the 'group interest' of financial institutions play a greater role in the implementation of financial policies which must have paved the way for greater dominance of the bank-based system. The 'group interest' theory contends the banks often attempt to dominate the bond issue market by maintaining their dominance in the financial intermediation. The indirect intermediation structure has higher interest rate consequence and higher interest rate spread (see Figure 1) and thus slow industrial development (Olokoyo, Adetiloye and Ikpefan 2016). Bhattacharyay (2011) tests the major determinants of factors that influence the bond market across major Asia economies and finds that bank interest rate spread negatively impacts the market growth in both the government and corporate bond categories.

Certainly, the high rate of financial system's inefficiency contributes to high nominal interest rate, such that the attendant high cost of funds consequently reflects on high price level for goods and services. If, as it has been suggested, that the high cost of loanable funds rate structure which results in the high-interest spread in African economies in the past decade merely reflect their true scarcity, why, however, does the cost of savings not reflecting their true real cost? For instance, in the Nigerian case, Soyibo and Olayiwola (2000) cited in Ojo (2010) it is reflected that aggregate savings propensity merely correlate the real deposit rate, such that both the savings rate and real demand for money do not significantly influence deposit rate. The liquidity of the market is also of serious concern where it has existed much unlike emerging Russia where the financial market liquidity has gone beyond bonds to establish a market in the currency, the rouble (Teplova and Sokolova 2015).

The disadvantage to potential savers has not increased the quantity and quality of investment in Africa, with an attendant dampening effect on output growth (Ojo 2010). It is observed that even at the low saving-investment gap, the economies often witness excess bank liquidity, while high lending gap prevails, which some literature attributes to the prevalence of a mismanaged fiscal system. An equilibrium savings rate is required to prompt scarce capital formation for real investment growth and help to stabilize the financial system. Thus, savings culture needs to be promoted because in situations where savings cannot be effectively mobilised idle funds cannot assume 'life' for productivity (Adegbite 2015). Savings seem to be a key issue in development financing as found out by Babajide, Taiwo and Isibor (2015) where the savings rate is reported to have increased significantly as a result of innovation in products.

2. Theoretical framework

One of the mechanisms that best links the workings of the interest rate to corporate bond issues is the well-known bond price mechanism. In a simple form the mechanism establishes the bond's risk and return (benefits) framework to determine its price, as stated below:

$$\text{Price} = \sum_{t=1}^{n} \frac{C}{(1+r)^t} + \frac{M}{(1+r)^n} \tag{1}$$

where: n = number of years; C = annual coupon payments; r = periodic required rate of return; M = maturity value; t = time period when payment is received.

The fundamental issue is that the price of a bond fluctuates with changes in market interest rate, such that as market interest rate (or market required yield) increases, the present value of its cash flows (the price) declines. This is commonly referred to as interest rate risk or price risk. The risk is inherent irrespective of the initial price that the investor pays for the bond. The bond interest rate risk or price sensitivity also depends on various features of the issue such as the maturity, coupon rate, and embedded options (Fabozzi 2007). However, by convention the

market interest rate and the macroeconomy is asynchronous, hence investing in corporate bonds entails managing the volatility of the market interest rate. In an increasingly globalised world, the behaviour of market interest rate becomes a product of the economy's macro-structure, as it correlates with major domestic and international economic and financial activities.

3. Data and methodology

Data was sourced from the Bank of International Settlement, the World Bank's World Development Indicators (WDI), Worldwide Governance Indicators (WGI), and the Annual Reports of respective African Stock Market Exchanges obtained from the website of African Securities Exchange Association (ASEA) as in 2014. There are fifty-four (54) countries in Africa, but not all the economies have corporate bond market. This study's population comprises the twenty-five (25) countries who are registered members of African Securities Exchange Association (ASEA) as in 2016 (ASEA 2016). Following the dearth of corporate bond market and the omission of observations the study sample is limited to thirteen economies that have corporate bond issues and being traded on their Exchanges as in 2014 (ASEA 2014). The aggregate size of the selected African capital markets is approximately 97.6% of African Stock Market Capitalization as in 2014 (ASEA 2014). The countries are Botswana, Cameroon, Cote d'Ivorie, Egypt, Kenya, Ghana, Mauritius, Morocco, Nigeria, and South Africa and were all obtained from 2005-2014.

The non-bank corporate bond issue is relatively new in African development paradigm (effectively from the current millennium) with South Africa obviously having the most advanced corporate and government debt markets in Africa that have been built in many decades (Mu *et al.* 2013). Being an emerging market, South Africa has a history of the yield curve for more than thirty (30) years (Osase 2007). The market is however dominated by the sovereign issues. The detail of the type and sources of the data adopted are presented in Table 1.

Table 1. Description of Variables, Data Sources with Justification and *a priori* expectation

Variable description	Type/Source	Literature justification	a-proiri
Irs = Interest rate spread	Secondary/ World Bank	Tendulker (2015), Adelegan and Radzewicz-Bak (2009), Bosworth (2014)	<0
Cbi = Corporate bond issued	Secondary/ BIS*/BM**	Tendulker (2015)	>0
Rpi = Real Gdp per capita	Secondary/ World Bank	Akinlo and Owoyemi (2012)	>0
Pdr = Public debt/Gdp ratio	Secondary/World Bank	Bosworth (2014), Akinlo and Owoyemi (2012)	<0
Iqx = Institutions' quality: Regulatory quality, rule of law, governance effectiveness	Secondary/ computed from Worldwide Governance Indicators, 2015 www.govindicators	Ayala *et al.* (2015), Djankor *et al.* (2007)	>0
Svr = Saving rate	Secondary/World Bank	Adelegan and Radzewicz-Bak (2009)	>0
Sbi = Sovereign bond issue	Secondary/ BIS*/BM**	Tendulkar (2015)	>0

Source: Compiled by authors: * BIS: Bank for International Settlement; **BM: Bond Markets from Annual Reports of sampled countries who are members of African Securities and Exchange Association

The empirical method of study is the fully modified ordinary least square (FMOLS) of Pedroni (2000) in autoregressive distributive lag (ARDL) framework. The study obtained the short run residual of the series and incorporated into the ARDL framework, to produce an augmented error correction linked ARDL. The ARDL specification with defined lag polynomial is within the VAR model family. The ARDL was developed by Henry, Pagan and Sargan (1984), and further popularized by Pesaran and Shin (1999) and Pesaran *et al.* (2001). Stated below is a modified Maddala and Kim (1998) generalized version of panel ARDL with p regressors m lags in y, and n lags in each p regressors denoted as ADL ($m, n; p$):

$$y_{it} = \phi_0 + \sum_{k=1}^{m} \alpha_k y_{it-k} + \sum_{j=1}^{p} \sum_{k=0}^{n} \beta_{jk} x_{jit-k} + \varepsilon_{it} \quad (2)$$

It is assumed that ε_{it} iid $(0, \sigma^2)$, a white noise process, and that the impact multiplier decreases in successive periods if $|\alpha_i| < 1$, and additionally by including sufficient lags of the dependent and explanatory variables, the serial correlation in the error term can be eliminated (Hill, Griffiths, and Lim 2011). Moreover, there is a theoretical connection between the ARDL and ECM. We modify in simplified panel form Verbeek (2004) as follows:

$$Y_{it} = \delta + \phi Y_{it-1} + \gamma_0 X_{it} + \gamma_1 X_{it-1} + \varepsilon_{it} \tag{3}$$

From 3, the long-run equilibrium relationship between *Y* and *X* can result by subtracting Y_{t-1} from both side and following transformation process, an ECM representation model could be formed as follows:

$$\Delta Y_{it} = \delta - (1-\phi) Y_{it-1} + \gamma_0 \Delta X_{it} + (\gamma_0 + \gamma_1) X_{it-1} + \varepsilon_{it}$$

or

$$\Delta Y_{it} = \phi_0 \Delta X_{it} - (1-\phi)[Y_{it-1} - \alpha - \beta X_{it-1}] + \varepsilon_{it} \tag{4}$$

where: α and β are the long run equilibrium multipliers of a unit change in *Xt*.

It connotes that the change in *Yt* responds to a current change in *Xt* plus an error correction term, and *(1-ϕ)* is the parameter that determines the speed of adjustment, the current error in achieving long run equilibrium. In this study, the ECM is extracted from the fully modified ordinary least square (FMOLS), in an autoregressive distributive lag model (ARDL) or Bound testing framework. Thus, the superiority of the ECM over the VAR is that apart from the long run equilibrium relationship, as part of explanatory variables, the past disequilibrium is introduced in a dynamic along with other current variables (Granger and Weiss 1983, Maddala and Kim 1998)

3.1. Model specification

In implicit form, the corporate bond issue (*Cbi*) is expected to be influenced by interest rate spread (*Irs*), sovereign bond issue (Sbi), gross saving rate (*Svr*), public debt stock (*Pdr*), institutional governance (*Iqx*), and real per capita income (*Rpi*), as follows:

CBI=f(Irs, Sbi, Svr, Pdr, Iqx, Rpi) (5)

The specification is presented explicitly below:

$$\Delta Cbi_{it} = \alpha_0 + \beta_1 \Delta Irs_{it} + \beta_2 \Delta Sbi_{it} + \beta_3 \Delta Svr_{it} + \beta_4 \Delta Pdr_{it} + \beta_5 \Delta Iqx_{it} + \beta_6 \Delta Rpi_{it} + \varepsilon_{it} \tag{6}$$

more formally, including the ECM term:

$$\Delta Cbi_{it} = \beta_0 + \sum_{j=1}^{P} \theta_{ij} \Delta Cbi_{it-j} + \sum_{j=1}^{P} \delta_{ij} \Delta Irs_{1t-j} + \sum_{j=1}^{P} \varphi_{ij} \Delta Sbi_{2t-j} + \ldots + \xi z_{t-1} + \varepsilon_{it} \tag{7}$$

It is assumed that ε_{it} iid $(0, \sigma^2)$, is the white noise process, while z_{t-1} is the ECM term.

3.2. Summary statistics

Presented in Table 3 below is the summary statistics. Corporate bond issue (*Cbi*) has the highest issue of \$4.5173bn in Botswana in 2008, while the lowest issue of \$0.2623bn was made in South Africa and Tunisia between 2004 and 2012 respectively. Interest rate spread (*Irs*) has the highest value recorded in Mauritius in 2005 with 13.8 percent, while the lowest spread also occurred in Mauritius with 0.5% in 2010. The highest institutional regulatory quality index (*Iqx*) value of 0.96 was achieved in Mauritius in 2012, while Nigeria achieved the lowest value of -1.63

in 2004. The real per capita income (*Rpi*) has the highest value of $7,328.5 in Morocco in 2012, while the lowest value of $11.5 was achieved by Ghana in 2006. Furthermore, Public debt ratio to GDP (*Pdr)* has its highest at 89 percent in Egypt in 2013 while Nigeria recorded the least value of 7.45% in 2008, and savings ratio to GDP has the highest value of 48% in Botswana in 2007, while the lowest is 9% in Ghana in 2008.

Table 2. Summary statistics table

	CBI	IRS	PDR	IQX	RPI	SBI	SVR
Mean	-0.1125	0.0457	0.3844	-0.2013	994.67	0.3034	0.2008
Maximum	8.3000	0.1380	0.8903	0.9600	7328.5	5.8795	0.4800
Minimum	0.1000	0.0500	0.0745	-1.6300	11.500	-2.3025	0.0900
Jarque-Bera	10.092	4.1003	2.0565	4.9791	456.03	630.29	24.430
Probability	0.0064	0.1287	0.3576	0.0829	0.0000	0.0000	0.0000
Observation	94	94	94	94	94	94	94

Sources: Computed by authors using E-view 9

3.3. Correlation analysis

Correlation study establishes the preliminary course of associations among variables. Table 3 suggests that corporate bond issue (*Cbi)* is positively associated with interest rate spread (*Irs*), sovereign bond issue *(Sbi*), savings rate (*Sv*r) and Institutional quality index (Iqx), but negatively related to public debt ratio (Pdr) and real per capital income (*Rpi*). Interestingly, the sovereign bond issue (*Sbi)* is positively associated with interest rate spread *(Irs*) but at a less value unlike the *Cb*i. Thus, while the association between the *Cbi* and *Irs* is 17%, that of *Sbi* and *Irs* is 15% among the economies of study.

Public debt ratio *(Pdr*) has 31% negative link with the *Cbi*, which suggests that increases in bond debt could be increasingly detrimental to corporate bond development in the African economies. The *Pdr* is also negatively linked with a sovereign bond issue (*Sbi*) with 25%, which could also suggest that increase in public debts ratio does not encourage *Sbi*. However, the negative 16% link between *Pdr* and interest rate spread (*Irs*) counters the public finance and monetary theory thoughts that increase in public debt is a potential source of high-interest rate in many developing economies.

Largely, the high valued 41% and 42% positive association between sovereign bond issue (Sbi) and Saving rate (*Svr*) to corporate bond issue (*Cbi*) respectively generally underscore the corporate bond development theory. Institutional quality (Iqx) is about 27% and 39% positively linked with *Cbi* and *Rpi* respectively. This result indicates the quality institution required in the development of corporate bond and improvement of living standards among African economies.

Table 3. Correlation analysis

	CBI	IRS	SBI	SVR	PDR	IQX	RPI
CBI	1.000000						
IRS	0.173081	1.000000					
SBI	0.412965	0.152935	1.000000				
SVR	0.427636	0.146055	0.420679	1.000000			
PDR	-0.312445	-0.165108	-0.25532	-0.206816	1.000000		
IQX	0.268929	0.067609	0.125014	0.200858	0.075965	1.000000	
RPI	-0.06638	-0.344915	0.049711	0.094585	0.189833	0.390583	1.000000

Source: As Computed by authors

3.4. The short and long run dynamic effects

The regression result presented in Table 8 below provides for the hypothesis's parametric short and long run regressions. The regression is addressed with the use of an augmented autoregressive distributed lag (ARDL) (that is, of order *p*+*m*) estimation technique, where *p* is optimal lag length and *m* is the highest integration order. The result is presented in Table 6 below. The short run dynamics interaction is rightly signed by the negative error correction mechanism (ECM), and it is significant at 1%. This result reveals that the explanatory variables jointly

influence the dependent variable, and the annual speed of adjustment to long-run equilibrium is about 100%. The ECM result of 101% suggests two outcomes. First, it affirms the underlying economic theory of the explanatory variables included in the model and secondly, it affirms the long-run equilibrium relationship among the variables (Kennedy 2008). The long run results are addressed through individual explanatory variables. The long run development of the corporate bond market is significantly determined by the immediate part history of the corporate bond market by 93%, while the lag 2-period result is negative with 7%, however insignificantly.

Additionally, interest rate spread (*Irs*) in line with *a priori* negatively influences corporate bond issues in the region, which implies that a one percent increase in interest rate spread would reduce corporate bond issue by about 168% and 50% for lags 1 and 2 respectively. This result allies with the findings of Tendulkar (2015). Tendulkar (2015) adopts correlation analysis and panel fixed regression technique to study interest rate spread (Irs) and corporate bond market in 62 developed and emerging economies between 2004-2013, with an outcome that interest rate spread negatively affects the bond market development. However, perhaps due to data limitation the outcomes are insignificant. Other complementary outcomes from the relationship meet *apriori* requirements, such that a one period lag saving rate (*Svr*) and institutional quality (*Iqx*) positively affect immediate corporate bond issue (*Cbi*) in the region by 273% and 77% respectively.

The outcome of the diagnostic results by the significance of the *F*-statistics and Chi-square statistics at 1 percent reasonably suggest that the explanatory variables determine the dependent variable. The R^2 is 58%, which suggests that the model is fitted. The overall Wald test for the multivariate variables by the *F*-statistics and Chi-square statistics produce significant outcomes at 1%. The outcome of the diagnostic tests results-serial correlation, model stability, cross-section serial correlation, and residual normality tests are presented below.

Table 4. FMOLS RESIDUAL BASED ECM-ARDL: Short & Long-run results

Dependent Variable CBI				
Explanatory Variables	Coefficient	Std. error	t stat.	p value
ECM(-1)	-1.0094	0.3286	-3.0717	0.0036*
IRS(-1)	-1.6718	7.6005	-0.2199	0.8269
CBI(-1)	0.9366	0.2982	3.1409	0.0029*
SVR(-1)	2.7318	3.8138	0.7162	0.4774
PDR(-1)	9.5678	3.6822	2.5983	0.0125*
IQX(-1)	0.7732	1.2758	0.606	0.5414
RPI(-1)	-0.0003	0.0002	-2.0543	0.0457**
IRS(-2)	-0.5	7.5451	-0.0662	0.9474
CBI(-2)	-0.0775	0.1544	-0.502	0.618
SVR(-2)	-1.6071	3.0209	-0.5319	0.5973
PVR(-2)	-9.2058	3.5764	-2.574	0.0133*
IQX(-2)	-0.8328	1.2785	-0.6514	0.518
RPI(-2)	0.0002	0.0002	0.9411	0.3516
F. Stat.	4.52078		0.0011*	
X Stat	17.12468		0.0001*	
Diagnostics				
R^2	0.5846			

Source: Computed by authors. * &** denote significance at 1% and 5% respectively

3.5. Diagnostics tests

3.5.1. Serial Correlation LM test

The Serial correlation LM test presented below in Table 7 suggests that the study fails to reject the hypothesis that there is no serial correlation among the series, given 49 degrees of freedom, thus concluding that there is no serial correlation among the residuals.

Table 5. Serial Correlation Test

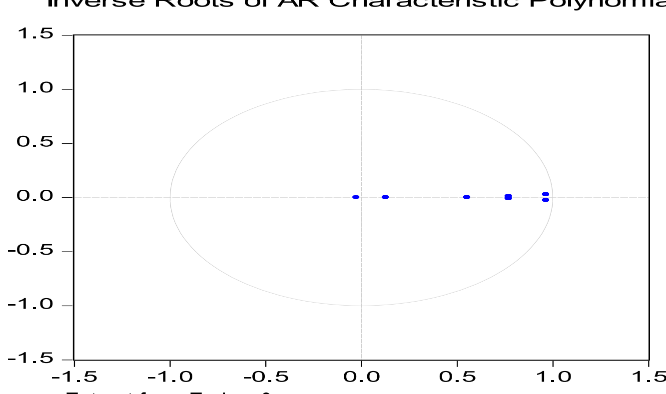
Lag	*LM-Stat.*	χ^2 D.F	*Probability*
1	58.31717	49	0.1701

Source: Computed by authors using E-view 9

3.5.2 Model stability test

This test examines whether the model is stable. In Figure 3 below evidence of the locations of the unit root within the unit root circle indicates that the study fails to reject the hypothesis that the model is stable overtime.

Figure 3. Inverse Roots of AR Characteristic Polynomial



Source: Extract from E-view 9

3.5.3. Residual test for cross section serial correlation

The four residual cross-section dependency (correlation) tests whose results are presented in Table 11 below suggests the absence of a serial correlation across the cross sectional unit, as the probability value is above 5%. Since the null hypothesis test shows 'no cross-sectional dependency (correlation)', the study then fails to reject the null hypothesis that the cross sections are independent.

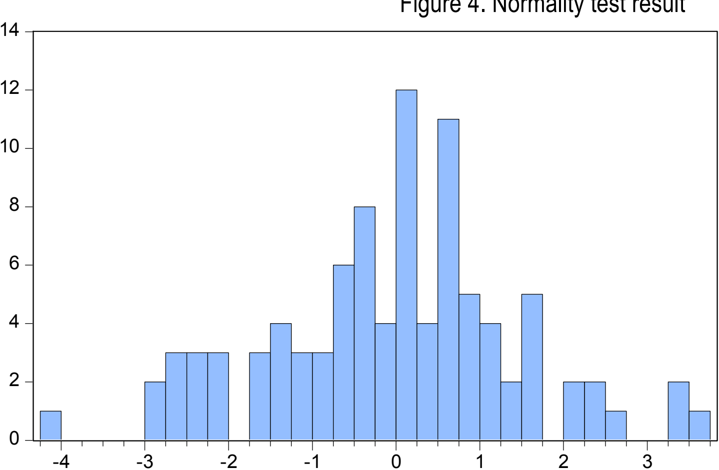
Table 6. Cross-section serial correlation

Test	statistics	*d.f.*	*p*.value
Breusch-Pagan LM	43.15326	36	0.1921
Pesaran scaled LM	-0.217641		0.8277
Bias-corrected scaled LM	-0.780141		0.4353
Pesaran CD	0.226660		0.8207

Source. Computed by authors using E-view 9

3.5.4. Test for Normality of Residual

Figure 4. Normality test result



Series: Standardized Residuals
Sample 2004 2013
Observations 94

Mean	-0.026652
Median	0.051750
Maximum	3.583921
Minimum	-4.179309
Std. Dev.	1.483267
Skewness	-0.102127
Kurtosis	3.210768
Jarque-Bera	0.337393
Probability	0.844765

4. Discussion

The hypothesis's result suggests a 167% negative influence of interest rate spread on a corporate bond issue. This analysis requires examination of potential developments that may arise from rising nominal interest rate. Given relative high inflation rate, often in two digits in the African region, rising nominal interest benefits the bank, as it increases the lending-deposit rate spread (profit), and infers an increase on issuing cost of bonds. When the margin is low however, banks would not have an appetite to produce loans for non-finance corporations (NFC), thereby improving patronage of the corporate debt issue market.

High-interest rate spread in bank based economies may not be unconnected with the inherent challenge of access to corporate information. It suffices that in developed economies, the capital market treat matters of corporate information as a public good. There is need to improve on the level of information and its quality on market participants. A general characteristic of developing market economies credit markets is that, investors and other market participants' merely free-rides on matters of corporate information (Stiglitz 1988). In line with the growth of efficient market economies are the instantaneous response needed from participants.

A high interest spread regime promotes the oligopoly market structure of the banks and frustrates the competitiveness of the financial institutions. A low nominal lending rate would stimulate the investors' appetite in the bond market where general price of issues is strictly under control, as it is market determined; that is, a-once–and-for-all issue price. This study finds support from Bosworth (2014) that there exists a weak relationship between interest rate and economic growth in G7 and 19 OECD countries from 1970-2012. In fact, despite the growth in support of finance led growth debate, several studies on African economies conclude that the financial system is maladapted and cannot promoted real growth (Ojo 2010).

The bond market can, therefore, malfunction in an atmosphere of increasing inflation, which exacerbates interest rate spread (Tendulkar 2015, Rose and Spiegel 2015). The result from this study is consistent with Tendulkar (2015) and Bhattacharyay (2011). Tendulkar (2015) finds that interest rate spread has negative impact on international bond market development under the markets size, depth and activity categories but positive to market activity in the domestic market category. It remains that for inflation-target regimes, the bond market could be an appropriate strategy to control increases in inflation and moderate high-interest rate spread in the money market.

Additionally, that there is a positive impact of savings rate on corporate bond issue market in these markets is supported by the work of Adelegan and Radzewick-Bak (2009). In the supply leading hypothesis, saving-investment-output nexus is positively linked. Savings rate need to be attractive to improve savings behaviour of the people and institutions and need to attract scarce capital towards the primary bond market growth.

The regression result also finds that regulatory institutional quality positively influences corporate bond issue. Financial regulation should generally govern commercial behaviour in the financial system. As social rules are needed to reconcile the conflicting interests of members of the social system, also commercial rules are to reconcile the conflicting interests of participants in the commercial system (Carmichael and Pomerleano 2002).

Recommendations and conclusions

The foregoing results suggest the need to recommend the following for African economies against interest rate spread and lagging corporate bond market development. First, the bank lending dominance in the credit market needs to be managed downwards. Interest rate spread would be reduced by policies that would help to provide competitiveness in the financial market and secure the potential creditors. Government Treasury bill rates need to be reduced to bring the bank lending rate downward with concurrent impact on spread. Additionally, since information asymmetry is a major constraint for growing market-based economies, regulations that would make corporate information a public good and reforms that would promote access to a credit bureau and credit registrar should be pursued. Secondly, the banking industry in African economies operates in oligopolistic market structure, which would have contributed to high lending rate and interest margins, due to low competitiveness. African governments should improve the level of competitiveness by granting more banking licenses. A model of banking behaviour indicates that in oligopolistic bank market structures a rise in the bill rate raises the loan rate (Matthews and Thompson 2014). Thirdly, there is need to provide a fiscal incentive to non-finance corporations (NFC) to accommodate bond funding in their corporate finance restructuring decisions.

Fourthly, the savings rate, habit, and behaviour can be improved upon by government's tax concessions. Many factors influence savings, however, the desire to save in order to improve investment in the corporate bond can be better addressed through higher income for the personal and corporate individuals and managed inflation rate policies. A two digits' inflation rate common with African economies discourages savings habit and behaviour, as savings has complimentary relations witc consumption. Moreover, since many households only engage in 'precautionary savings', a government needs to improve the level of economic certainty in the region. Government fiscal and monetary policies should be holistic to improve disposable income and provide cheap living conditions.

Fifthly, the importance of institutional regulatory quality index is stressed in the regression result for a corporate bond market. Economic theory suggests that financial systems adopt rules and regulations meant to promote economic efficiency; safeguard the system against systemic risk; protect consumers against opportunistic behaviour by suppliers of financial services; and achieve a range of social objectives (Herring and Santomero 1999). The nature of the risks and the special role the financial institutions play in the financial system makes them to be singled out for special regulatory attention. The "specialness" of their role in the economy is attested to in the nature of financial services. To improve the competitiveness, innovation and efficiency in the corporate bond market, the apex and self-regulatory institutions must ensure that rules are strictly applied and be dynamic. The quality regulatory regime is anecdotal to investors' confidence.

The institutional regulatory outcome ties with the fifth recommendation since the auto- regression's outcome reveal corporate bond issue market positively correlating with past performance. For the market to improve upon its past, associated institutions need to improve on their qualities. Capital market institutions develop on the strength of effective rule of law, effective governance and regulations.

This paper has examined the co-integrating relationship between interest rate spread and corporate bond market, while also testing the 'group interest' theory of financial intermediation. A common characteristic of many African bank-based economies is the prevalence of high-interest rate spread, which this study argues as correlating with a low development of corporate bond issues. The banking institutions dominate the corporate bond issue market in the region and hence produce loans at high rates to long-term fund seekers, who hitherto, would have approached the long term market. The financial mismatch syndrome has consequences in financial instability. The study, in a context of thirteen African economies, used fully modified ordinary least square (FMOLS) in an autoregressive distributive lag (ARDL) framework. Our result provides evidence that corporate bond issue, as a proxy for financial development is negatively influenced by interest rate margin in the short and long terms. The result supports the postulation of the 'group interest' theory, that a bank-based financial system may be

uncompetitive, hence a deterrent to financial development in the respective economies. The ECM coefficient significantly satisfies the *apriori* expectation which implies long run equilibrium from the annual speed of adjustment.

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ISSN 2393 – 5162 ISSN - L 1843-6110