CAUSAL BEHAVIOUR OF REIT DIVIDEND RETURN UNDER ASYMMETRIC MARKET INFORMATION: EVIDENCE FROM SA REIT MARKET

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Abstract

Purpose: With a focus on the South African REIT market, this study examined the behavioural pattern of REIT dividend returns and establishes a causal linkage between information asymmetry indicators and REIT dividend return behaviour.

Design/Methodology/Approach- The daily returns on twelve (12) quoted SA REIT firms, and daily data on market information asymmetry indicators such as ask-bid price, trade volume, number of shares listed, volatility index, weighted value average price and market capitalization from the year 2007-2017, extracted from IRESS Expert database were used. The average of the data was calculated and used as a proxy for market data such as market REIT dividend return, market spread, market turnover market volatility index, market value-weighted average price and market capitalization. The study conducted a unit root and co-integration test, while the vector error correction model (VECM) was deployed to analyze the causal behaviour of REIT dividend returns under the asymmetric market information.

Finding: For the reviewed period (2007-2017), SA market REIT has a negative average return (-0.0312), skewed negatively (-6.2136) and exhibited gentle fluctuations, with higher degrees recorded in trading days of 2013, attributed to a transition period of the SA property stock to REIT regime. Also, the SA REIT dividend return behaves in a similar manner and responds sharply to shock in the market spread. Co-integration relationships exist among the exogenous variables, and market spread exhibited a significant causal effect ($p<.05$) with REIT dividend returns dynamics in both short and long-run relationships.

Practical implications: The study provides insight into the behaviour of REIT dividend return in an asymmetric information market condition of the South African property stock market.

Originality/Value: The study provides useful information on information asymmetry indicators that explains South Africa REIT dividend return behavior. Additionally, this is the first study to investigate REIT dividend returns behavior under the asymmetric market information using the South African REITs context

***Keywords**: REIT, Dividend Return, Information Asymmetry, Causal Behaviour*

1.0. Introduction

Information on stock dynamics stimulates the reactions of market participants to trading activities such as choice of stock to buy, sell and hold, price, return on investment and volume of stock traded (Ajina, et al., 2015). By implication, information transparency and the levels of its free flow are essential not only to the market and stock performance but also critical to market analysts and fund managers for informed decision making. The dynamics of market information on stock are attributed to changes in the economy, policy, regulations, and underlying factors characterized by the stock industry and company-specific indexes. While information transparency is key to informed decision making in the stock market, Anim-Odame (2022) posited that the African real estate market is less transparent and yet to be fully matured. Whereas Sahin, et al. (2020) stressed that information on REIT announcements and RIET spread is essential for fund managers in the implementation of their investment policy.

The stock market is said to experience transparent trading activities when the market participants, the buyers and the sellers enjoy good access to and have a fair knowledge of the stock market information. In a case of an information mismatch, the stock trading activities are said to be carried out under information asymmetry, implying a knowledge gap between the sellers and the buyers or the informed and uninformed investors (Naqvi et al., 2021). The situation creates a frightening trading environment and distorts the stock market from attaining its equilibrium position. Asem, et al (2022) posited that more available information on dividend changes encourage institutional investors to trade more, and this has given REIT vehicle an edge due to their transparent nature. Whereas, evidence of information asymmetry in the REIT market has been reported in the literature (Devos, et al. 2019; Feng, 2021), its causal effects vary from one local stock market to another. The difference is linked to the peculiar attributes of each local REIT market, considering their level of market maturity, therefore informing the need to evaluate the similar situations in the South African REIT market.

The choice of the South African REIT market cannot be disconnected from the leading role the REIT market plays in the continent REIT industry and global REIT market space (Ijasan, et al 2021). The SA REIT market remains the major active property stock market and has a market capitalization worth US$30 billion in 2018. Also, the SA REITs market is the only quoted African REIT market on the FTSE EPRA NAREIT global indexes. As of August 2020, SA REIT was ranked 21st position and contributes about 0.30% to the global REIT market index (Akinsomi, 2022). The statistics show the sophisticated nature and the enormous volume of stock traded by the local and international investors in the market. Therefore the need for investors to have useful information on REIT return behaviour in a fast-emerging REIT market in an asymmetry information market condition and the predictive causal factors is essential for informed investment decision making and serving as guidance for developing a sustainable strategic investment plan by investment analysts, fund managers, regulators and policymakers in the REIT industry.

2.0. Literature Review

Many factors are responsible for REIT return behaviour; such as volatility, asset growth, financial leverage, economic factors, investor sentiment and more (Dogan, et al., 2019; Letdin, et al., 2019; Nti, et al., 2021; Song & Zhan, 2022). For instance, Dogan, et al. (2019) investigate determinants of REIT capital structure in twelve (12) countries including South Africa. The authors reported that financial leverage plays a significant role in determining REIT payout power. Song & Zhan (2022) assess the interactions among REIT return, stock return and option price implied information behaviour. The study discovered that REITs are more transparent and price-efficient but less liquid than stocks. The authors posited that REIT return behaviour is strongly explained by changes in option implied volatilities. Meanwhile, in an attempt to explain REIT return behaviour, Letdin, et al., (2019) extensively review empirical relevant literature and concluded that predictive information on volatility, valuation, asset growth, financial leverage and investor sentiment are useful for investors for policy implementation

Another prominent factor that is generating academic research interest in literature is information asymmetry (Ajina, et al., 2015; Devos, et al. 2019; Sahin, et al., 2020; Feng, 2021). The increasing interest in appraising the causal linkage among REIT return, dynamics of market information announcement and its driven factors such as market spread, volatility, turnover, and REIT size (market cap.) among others, is attributable to their predictive power to explain how returns of REIT behave under the fast-changing pattern of information dissemination and diffusion, especially in the emerging REIT market (Nti, et ai., 2021). Therefore the debate on issues concerning information asymmetry in the stock market and by extension in the REIT industry will continue to receive research attention because of the level of adverse effects an information mismatch can have on the performance of the stock market which varies from one country to another, reason attributed to uniqueness characterized by local stock market across the globe.

From the parlance of the empirical literature on REIT markets, the trending debates on information asymmetry and REIT return dynamics are mixed, with varying results across the globe. For instance, Feng (2021) tries to answer whether information asymmetry affects REIT investment behaviour in the US stock market. The study assesses the information disclosure of REIT firms and found that while REIT firms characterized by high-information-asymmetry are less active, low-level information asymmetric REIT firms have higher growth of real estate investment. The author further ascertained that information asymmetry has a positive relationship with capital costs and is negatively related to operational performance. Whereas, a study by Devos, et al. (2019) attempts to know whether the transparent nature of REITs, which implies a low level of information asymmetry can be sustained when REIT stocks are exposed to the capital market. The study discovers that REITs increase their information disclosure when they assess the capital market, thereby lowering their level of information asymmetry. Also, the authors established interactions among REIT size, ask-bid spread and turnover. Similarly, Asem, et al. (2022) study tries to know whether institutional investors are well informed about the changes in REITs dividends. The authors reported that the investors are relatively more informed about the events by REITs than industrial firm, the reason attributed to its transparent nature. However, the findings are unique to the local REIT market, and thus cannot be generalized to other REIT markets.

Whereas, such study is a dearth in the African REIT market because of some challenges attributed to the level of maturity, transparency and data availability challenged characterized by developing economy in general and the emerging REIT market in particular (Anim-Odame, 2022). Notwithstanding, empirical evidence has shown a co-movement of the Africa REIT market with regional and global markets (Boako & Alagidede, 2017). Specifically, a recent study conducted by Ijasan, et al. (2021) evidenced the integration of South Africa REIT (SA REIT) into the major global real estate market, which spans Europe, Asia and North America. The author reveals that, although the pattern of integration is unique, non-uniform, and largely depends on the local geographical attributes, generally, SA REIT exhibited diverse directional linkages with low levels of coherencies, indicating diversification gains. This suggests the global relevance of the SA REITs market, thereby necessitating the need to have useful information on the dynamics of REIT return behaviour and its associated causal linkages under asymmetric market information for informed decision making and policy implication.

3.0. Research Method

3.1 Data Description and Sources

The study used secondary data, extracted from IRESS Expert database from the year 2007 to 2017. A total of twelve (12) REIT firms having consistent data publication spans over the reviewed period were considered. The sample data were dividend yield and the information asymmetric market indicators namely ask-bid price, trade volume, No. of shares listed, volatility index, weighted value average price and market capitalization of SA REIT market. The average value of the variables was estimated and used as a proxy for REIT market data such as market REIT dividend return (MRDR), market spread (MSPD), market turnover (MTNV), the market volatility index (MVIX), the market value-weighted average price (MWAP) and market capitalization (MCAP). Meanwhile, some variables such as volatility index, weighted value average price and market capitalization were extracted directly and estimated (average) for market data. Other variables such as dividend return, bid-ask spread, and turnover ratio were derived data. The mathematical equations of the dividend return (*Eqn.1*), bid-ask spread (*Eqn.2*) and the turnover (*Eqn. 3*) are expressed as thus:

$$Dividend\ Return\ (DR) = \left(\frac{DY_t - DY_0}{DY_0}\right) * 100 \quad \text{-----------------------} \textit{Eqn. 1}$$

Where $\boldsymbol{DY_t}$ is the REIT dividend yield of the current trading day (***t***) and the $\boldsymbol{DY_0}$ is the REIT dividend yield of the previous trading day. The dividend return was calculated for all the REIT stocks considered, and the average for the REIT stock was estimated and used as a proxy for market REIT dividend return (MRDR).

$$Spread = \frac{Bid - Ask}{\left[{(Bid+Ask)}/{2}\right]} \qquad \text{--------------------------------} \textit{Eqn. 2}$$

The ***Bid*** is the open price and the ***Ask*** is the close price of the trading day for the reviewed period (2007-2017). The estimated average spread is calculated and used as a proxy for the daily market spread (MSPD). The higher the spread value, the higher the market information asymmetry.

$$Turnover = \frac{Volume}{No.of\ Shares} \qquad \text{-----------------------------------}Eqn.\ 3$$

The *volume* connotes a total number of daily REIT shares traded (bought and sold), while *No. of shares refers* to REIT shares that have been issued to investors or are available for purchase. Turnover rate primarily measures liquidity, the higher the turnover, the more liquid the REIT stock. The REITs market data and their corresponding acronym is presented in Table 1.

Table 1: REIT Stocks and Acronym

REIT Market Data	Acronym
Market REIT Dividend Yield	MRDR
Market Spread	MSPD
Market Turnover	MTNV
Market Volatility Index	MVIX
Market Value Weighted Average Price	MWAP
Market Capitalization	MCAP

3.2 Descriptive Statistics

The study used descriptive statistical tools such as mean, standard deviation and skewness to analyse the market REIT data. The *mean statistics* give the average estimate, *standard deviation* measures the risk level and *skewness* indicates the lop-sidedness of the series data over the reviewed period. In addition to this, the data series was transformed into a log form and used for time series graph analysis. The transformation to log form helps to stabilise variance in the series and reduces data variability.

3.3 Test for Unit Root and Optimal Lag Length

The quality of the causality model and the reliability of its predictive power is hinged on whether the time series data is stationary or not. When time-series data is non-stationary, it signals the presence of unit root and is not good for causality models. Therefore good time-series data for causality models must be stationary in the absence of a unit root. Thus, to ascertain the status of the data, the study conducted two different unit root tests, *Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP)* tests. The two tests were conducted to ascertain the unit root attribute of the data, using *the Schwarz information criterion (SIC)* and *Trend and Intercept* criteria for the model specification. Also, to enhance the reliability of the causality model, the study conducted a *VAR Lag Order Selection Criteria* for choosing the appropriate lag length order (optimal lag) given the size of the time-series data

3.4 Co-integration Test

Co-integration test helps to establish relationship dynamics among the exogenous variables and the appropriate model to use in a causality analysis. In a VAR environment, when there is a case(s) of co-integration among the exogenous variables (long-run relationship), the appropriate model to use is Vector Error Correction Model (VECM). In other case(s) of no co-integration, a Basic VAR model is deployed. However, the study used the Johansen Co-integration test which comprises *Trace and Maximum Eigenvalue Rank* Tests. The two test results complement each other to ascertain the dynamics of the relationship among the exogenous variables. The mathematical equations for Johannes Co-integration's Trace *(Eqn. 4)* and the Maximum Eigenvalue *(Eqn. 5)* rank tests in a VAR environment are expressed as follows:

Trace Rank Test (LR_{tr})

$$LR_{tr}(r/k) = -T \sum_{i=r+1}^{k} log\,(1-\delta_i) \quad \text{-------------- } Eqn.\ 4$$

Where ***r*** is the null hypothesis of *Trace Statistics* and shows no co-integrating relations against the alternative of ***k***. $\boldsymbol{\delta_i}$ is the ***i-th*** largest eigenvalue of the analysis.

Maximum Eigenvalue Rank Test (LR_{max})

$$LR_{max}(r/r+k) = -T\ Log(1-\delta_{r+1}) = LR_{tr}(r/k) - LR_{tr}(r+1/k)\ .Eqn.\ .5$$

Where the null hypothesis of ***r*** shows no co-integrating relations against the alternative of ***r+1*** However, the null hypothesis (***r***) of no co-integrating relations is rejected in favour of the alternative relations (***k)*** if the p-value is less than 5% level of confidence ($p<0.05$)

3.5 Vector Error Correction Model (VECM) Granger Causality

When there is evidence of a co-integration relationship among exogenous variables, which indicates a long-run relationship, the appropriate causality model to use is the Vector Error Correction Model (VECM). The VECM is a restricted VAR model with co-integration restrictions built into the specification. The model performs two major functions. First, it examines the long- and short-run dynamics of the co-integrated series and second, it restricts the long-run behaviour of endogenous variables to converge to their co-integration relationships refers to short-run structural adjustment (Leonard, Humayun, Haiyue & Yunjie 2020). However, the cointegrating term is known as Error Correction Term (ECT). In a good causality model, the ECT is expected to be negative and has a statistically significant p-value ($p<0.05$) in a short run structural adjustment model. Conventional VECM in a VAR is expressed as in Eqn. 6

$$\Delta Y_t = \sigma + \sum_{i=1}^{k-1} \gamma_i \Delta Y_{t-i} + \sum_{j=1}^{k-1} \pi_j \Delta X_{t-j} + \sum_{m=1}^{k-1} \theta_m \Delta R_{t-m} + ECT_{t-1} + \mu_t \quad \text{-----}\textit{Eqn. 6}$$

Where the explained (dependent) variable ($\Delta \boldsymbol{Y_t}$) is the market RIET dividend return (MRDR). The changes in the MRDR in the model are explained by the changes in the exogenous (independent) variables (Y, X, R). In this study, the exogenous variables are the market spread (MSPD), market turnover, (MTNV), the market volatility index (MVIX), the market value-weighted average price (MWAP) and market capitalization (MCAP). The short-run dynamic of the model's adjustment to co-integrating relations (long-run equilibrium) is measured by $\gamma_i, \pi_j$and θ_m for the corresponding exogenous variable (Y, X, R). The model is differenced at I(1), therefore the lag length is reduced by one ($k-1$) across the model, and also at optimal lag ($t-i, t-j, t-m$) of the regressor. ECT_{t-1} is the error correction term lag (residue from dependent variable) at I(1) and contains long-run information derived from the long-run co-integration relationships. μ_t is the stochastic error term referred to as impulse and measures the response of the dependent variable (MRDR) to shock from the regressor. Thus, the VECM equation can be re-write to reflect the terminologies of the study as in Eqn 7:

$$\Delta \mathrm{MRDR}_t = \sigma + \sum_{i=1}^{k-1} \gamma_i \Delta \mathrm{MRDR}_{t-i} + \sum_{j=1}^{k-1} \pi_j \Delta \mathrm{MSPD}_{t-j} + \sum_{m=1}^{k-1} \theta_m \Delta \mathrm{MTNV}_{t-m} +$$

$$\sum_{n=1}^{k-1} \rho_n \Delta \mathrm{MVIX}_{t-n} + \sum_{r=1}^{k-1} \omega_r \Delta \mathrm{MWAP}_{t-r} + \sum_{u=1}^{k-1} \phi_u \Delta \mathrm{MCAP}_{t-u} + ECT_{t-1} + \mu_t \quad \text{---}\textit{Eqn. 7}$$

Limitation to the findings of the study

The period covered by the study (2007 to 2017) is a limitation as it indicates a 5-year gap (2018 to present). While it is accepted that a more recent data set would have been more insightful, nevertheless, the 5-year gap may not have significantly influenced the findings. Perhaps, this may form the subject of another study.

4.0. Result and Discussion

Descriptive Statistics

In Table 2, the SA REIT market return is negative (-0.0312), characterized by risk level (3.9958), and negatively skewed (-6.21136). The result implies that the dividend return of the REIT market declines over the reviewed period. The observed negative skewness signals the asymmetric (non-normal) distribution pattern, meaning that the mean dividend payout is less than the median return. The result aligns with the findings of Ijasan, et al.(2021) study. The study had analyzed the performance of global REIT market return including the SA REIT market, from 2013 to 2018. The authors reported a negative mean and skewness for the SA REIT market over the study period.

The market bid-ask spread has a negative mean and skewness value of -0.2039 and -9.6053 respectively. The result reflects the depth and wide of bid-ask spread in the SA REIT market, indicating the presence of information asymmetry. This suggests that more investors prefer a limit to the market price. This is because the majority of the investors buy at a price above the limit order price (Ask>Bid price). The result is attributed to the liquidity preference of the REIT stock and investor confidence in the REIT market. Moreover, other information asymmetry market indicators such as turnover, volatility, weighted average price and REIT size (market cap.) have their respective mean value higher than the median value (mean>skew), indicating that the larger value recorded for the indicators exceeded their median value.

Table 2: Descriptive Market Analysis

Variables	Mean	Std. Dev.	Skew	Min.	Max	No. of Obv.
MRDR	-0.0312	3.9958	-6.2136	-79.0640	55.4791	2749
MSPD	-0.2039	1.5343	-9.6053	-18.9238	3.2143	2749
MTNV	21.4628	35.9712	11.9613	0.0178	951.593	2749
MVIX	28.7216	5.4407	0.3208	19.2609	42.2227	2749
MWAP	2619.214	645.90	0.0944	1135.81	3757.42	2749
MMCP	1.40E+10	6.05E+09	0.5686	5.86E+09	2.51E+10	2749

Trend Analysis

The graphical illustrations in Fig 1-5 present the trend (in log form) of the REIT market indexes over the study period (2007-2017). The SA REIT market return (in Fig 1-5) experienced gentle fluctuations over the period under review, but with a sharp downward-swing movement in the trading days of the year 2013, attributed to spell-over effects of the REIT transition regime. Whereas more frequent fluctuations were observed in the trends of the market bid-ask spread (MSPD) and the market volatility index (MTNV) as shown in Fig. 1&2 respectively. The widening spread and fluctuated turnover signal the challenges of information asymmetry in the market, attributed to relatively less liquidity, transparency and maturity characterized by the emerging REIT market (Anim-Odame, 2022). Whereas in Fig. 3, the trend in market volatility (MVIX) exhibits a 'zig-zag' gentle slope pattern. For instance, the MVIX reached its peak in 2012, thereafter; the trend has been consistently falling, with a sharp fall noted in 2013 and 2016-2017. This further suggests that the SA market volatility is gradually bouncing back to a stable condition. The graphic illustration in Fig. 5 explains the trend in the REIT market size (market capitalization).

The market size witness a contraction from 2007 to early 2009, thereafter entering into a recovery state in late 2009. By late 2009, the market enters into an expansion phase up to the year 2015, after which it remains flat. A similar trend pattern was obtained in the average price movement in Fig 4. The average price initially saw a downward trend from the beginning (2007) to late 2009, thereafter proceeded in upwards movement from 2010 to 2015, and remain flat to 2017. The steady expansion of the REIT market size demonstrated the unprecedented growth of the market as reported by Akinsomi (2022) and further ascertained the prediction by Boshoff & Bredell (2013) on the growth potential of the SA REIT market for global relevance.

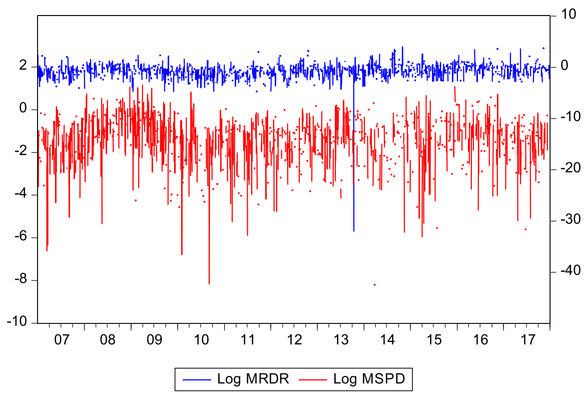

Fig. 1: Trend in MRDR and MSPD

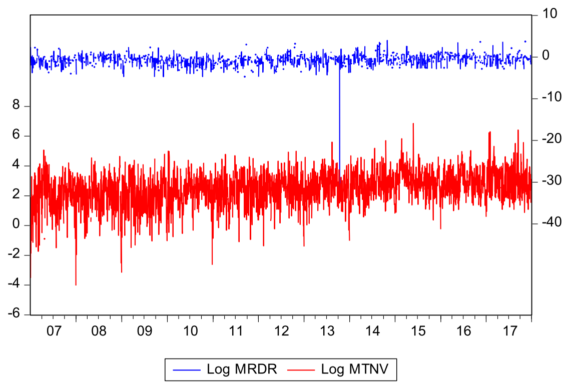

Fig. 2: Trend in MRDR and MTNV

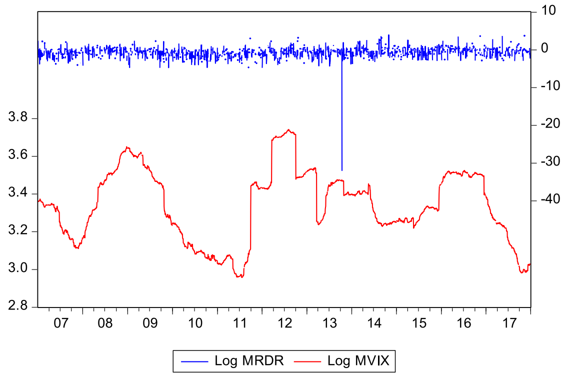

Fig. 3: Trend in MRDR and MV$_{IX}$

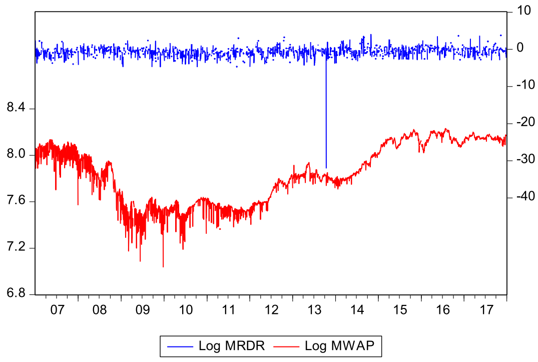

Fig. 4: Trend in MRDR and MWAP

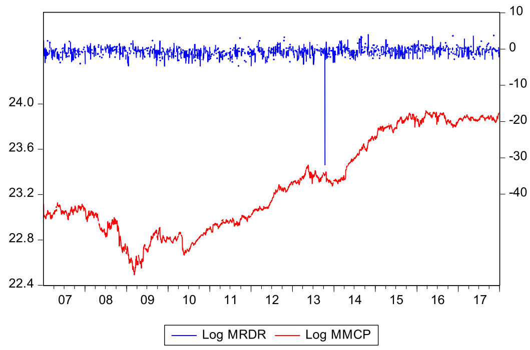

Fig. 5: Trend in MRDR and MMCP

The illustration in Fig. 6 explains the behaviuor of the REIT market dividend returns to response to shock in information asymmetry indicators. Using Cholesky One Standard Deviation (S.D.) innovations statistics, the REIT dividend return (MRDR) behaves similarly and response sharply to shock in the market spread (MSPD). The co-movement in similar manner implies that changes in the behavior of the SA REIT dividend return are driven by market spread dynamics. Meanwhile previous studies have reported the strong influence of bid-ask spread to explain REIT behaviour in other market. The findings of Feng, (2021) and Devos, et. al., (2019) in United States and United Kingdom REIT markets respectively evidenced the significant effect of bid-ask spread on REIT dividend return and concluded that wide spread signal high level of information asymmetry characterized with the REIT market.

Meanwhile, the response of the REIT dividend return to shock of other information asymmetry indicators such as market turnover (MTNV), the market volatility index (MVIX), market average price (MWAP) movement and market size (MMCP) were low and flat. The result implies that the influence of the indicators to explain the REIT dividend return is weak, therefore having little or no effects on the REIT market dynamics.

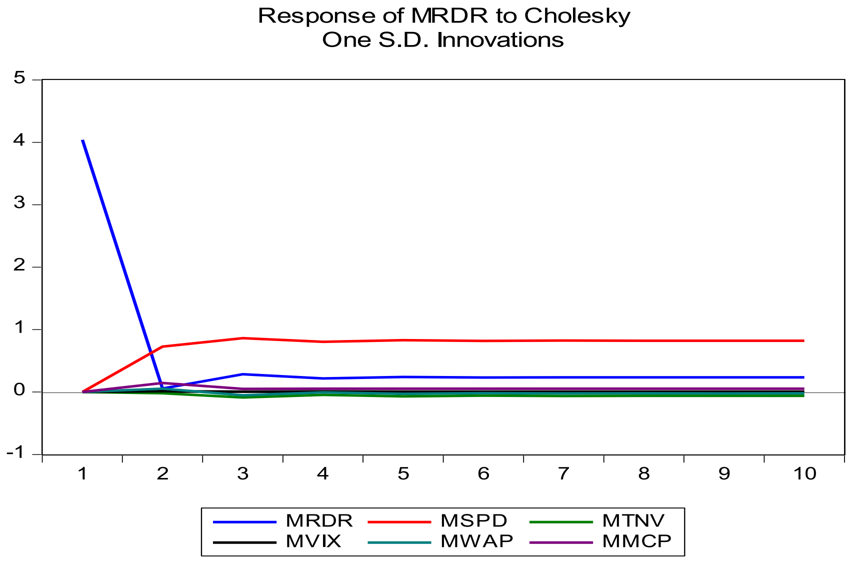

Fig. 6: Response of MEDR to information asymmetry market indicators

Data Screening and Lag Length Selection Criteria

To conduct causal analysis in a VAR environment, the need to know the stationary status of time series data and the appropriate (optimum) lag length to apply is critical to the predictive ability of the model. The result of unit root tests conducted is presented in Table 3. At level order precision (I(0)), the result of the ADF test shows that except for MSPD and MTNX data with statistical significant p-value (p<.05) and stationary, other data series namely MRDR, MVIX, MWAP and MMCP were less statistical significant p-value (p>.05) which mean the presence of unit root. For the PP test at (I(0)), MWAP data was found stationary (p<.05) in addition to MSPD and MTNV, while MRDR, MVIX and MMCP remain non-stationary (p>.05). Whereas, at first difference lag order precision (I(1)), all the data series were stationary (p<.05) for ADF and PP tests. The result is in tandem with previous studies (Huerta-Sanchez, et al., 2021; Saengchote & Charoenpanich, 2021; Olanrele, et al., 2021) that have reported the ability of economic data to attain stationary at first difference lag order (I(1)).

Table 3: Unit Root Test

Time Series Data	Augmented Dickey-Fuller (ADF)				Phillips-Perron (PP)			
	I(0)		I(1)		I(0)		I(1)	
	t-stat	p-value	t-stat	p-value	t-stat	p-value	t-stat	p-value
MRDR	-2.4143	0.3719	-56.4943	0.0000*	-2.2288	0.4727	-56.6283	0.0000*
MSPD	-26.6592	0.0000*	-18.3856	0.0000*	-49.3189	0.0000*	-740.059	0.0001*
MTNV	-21.83792	0.0000*	-19.8869	0.0000*	-50.4927	0.0000*	-898.242	0.0001*
MVIX	-1.512939	0.8253	-45.0719	0.0000*	-1.7756	0.7165	-46.1338	0.0000*
MWAP	-2.078092	0.5573	-25.5803	0.0000*	-3.9149	0.0116*	-210.109	0.0001*
MMCP	-2.3623	0.3994	-29.7529	0.0000*	-2.3242	0.4200	-52.1571	0.0000*

**Significant @5% level of confidence; Specification: Trend and Intercept*

To further enhance the quality and reliability of the model predictive power, the study conducted a lag order selection criteria test (see *Table 4*), aimed at selecting optimum lag for the time data series, giving attention to the size and peculiarity of the dataset. The study used the *Schwarz information criterion (SC)* at optimum lag 2 (72.76892*). The choice of *Schwarz information criterion (SC)* was informed by the work of Asghar & Abid (2007). The author claimed that SIC is characterized by the least probability of under or overestimation and relatively performs better, especially for a small sample size.

Table 4: VAR Lag Order Selection Criteria

Lag	LogL	LR	FPE	AIC	SIC	HQ
0	-119877.4	NA	5.97e+30	87.89108	87.90409	87.89578
1	-99320.56	41008.26	1.75e+24	72.84645	72.93746	72.87935
2	-98948.26	741.0426	1.36e+24	72.59990	72.76892*	72.66099
3	-98813.98	266.6949	1.27e+24	72.52784	72.77487	72.61713
4	-98711.89	202.3046	1.21e+24	72.47939	72.80443	72.59687*
5	-98653.33	115.8030	1.19e+24	72.46285	72.86589	72.60853
6	-98602.42	100.4243	1.18e+24*	72.45192*	72.93298	72.62580
7	-98579.57	44.98625	1.19e+24	72.46156	73.02062	72.66363
8	-98542.01	73.77856*	1.19e+24	72.46041	73.09749	72.69068

LR: sequential modified LR test statistic (each test at 5% level), FPE: Final prediction error, AIC: Akaike information criterion, SC: Schwarz information criterion and HQ: Hannan-Quinn information criterion

The findings in Table 5 presents the dynamic relationships among the exogenous variables, namely the REIT market dividend return and asymmetric market information indicators such as bid-ask spread, turnover, volatility, average price movement and market size in an asymmetric market situation. This was done to know whether the dynamics of the causal behaviours, whether theirs is a long-run effect or the relationships fade away in the short run. The results of the co-integration tests show the evidence of both the short and long term relationships but not for all the six (6) cases examined. For instance, the null hypothesis of no co-integration relations was rejected (p<.05) for *'None', 'At most 1'* and *'At most 2'* cases for both the *Trace Rank and Maximum Eigenvalue Rank* Tests, which implies the presence of co-integration relation. While the null hypothesis of no co-integration was accepted for cases for *'At most 3', 'At most 4'* and *'At most 5'* because of their statistical non-significant p-value (p>.05). This result signal the presence of long and short run relationship dynamics among the variables.

Table 5: Co-integration Test

Hypothesized No. of CE(s)	Trace Rank Test			Maximum Eigenvalue Rank Test		
	Eigenvalue	Trace-Stats	Prob.	Eigenvalue	Max-Eigen Stats	Prob.
None	0.251890	2118.373	0.0000*	0.251890	794.5813	0.0001*
At most 1	0.214290	1323.791	0.0000*	0.214290	660.3180	0.0001*
At most 2	0.207400	663.4735	0.0001*	0.207400	636.4110	0.0001*
At most 3	0.008831	27.06248	0.1001	0.008831	24.28740	0.0174
At most 4	0.000981	2.775080	0.9761	0.000981	2.687573	0.9654
At most 5	3.20E-05	0.087507	0.7674	3.20E-05	0.087507	0.7674

*Unrestricted Cointegration Test , Trace test indicates 3 cointegrating eqn(s) at the 0.05 level, * denotes rejection of the hypothesis at the 0.05 level, **MacKinnon-Haug-Michelis (1999) p-values, Max-eigenvalue test indicates 4 cointegrating eqn(s) at the 0.05 level.*

Meanwhile, when co-integration relations are reported in some cases (but not all) in a CE model, Leonard, Humayun, Haiyue and Yunjie (2020) argued that the appropriate causal model to measure the relationship dynamics is the vector error correction model (VECM). This informed the use of VECM to analyse the causal linkage of REIT dividend returns with the asymmetric market indicators such as market spread (MSPD), market turnover (MTNV), and the market volatility index (MVIX), the market-weighted average price (MWAP) and market capitalization (MMCP). The relationship dynamics is presented in Table 6. REIT behaviour is explained by two major factors under asymmetric market information conditions. First, by itself (MRDR t-stat: -2.1685; p<.05) and second, by market spread (MSPD; t-stat: -6.7886; p<.05). The explanatory power of other market indexes with correspondent t-stat., such as MTNV (1.3669), MVIX (0.1969), MWAP (0.9696) and MMCP (1.8612) is less statistical significant to explain REIT dividend behaviour in the long run.

Similarly, in the short run, except for MRDR (-2.16624) and MSPD (-6.78442) that exhibited statistical significant causal effects (p<.05), the study observed less significant (p>.05) predictive power of MTNV (1.3659), MVIX (0.1957), MWAP (0.9668) and MMCP (1.8566). Moreover, the error correction term (ECT) statistics reported a negative and statistical significant t-stats value (-35.9241; p<.05). This means that the model possessed a strong convergent ability and good predictive power. Also, the model accounts for 50.18% total variance of the level of precision (Ajd. R-square). The Durbin-Watson stat of 2.01233 shows the weak autocorrelation attribute of the model, while the statistical significance of the F-statistic p-value (p<.05), indicates the statistical significant predictive power of the model to explain the behaviour of SA REIT dividend return in an asymmetric market information period. The model attributes such as weak autocorrelation and statistical significant p-value (p<.05) demonstrated a good predictive power and the reliability of the estimate. The significant explanatory power of bid-ask spread to explain variance in REIT return in the SA REIT market is aligns with findings in other REIT markets across the globe, including the U.S. (Feng, 2021) and U.K. (Devos, et. al., 2019) REIT markets. Feng (2021) noted that information spread is critical to investor confidence. Asem, et al., (2022) added that high level of information transparent gives the REIT vehicle a competitive edge in the stock market. However, the negative relationship of bid-ask spread and the divided return, meaning that the wider the spread (information asymmetry), the lower the dividend returns, thus signalling adverse effects.

Table 6: Causal relationship Dynamics between SA REIT market dividend Return and Information Asymmetric Indicators

Long Run Relation Dynamics			**Short Run Relation Dynamics**		
Indicators	**Coefficient**	**t-Statistic**	**Indicators**	**Coefficient**	**t-Statistic**
MRDR	-0.0409	-2.1685*	D(MRDR(-1))	-0.040887	-2.16624*
MSPD	-0.2697	-6.7886*	D(MSPD(-1))	-0.269616	-6.78442*
MTNV	0.0022	1.3669	D(MTNV(-1))	0.002207	1.36590
MVIX	0.0476	0.1969	D(MVIX(-1))	0.047420	0.19573
MWAP	0.0005	0.9696	D(MWAP(-1))	0.000577	0.96687
MMCP	9.53E-10	1.8612	D(MMCP(-1))	9.51E-10	1.85667
			ECT	***-0.960368***	***-35.9241****

5.0. Conclusion and Policy Implications

The study investigated how REIT Return behaves under an information asymmetry market using the SA REIT market as a case study. The dataset was dividend return, bid-ask spread, turnover, volatility index, average price movement and market capitalization, with a review period from 2007 to 2017. The study employed trend analysis; a con-integration test and a vector error correction model (VECM to evaluate the time series REIT market data. The trend in REIT returns experienced a gentle fluctuation, turbulence swings were observed in the bid-ask spread and turnover trends, while market cap witnessed expansion from late 2009, the trend in average prices maintains steady growth. The study discovers both long and short run relationships among the REIT returns and the information asymmetry market indicators. Meanwhile, among the information asymmetry indicators, the market spread has a negative effect and demonstrated a statistically significant explanatory power. This means that the depth and wide of the bid-ask spread explain what happens to REIT dividend return behaviour in the SA stock market in both the short and long run. However, the wider the spread, the higher the level of information asymmetry and the lover the REIT market dividend return. The result ascertained the significant predictive power of bid-ask spread, which has been reported in other REIT markets across the globe. The strong effects of market spread in the REIT stock market necessitate the need to critically evaluate the information asymmetry market condition driven by bid-ask spread by the investors, investment analysts and fund managers. The study, therefore, suggests an efficient and effective information transparent mechanism/policy that could enhance information dissemination and diffusion among the stakeholders in the REIT market.

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