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Causal Behavior of Dynamic Dividend Yield of Property Stock in Information Asymmetric Market: Evidence from South African Listed Property Stock Market

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The paper investigates the dynamic behavior of the dividend yield of South African (SA) property stocks under an information asymmetric market. The vector error correction model (VECM) is used to analyze daily data on dividend yield and asymmetric market indicators including bid-ask spread, turnover, volatility index, weighted average price, and market size for the period of 2007-2017. We find that dividend payouts from the SA property stock market declined during the study period and reacted positively and sharply to shocks in the market spread. The VECM shows a statistically significant causal effect between the dynamic behavior of property stock and market spread. The market spread predicts the dynamic behavior of the dividend yield of SA property stocks in both the short and long run.

Keywords

Property Stock, Dividend Yield, Information Asymmetry, Causal Behavior

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1. Introduction

Information on stock dynamics stimulates reactions from market participants, thus influencing decisions such as stock choices, buying, selling, holding, pricing, return on investment, and stock trading volume (Ajina et al., 2015b). Information transparency and the level of free flow of information are crucial not only for market and stock performances, but also for market analysts and fund managers. The dynamics of market information on stocks are attributed to changes in the economy, policies, regulations, and underlying factors in the stock industry and company-specific indexes. While information transparency is key to informed decision-making in the stock market, Anim-Odame (2022) posits that the African real estate market is less transparent and yet to be fully matured. Sahin et al. (2020) stress that information on property stock announcements and property stock spread is essential for fund managers in implementing their investment policies.

The stock market is said to experience transparency in trading activities when market participants, both buyers and sellers, have good access to and fair knowledge of stock market information. In cases of information mismatch, stock trading activities are carried out under information asymmetry, which implies that there is a knowledge gap between sellers and buyers or informed and uninformed investors (Naqvi et al., 2021). This situation creates a challenging trading environment and prevents the stock market from attaining an equilibrium position. Asem et al. (2022) posit that more available information on dividend changes encourages institutional investors to trade more, which gives property stock as investment vehicles an edge due to their transparent nature. While evidence of information asymmetry in the property stock 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 dynamic effects of information asymmetry on stock returns have been widely debated in the literature (Goel et al., 2021; Wang and Wang, 2017; Ajina et al., 2015a; He et al., 2013; Clarke et al., 2004), but there is no clear consensus in the findings. For instance, Wang and Wang (2017) analyze the effect of asymmetric information on insider trading and how stock prices move after information about future news events is obtained. Part of the key findings is that, in the long run, information followers earn a higher premium only if they can accurately predict information about future events, with a certain level of probability. The average diversified firm in Clarke et al. (2004) experiences less severe information mismatch, but an increase in information asymmetry has no association with greater diversification for firms in the stock market. According to Goel et al. (2021), as information bias increases, the stock market experiences return expansion, and investors are more recompensed for bearing information risk. He et al. (2013) assess the relationship between asymmetric information and the cost of equity stock, and find a positive and statistically significant relationship.

In our study, we analyze the African stock market situation, with a focus on the South African (SA) property stock market. Besides market spread (MSPD), we include other market variables such as market turnover, volatility index, value-weighted average price, and market capitalization. These market indexes are fundamental but less stable in emerging markets, and their dynamic nature could contribute to property stock yield behavior. However, the choice of using the SA property stock market cannot be discussed separately from the leading role that the property stock market plays in the continent and global property stock markets.

According to Ijasan et al. (2021), the SA property stock market remains the only quoted African property stock market on the FTSE EPRA NAREIT global real estate indexes, with a market capitalization worth US$30 billion in 2018. As of August 2020, the SA property stock market was ranked 21st and contributed about 0.30% to the global property stock market index (Akinsomi, 2022). These statistics underscore the importance of the property stock market on the continent and its global relevance for diversification opportunities. Therefore, our findings not only provide useful information for local investors but also serve as guidance and offer policy direction for optimal decision-making when considering investment in the SA property stock market. Understanding the causal effect of asymmetric information in a rapidly emerging property stock market could assist investment analysts, fund managers, regulators, and policymakers in developing a sustainable strategic investment plan for the property stock industry.

2. Literature Review

Several factors influence property stock returns, including volatility, asset growth, financial leverage, economic factors, and investor sentiment (Dogan et al., 2019; Letdin et al., 2019; Nti et al., 2021; Cao et al., 2022). Dogan et al. (2019) report that financial leverage significantly determines the payout power of property stocks in their study that covers twelve countries, including South Africa. Song and Zhan (2022) explore the interactions among property stock return, stock return, and option price implied information behavior, and find that property stocks are more transparent and price-efficient but less liquid than stocks. Letdin et al. (2019) review the empirical literature, and conclude that predictive information on volatility, valuation, asset growth, financial leverage, and investor sentiment is useful for investors in policy implementation.

From an emerging market perspective, various opinions on stock price behavior and influencing factors have been shared. In India, Ray (2012) finds that interest rates do not explain stock price behavior, but monetary policies, foreign direct investment, and exchange rates have significant and bidirectional effects. Füss (2006) explores Asian emerging stock markets, and reports that the predictability of stock returns is determined by financial integration. Shrestha and Subedi (2014) find that stock market returns respond strongly to changes in the political environment and dynamism in Nepal. Thampanya et al. (2020) highlight the importance of monetary and fiscal policies on stock return behavior among the Association of Southeast Asian Nations-5 (ASEAN-5) countries.

Another prominent factor that has generated academic research interest is information asymmetry (Ajina et al., 2015a, 2015b; Devos et al., 2019; Sahin et al., 2020; Feng, 2021). Analyzing the causal linkages among property stock return, market information dynamics, and factors such as MSPD, volatility, turnover, and property stock size among others is essential for understanding how returns of property stocks behave in the emerging markets (Nti et al., 2021). Therefore, the debate on issues that concern information asymmetry in the stock market, and by extension in the property stock industry, will continue to receive research attention due to the adverse effects of information mismatch on stock market performance. These effects vary across countries, attributed to the uniqueness of local stock markets globally.

The literature on property stock markets shows mixed results on the relationship between information asymmetry and property stock return dynamics. Feng (2021) investigates the impact of information asymmetry on property stock investment behavior in the US stock market, and finds that property stock firms characterized by high information asymmetry are less active. Devos et al. (2019) study the transparent nature of property stocks in the United Kingdom (U.K.) and conclude that property stocks increase their information disclosure when exposed to the capital market, thus reducing their level of information asymmetry. Asem et al. (2022) explore whether institutional investors are well-informed about changes in property stock dividends, and report that investors are relatively more informed about property stock events than industrial firms, due to the transparent nature of property stocks. However, the findings are unique to the local property stock market and cannot be generalized to other property stock markets.

Empirical investigations into the behavior of African stock returns are relatively few, and some have not considered the effects of asymmetric information. Recent studies (Akinsomi, 2022; Anim-Odame, 2022; Fateye et al., 2022; Ijasan et al., 2021; Dabara, 2021; Olusegun et al., 2021) investigate African property stocks holistically or through country-specific approaches. Understanding how property stocks behave in an emerging and sophisticated stock market, such as the South African property stock market, is crucial due to the spread of rapidly-changing information and diffusion challenges associated with developing economies (Anim-Odame, 2022). However, empirical investigations on similar studies are non-existent, especially on SA property stock, thus creating a knowledge gap that is addressed by this study. Despite these challenges, the SA property stock market has diversification benefits and integration potential on a global scale (Ijasan et al., 2021). This underscores the global relevance of the SA property stock market, which necessitates the need for useful information on the dynamic behavior of property stock yield and its associated causal linkages to asymmetric information for optimal investment decision-making and policy direction.

3. Methods and Materials

3.1 Data Description and Sources

This study uses historical daily data of SA property stocks extracted from the *Iress* database over the reviewed period of 3 January 2007 to 29 December 2017. Seventeen (17) property stocks with consistently published data throughout the reviewed period are considered. The focus of this paper is on the category of property stocks with a long trading history and sufficient data publication, particularly upgraded property stocks, to establish the presence of asymmetric information and dynamic reaction of property stock yield over a reasonable period of time (10 years). A cause-effect relationship is established between the dynamic behavior of the dividend yield of property stock and information asymmetry by using a bid-ask spread. Additionally, the predictability of underlying market fundamental variables such as trade volume, turnover, volatility index, weighted value average price, and market capitalization on property stock yield is analyzed.

The average values of the variables are estimated and used as proxies for property stock market data, such as the market dividend yield growth rate (MRDR), MSPD, market turnover (MTNV), market volatility index (MVIX), market value-weighted average price (MWAP), and market capitalization (MCAP). Meanwhile, some variables, such as the volatility index, weighted value average price, and market capitalization, are extracted directly and estimated (averaged) for market data. Other variables, such as dividend yield, bid-ask spread, and turnover ratio, are derived data. The mathematical equations for dividend yield (Equation 1), bid-ask spread (Equation 2), and turnover (Equation 3) are expressed as follows:

$$Dividend\ Yield\ Growth\ Rate\ (DR) = \left(\frac{DY_t - DY_{t-1}}{DY_{t-1}}\right) * 100 \qquad (1)$$

Here, DYt represents the dividend yield of property stock of the current trading day t, and $DYt{-}1$ is that of the previous trading day. The dividend yield dynamics are calculated for all the property stocks considered, and the average for the property stocks is estimated and used as a proxy for the MRDR.

$$Spread = (Bid - Ask)/[((Bid + Ask))\ /\ 2] \qquad (2)$$

The ***Bid*** is the opening price and ***Ask*** is the closing price of the trading day for the reviewed period (2007-2017). The estimated average spread is calculated and used as a proxy for the MSPD. A larger spread value denotes greater asymmetry of market information.

$$Turnover = \frac{Volume}{No.of\ Shares} \tag{3}$$

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

Table 1 Property Stock Market Variables and Acronyms

Variable	Acronym
Market Dividend Yield Growth Rate	MRDR
Market Spread	MSPD
Market Turnover	MTNV
Market Volatility Index	MVIX
Market Value Weighted Average Price	MWAP
Market Capitalization	MCAP

3.2 Descriptive Statistics

This study uses descriptive statistical tools such as mean, standard deviation, and skewness to analyze the market property stock data. The mean statistics provide the average estimate, standard deviation measures the risk level, and skewness indicates the asymmetry of the series data over the reviewed period. Additionally, the data series are transformed into a logarithmic form and used for a time series graph analysis. The transformation to log form helps to stabilize the 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 reliability of its predictive power hinge on whether the time series data are stationary. Time-series data that are non-stationary signal the presence of a unit root and are not suitable for causality models. Therefore, good time-series data for causality models must be stationary in the absence of a unit root. To ascertain the status of the data, this study conducts two different unit root tests: the augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) tests. The two tests are conducted to ascertain the unit root attribute of the data by using the Schwarz information criterion (SIC) and trend and intercept criteria for model specification. Also, to enhance the reliability of the causality model, this study has conducted a vector autoregression (VAR) lag order selection process to choose the appropriate lag length order (optimal lag) given the size of the time-series data.

3.4 Co-integration Test

Co-integration tests help to establish relationship dynamics among the exogenous variables and determine the appropriate model to use in a causality analysis. In a VAR environment, when there are cases of co-integration among the exogenous variables (long-run relationship), the appropriate model to use is the VECM. In other cases of no co-integration, a basic VAR model is deployed. However, this study uses the Johansen co-integration test, which comprises trace and maximum eigenvalue rank tests (Johansen and Juselious, 1990). The results of both tests complement each other to ascertain the dynamics of the relationship among the exogenous variables. The mathematical equations for Johansen co-integration's trace (Equation 4) and the maximum eigenvalue (Equation 5) rank tests in a VAR environment are expressed as follows:

Trace Rank Test (LR_{tr})

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

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 (LRmax)

$$\begin{aligned} LR_{max}(r/r+k) &= -T\,Log(1-\delta_{r+1}) \\ &= LR_{tr}(r/k) - LR_{tr}(r+1/k) \end{aligned} \tag{5}$$

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 favor of alternative relations (***k)*** if the p-value is less than a confidence level of 5% ($p<0.05$)

3.5 Vector Error Correction Model and 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 VECM (Srivastava and Yadav, 2023; Bekhet and Matar, 2013). The VECM is a restricted VAR model with co-integration restrictions built into the specification. The model serves two major functions: first, it examines the long- and short-run dynamics of the co-integrated series, and second, it restricts the long-run behavior of endogenous variables to converge to their co-integration relationships, which is referred to as short-run structural adjustment (Leonard et al., 2020). However, the cointegrating term is known as the 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. Conventionally, the VECM in a VAR is expressed as:

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

where the explained (dependent) variable (ΔY_t) is the MRDR. The changes in the MRDR in the model are explained by the changes in the exogenous (independent) variables (Y, X, and R). In this study, the exogenous variables are the MSPD, MTNV, MVIX, MWAP, and MCAP. The short-run dynamic behavior of the adjustment of the model to co-integrating relations (long-run equilibrium) is measured by γ_i, π_j and θ_m for the corresponding exogenous variables Y, X, and R, respectively. The model is differenced at I(1), therefore the lag length is reduced by one $(k-1)$ across the model, and at optimal lag $(t-i, t-j, t-m)$ of the regressor. ECT_{t-1} is the ECT lag (residuals from the 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 an impulse and measures the response of the dependent variable (MRDR) to shock from the regressor. Thus, the VECM equation can be rewritten to reflect the terminologies of the study as:

$$\Delta MRDR_t = \sigma + \sum_{i=1}^{k-1} \gamma_i \Delta MRDR_{t-i} + \sum_{j=1}^{k-1} \pi_j \Delta MSPD_{t-j} + \sum_{m=1}^{k-1} \theta_m \Delta MTNV_{t-m} + \sum_{n=1}^{k-1} \rho_n \Delta MVIX_{t-n} + \sum_{r=1}^{k-1} \omega_r \Delta MWAP_{t-r} + \sum_{u=1}^{k-1} \phi_u \Delta MCAP_{t-u} + ECT_{t-1} + \mu_t \quad (7)$$

4. Empirical Results

4.1 Descriptive Statistics

In Table 2, the changes in the dividend yield of the SA property stock market are negative (-0.0312) and negatively skewed (-6.21136). The result implies a decline in the dividend yield growth rate, and the SA property stocks pay less dividend to shareholders over the review period. The negative skewness observed reinforces the smaller dividend payout ratio. The market bid-ask spread has a negative mean and skewness value of -0.2039 and -9.6053, respectively. A negative market bid-ask spread signals the dominance of buy order limit, where the prices of the buyers exceed the selling price. Moreover, other indicators of an information asymmetric market such as turnover, volatility, weighted average price, and property stock size (market cap.) have their respective positive mean values, which are higher than the median value (mean > median).

Table 2 Descriptive Market Analysis

Variable	Mean	Std. Dev.	Skew	Min.	Max	No. of Obs.
MRDR	-0.03	3.99	-6.21	-79.06	55.48	2749
MSPD	-0.20	1.53	-9.61	-18.92	3.21	2749
MTNV	21.5	35.97	11.96	0.02	951.59	2749
MVIX	28.72	5.44	0.32	19.26	42.22	2749
MWAP	2619.21	645.90	0.09	1135.81	3757.42	2749
MMCP	1.4E+10	6.1E+09	0.57	5.9E+09	2.5E+10	2749

Notes: We provide the summary descriptive statistics for the market dividend yield growth rate (MRDR), market spread (MSPD), market turnover (MTNV), market volatility (MVIX), market average weighted price (MAWP), and market size (MMCP) over the sample period of 03 January 2007 to 29 December 2017.

4.2 Trend Analysis and Dynamic Behavior of Dividend Yield of Property Stock

The graphical illustrations in Figures 1-5 present the trend (in log form) of the property stock market indexes over the study period (2007-2017). The SA property stock market return (in Figures 1-5) experienced mild fluctuations from 2007 to 2017, but with a sharp downward-swing in the trading days of 2013, which is attributed to the spillover effects of the transition regime of property stock. On the other hand, more frequent fluctuations can be observed in the trends of the MSPD and MTNV as shown in Figures 1 and 2, respectively. In Figure 3, the trend in the MVIX exhibits a 'zig-zagging' gentle slope pattern, which peaks in 2012. Thereafter, there has been a consistent trend of decline, with a sharp decline noted in 2013 and 2016-2017. This further suggests that the volatility of the SA market is gaining stability gradually. The analysis in Figure 5 shows that the market size contracted during 2007 to early 2009, thereafter entering a state of recovery in late 2009. By late 2009, the market enters an expansion phase up to 2015, after which it remains linear. A similar trend is found in the average price movement in Figure 4. The average price initially has a downward trend at the beginning of the study period (2007) to late 2009, and thereafter proceeded move upwards during 2010 to 2015, and then remained linear until 2017.

Figure 1 MRDR and MSPD

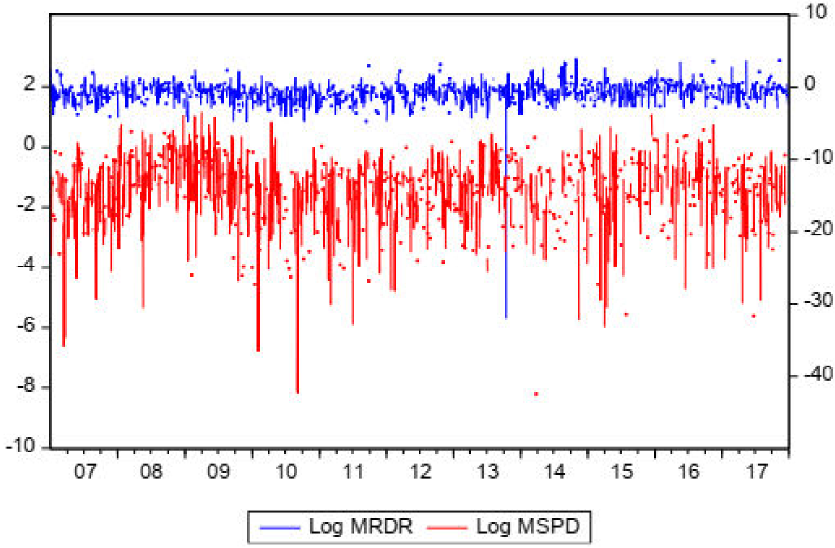


Figure 2 MRDR and MTNV

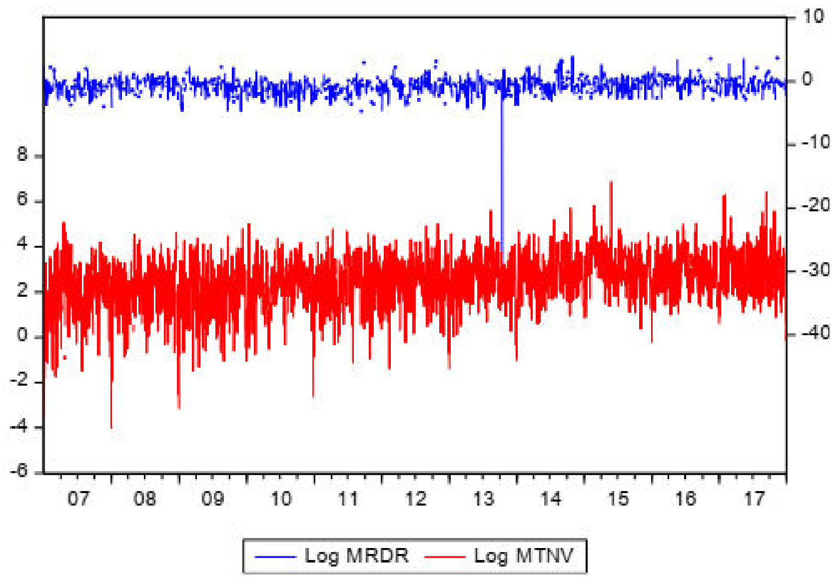


Figure 3 MRDR and MVIX

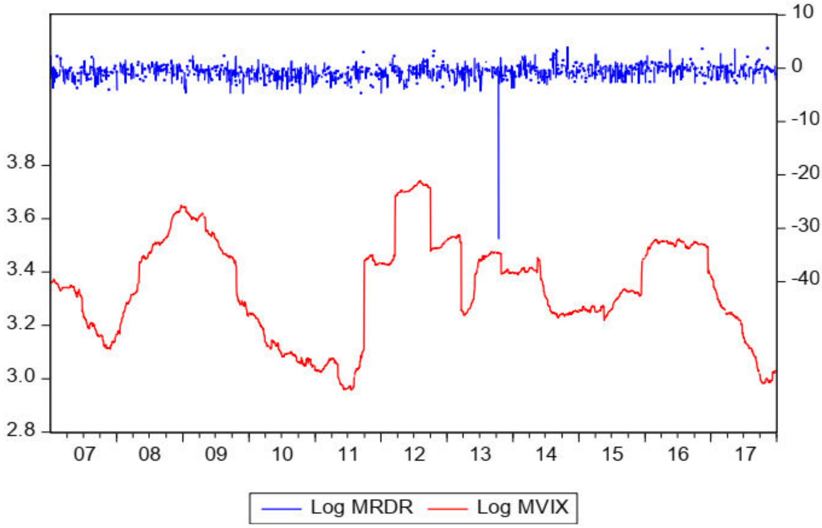


Figure 4 MRDR and MWAP

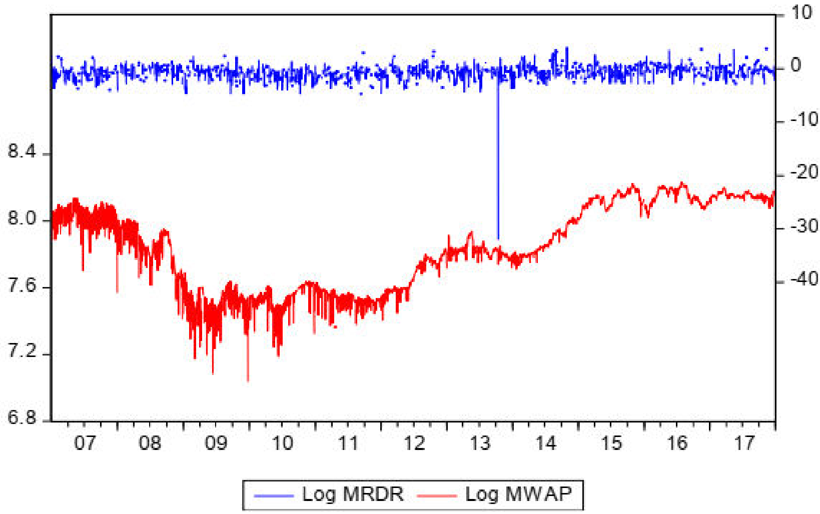


Figure 6 plots the dynamic behavior of the dividend yield of property stock in response to shocks in information asymmetry indicators. Using Cholesky one standard deviation (S.D.) innovations, the MRDR behaves similarly and responds sharply to a shock in the MSPD. The co-movement in a similar manner implies that changes in the dynamic behavior of the dividend yield of SA property stock are driven by the dynamics of the MSPD. The dynamic behavior of the dividend yield of property stock to the shock of other information asymmetry indicators such as the MTNV, MVIX, MWAP, and MMCP, is low and linear. The result implies that the influence of the indicators to explain for the dynamic behavior of the dividend yield of property stock is weak, therefore having little or no effect on the property stock market dynamics.

Figure 5 MRDR and MMCP

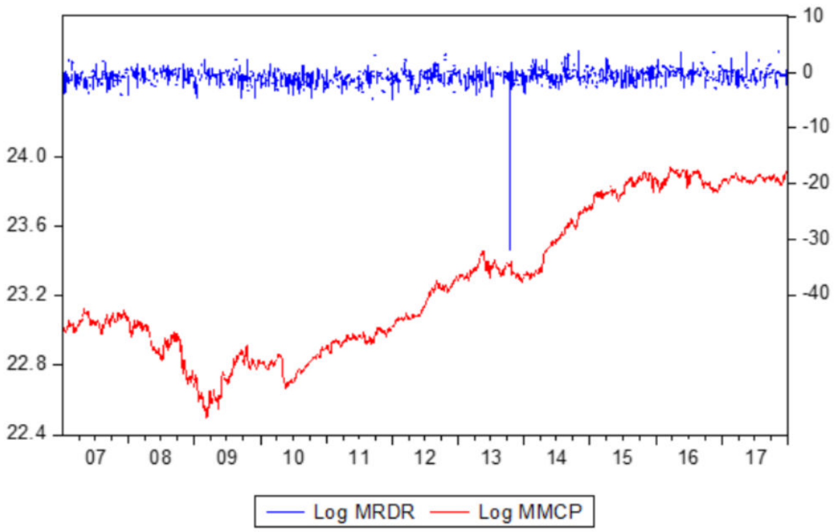
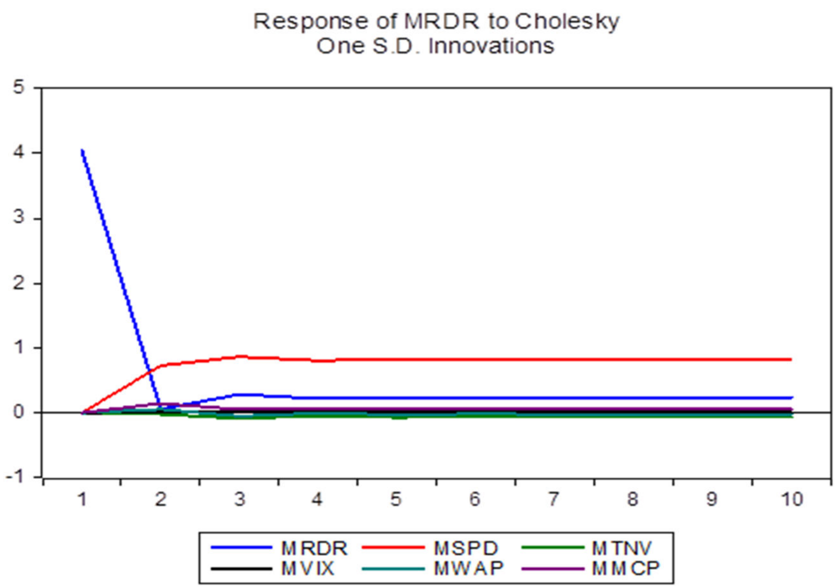


Figure 6 Response of MRDR to Shocks from Indicators of Information Asymmetry Market



4.3 Data Screening and Lag Length Selection Criteria

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

To further enhance the quality and reliability of the predictive power of the model, this study has conducted a lag order selection criteria test (see Table 4), with the aim of selecting the optimum lag for the time data series, by giving attention to the size and peculiarity of the dataset. This study uses the SIC at an optimum lag of 2 (72.76892*). The use of the SIC is informed by the work of Asghar and Abid (2007) who state that the SIC is characterized by the least probability of underestimation or overestimation and performs relatively better, especially for a small sample size.

The findings in Table 5 show the dynamic relationships among the exogenous variables, namely, the growth rate of the dividend yield of the property stock market and indicators of an information asymmetric market such as bid-ask spread, turnover, volatility, average price movement, and market size. This was done to understand the dynamics of the causal behaviors, whether there is a long-run effect, or whether the relationships fade away in the short run. The results of the co-integration tests show evidence of both short and long-term relationships but not for all 6 cases examined. For instance, the null hypothesis of no co-integration relations was rejected ($p < 0.05$) 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 a co-integration relation. On the other hand, the null hypothesis of no co-integration is accepted for cases of 'At most 3,' 'At most 4,' and 'At most 5' because of their statistically non-significant p-value ($p > 0.05$). This result signals the presence of long and short-run relationship dynamics among the variables.

Meanwhile, when co-integration relations are reported in some cases (but not all) in a cointegration equation (CE) model, Leonard et al. (2020) argue that the appropriate causal model to measure the relationship dynamics is the VECM. This informs the use of VECM to analyze the causal linkage of the dynamics of the dividend yield of property stock with asymmetric market indicators such as MSPD, MTNV, and MVIX, MWAP and MMCP. The relationship dynamics are presented in Table 6. Property stock behavior is explained by two major factors under the conditions of an information asymmetric market . The first factor is by the lagged version of itself (MRDR t-stat: -2.1685; p<.05) and the second, by MSPD (t-stat: -6.7886, p<.05). The explanatory power of other market indexes with a correspondent t-statistic, such as MTNV (1.3669), MVIX (0.1969), MWAP (0.9696) and MMCP (1.8612), is less statistically significant (P>.05) to explain the behavior of property stock dividends in the long run.

Similarly, in the short run, except for MRDR (-2.16624) and MSPD (-6.78442) which exhibit statistically significant causal effects (p<.05), this study has observed that the predictive power of MTNV (1.3659), MVIX (0.1957), MWAP (0.9668) and MMCP (1.8566) is less significant (p>.05). Moreover, the error correction term (ECT) statistics report a negative and statistically significant t-statistics value (-35.9241; p<.05). This means that the model has strong convergent ability and good predictive power. Also, the model accounts for 50.18% of the total variance of the degree of accuracy (adjusted R-square). The Durbin-Watson stat of 2.01233 shows the weak autocorrelation of the model, while the significance of the F-statistic p-value (p<.05), indicates the statistically significant predictive power of the model to explain for the dynamic behavior of the dividend yield of SA property stock in a period of an information asymmetric market. The model attributes such as weak autocorrelation and statistically significant p-value (p<.05) show the good predictive power and reliability of the estimate.

5. Discussion of Findings

The SA property stock market has experienced a low dividend payout, which signals a decline in the earning capacity of the SA property stock industry, although the market remains an active player on the continent and in the global property stock market. However, our result aligns with the findings in Ijasan et al. (2021) who report a negative mean return for SA property stock between 2013 and 2018. The negative direction of the MSPD signals a buyer's market, where the buying prices (bid price) dominate, and investors who prefer buying to selling limit order pricing (bid > ask price) when trading. This is attributed to the liquidity preference of the SA property stocks and the level of investor confidence in the property stock market.

Moreover, more frequent fluctuations have been observed in the trends of spread and turnovers, thus signaling the breadth and depth of information asymmetry characterized by the SA property stock market. Anim-Odame (2022) notes that the emerging property stock market is confronted with liquidity, transparency, and maturity challenges but to varying degrees.

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*

Notes: Specification: trend and intercept, stationary tests for the variables are conducted at level (I(0)) and first difference (I(1)) lag orders. (*) denotes that the coefficient is significant at the 5% level.

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

Notes: LR: sequential modified LR test statistic (each test at 5% level), FPE: Final prediction error, AIC: Akaike information criterion, SIC: Schwarz information criterion and HQ: Hannan-Quinn information criterion. (*) denotes that the coefficient is significant at the 5% level.

Table 5 Cointegration 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

Notes: Unrestricted cointegration test refers to testing and analyzing systems with more than two variables, thus allowing for multiple cointegrating relationships; trace test indicates 3 cointegrating equation(s) at the 0.05 level; * denotes rejection of the hypothesis at the 0.05 level; **MacKinnon-Haug-Michelis (1999) p-values; and max-eigenvalue test indicates 4 cointegrating equation(s) at the 0.05 level.

Table 6 Causal Relationship between Dividend Yield of SA Property Stock and Asymmetric Information Indicators

Long Run Relation Dynamics			Short Run Relation Dynamics		
Indicator	Coefficient	t-Statistic	Indicator	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(-1)	***-0.960368***	***-35.9241****

Notes: The table reports the VECM result for SA property stock market indicators for the sample period (03 Jan. 2007 – 29 Dec. 2017). The lagged version of MRDR is included to capture the contributions of changes in dividend yield in the model. The rate of adjustment to long run equilibrium is captured by the ECT with a negative co-efficient, and a statistically significant p-value ($p<0.05$) implies a non-explosive model. D (-1) is the lag 1 version of the variables in the short run, (*) denotes that the coefficient is significant at the 5% level.

This may be part of the major reason that the property stock market has yet to be fully transparent. The gradual trend in the SA volatility index signals the gradual stability of the market, while steady growth in the market price and expansion of the market size are indicators of the good performance of the SA property stock market. The growth potential of the SA property stock market has been earlier purported by Boshoff and Bredell (2013). Akinsomi (2022) explains that the rapid growth and expansion of SA property stocks and SA property market for over a decade reflect competitive ability and the global relevance of this market.

Meanwhile, the sharp response to changes in the dividend yield of SA property stock to the shock in the MSPD further indicates the ability of the MSPD to explain what happens to the dividend-paying ability of the SA property stock market under an information asymmetric market. However, the predictive power of MSPD to explain for property stock behavior has been demonstrated in the literature. In the US, Feng (2012) uses US equity property stocks and finds that information asymmetry affects the property stock market; higher growth is characterized by property stock firms having low information asymmetry. Similarly, Devos et al. (2019) show the presence of information asymmetry in the U.K. capital market. They explain that increasing the exposure of property stocks to the capital market improves their information transparency. However, evidence of information asymmetry in the SA property stock market aligns with the current situations in the global property stock market, but the higher level of information mismatch could prevent this vibrant property stock market from attaining an optimal performance.

6. Conclusion and Policy Implications

This study has investigated the dynamic behavior of the dividend yield of property stocks under an information asymmetric market using the SA property stock market as a case study. The dataset includes the following indicators: dividend yield, bid-ask spread, turnover, volatility index, average price movement, and market capitalization, during the review period of 2007 to 2017. The study employs a trend analysis, co-integration tests, and a VECM to evaluate the time series data of the property stock market.

The trend in the dynamics of the dividend yield of property stock shows mild fluctuations, while stronger fluctuations are observed in the bid-ask spread and turnover trends. Market capitalization has witnessed expansion since late 2009, and the average prices have maintained a trend of steady growth. The study finds both long and short-run relationships between the dynamics of the dividend yield of property stock and indicators of an information asymmetric market. Meanwhile, the market spread shows statistically significant explanatory power. This means that the bid-ask spread can significantly predict the dynamics and behavior of the dividend yield of property stock in the SA stock market in both the short and long run. However, a wider spread means greater information asymmetry, and more harm to the SA property stock industry.

The strong effects of market spread in the property stock market necessitate the need to critically evaluate the conditions of an information asymmetric market driven by the bid-ask spread of investors, investment analysts, and fund managers. This study, therefore, suggests an efficient and effective information transparent mechanism/policy that could enhance information dissemination and diffusion among stakeholders in the property stock market.

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