

An Investigation of Herding Behaviour in Offshore and Domestic REITs in South Africa

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Abstract

This study investigates behavioural contagion in the South African Real Estate Investment Trust (REIT) market by examining herding dynamics between internationally diversified (offshored) and domestically focused (localised) REITs. Despite the increasing internationalisation of South African REITs, limited evidence exists on whether investors in local REITs imitate the trading behaviour of offshore-focused REITs, particularly during periods of market stress and directional market movements. Addressing this gap, the study assesses herding behaviour across REIT segments under normal, extreme, and asymmetric market conditions and evaluates its implications for market efficiency and portfolio diversification. The analysis employs the Cross-Sectional Standard Deviation (CSSD) and Cross-Sectional Absolute Deviation (CSAD) approaches, enhanced with extreme market quantile thresholds (5th and 95th percentiles) and directional market return specifications to capture nonlinear and time-varying herding effects. Equally weighted portfolios comprising 11 offshored REITs and 9 localised REITs were constructed using daily market data covering the period from 3 October 2017 to 27 March 2024. The findings reveal no statistically significant evidence of herding behaviour within or between REIT segments across daily, weekly, and monthly frequencies. This absence of herding persists during extreme market conditions and across both bullish and bearish market regimes. However, offshored REITs exhibit greater market influence, consistently demonstrating stronger leadership during both upward and downward market movements. These results suggest that investment decisions in the South African REIT market are primarily driven by firm-specific information and rational assessment rather than behavioural imitation or collective sentiment. The study contributes to the behavioural finance and real estate investment literature by providing evidence of market resilience and informational efficiency in an emerging REIT market. The

findings further highlight the diversification benefits of REIT segmentation and the growing significance of internationally diversified REITs in shaping market performance.

Keywords – Herding Behaviour; Behavior Contagion; Portfolio Diversification; REIT Market, South Africa.

1. Introduction

Herding behaviour remains one of the most widely examined anomalies in behavioural finance because of its implications for market efficiency, price discovery, and financial stability (Bhanu, 2023). Herding occurs when investors disregard their private information and mimic the investment decisions of others, leading to convergence in trading behaviour that is not necessarily justified by underlying market fundamentals (Cheng et al., 2022; Ngene et al., 2017). Such behaviour can distort asset prices, amplify market volatility, reduce market liquidity, and increase systemic risk (Hasan et al., 2023). From a theoretical perspective, herding is often associated with informational cascades and the actions of noise traders, whose decisions are driven more by market sentiment than by rational evaluation of available information (Black, 1986; Humayun Kabir & Shakur, 2018). Consequently, markets characterised by herding tend to exhibit pricing inefficiencies and deviations from fundamental values (Tiwari et al., 2019).

Although herding has been extensively documented in equity markets, growing attention has recently been directed towards Real Estate Investment Trusts (REITs) because of their increasing integration into global capital markets and their hybrid characteristics as both real estate and financial assets. Existing studies provide evidence of herding behaviour in REIT markets across developed economies (Akinsomi et al., 2018; Essa & Giouvris, 2023; Ro & Gallimore, 2014; Tsai & Lee, 2012). The tendency for REITs to exhibit herd behaviour is attributable to their similarities with conventional equities in terms of return dynamics, liquidity characteristics, and exposure to market-wide risk factors (Liow et al., 2015; Peterson & Hsieh, 1997; Tirtiroglu et al., 2017). At the same time, REITs possess distinctive real estate attributes that provide diversification benefits and make them attractive instruments for portfolio risk management.

The relevance of understanding investor behaviour in REIT markets has increased substantially as the sector has expanded globally. The global REIT market now exceeds US\$2 trillion in market capitalisation, with significant participation from both domestic and international investors. South Africa represents one of the most developed REIT markets in Africa and has undergone a notable transformation since the introduction of REIT legislation in 2013. A defining feature of this evolution has been the increasing internationalisation of South African REITs through offshore property acquisitions and cross-border investment strategies. By 2018, approximately 47% of South African REIT assets were allocated to offshore properties, compared with virtually no offshore exposure at the inception of the REIT regime. This shift has been driven by domestic economic constraints, including weak growth prospects, policy uncertainty, rising operating costs, and attractive investment opportunities in foreign property markets.

The growing internationalisation of South African REITs raises important questions regarding investor behaviour and market dynamics. Previous research suggests that international investors may be more susceptible to herding, particularly in emerging markets where information asymmetries are greater and macroeconomic conditions exert stronger influences on investment decisions (Khorana et al., 1999). Furthermore, global financial integration may facilitate the transmission of behavioural effects across markets, resulting in synchronised trading patterns and behavioural contagion (Balcilar & Demirer, 2015). Despite these developments, little is known about whether internationally diversified REITs influence the behaviour of domestically focused REITs or whether behavioural contagion exists within the South African REIT market.

This gap is particularly important because existing studies on South African REITs have largely focused on macroeconomic determinants, stock market linkages, and volatility dynamics (Ajayi & Akinsomi, 2022; Carstens et al., 2019; Fateye et al., 2021; Mpofu et al., 2023; Naidoo et al., 2024). Empirical evidence on herding behaviour remains limited, while studies examining behavioural interactions between internationally diversified and domestically focused REITs are virtually absent. Consequently, the behavioural implications of the internationalisation of South African REITs remain poorly understood.

This study addresses this gap by investigating behavioural contagion and herding dynamics between internationally diversified (offshored) and domestically focused (localised) REITs in South Africa. Drawing on the informational cascade framework of Bikhchandani et al. (1992), we examine whether localised REITs follow the investment patterns of offshored REITs and whether internationally diversified REITs act as market leaders within the sector. Specifically, the study addresses two research questions: (i) does herding behaviour exist within the South African REIT market, and (ii) do offshored REITs drive herding behaviour among localised REITs?

To answer these questions, South African REITs are classified into offshored and localised categories based on the geographical composition of their property portfolios. Herding behaviour is examined using the Cross-Sectional Standard Deviation (CSSD) and Cross-Sectional Absolute Deviation (CSAD) methodologies. In addition, the analysis incorporates extreme market conditions and asymmetric market states by examining the lower (5%) and upper (95%) tails of market-return distributions. To assess the robustness of the findings, the analysis is conducted using both daily and weekly return frequencies. The study contributes to the literature in three important ways. First, it extends the behavioural finance literature by providing novel evidence on behavioural contagion within an emerging REIT market. Second, it offers one of the first investigations of herding dynamics between internationally diversified and domestically focused REITs. Third, it provides insights into the implications of REIT internationalisation for market efficiency, diversification, and investment strategy.

The remainder of the paper is organised as follows. Section 2 reviews the relevant literature and develops the study hypotheses. Section 3 describes the data and research methodology. Section 4 presents and discusses the empirical findings. Section 5 concludes the study and outlines its implications for investors, policymakers, and future research.

2. Literature Review

2.1 *Herding Behaviour in Financial Markets*

Herding behaviour in behavioural finance, refers to situations in which investors suppress their private information and imitate the actions of other market participants, resulting in convergence in trading behaviour that may not be justified by underlying fundamentals (Asteriou et al., 2026; Lakshminarayana et al. 2026; Komalasari et al., 2022; Chang et al., 2000). Theoretical explanations for herding generally fall into two broad categories: informational and behavioural motives.

The informational perspective argues that investors herd because they infer information from the actions of others. In environments characterised by information asymmetry, correlated information signals, or uncertainty regarding asset values, investors may rationally disregard their own information and follow perceived informed traders, creating informational cascades (Bikhchandani et al., 1992; Cipriani & Guarino, 2005). Empirical evidence from the Hong Kong stock market supports this argument, showing that institutional investor herding is largely driven by information-based trading activities (Zhou & Lai, 2009). Similarly, Hsieh et al. (2020) suggest that institutional investors are more likely to herd when operating within highly correlated information environments.

Conversely, the behavioural perspective attributes herding to psychological biases, sentiment, and social influences (Viga, 2025; Kameda et al., 2014). Individual investors often follow market trends because of overconfidence, fear of missing out, reputation concerns, or attention-grabbing effects (Barber et al., 2009). These behavioural motives may generate excessive co-movement in asset prices and contribute to market inefficiencies. Consequently, the dynamic effects of herding remain debated. While some studies argue that herding improves information aggregation and stabilises prices (Sias, 2004; Yan et al., 2012), others find that it amplifies volatility, distorts prices, and contributes to market instability (Jiao & Ye, 2014; Guo et al., 2024).

Building on these theoretical foundations, subsequent research has focused on developing empirical techniques capable of detecting herding under different market conditions. The approaches proposed by Christie and Huang (1995) and Chang et al. (2000) remain the most widely adopted frameworks, using cross-sectional return dispersion measures to identify convergence in investor behaviour (Babalos et al., 2026; Verousis and Voukelatos, 2018). These methodologies have been extensively applied across developed and emerging financial markets and continue to form the basis of contemporary herding research (Chen et al., 2017; Essa & Giouvris, 2023; Philippas et al., 2013; Zhou & Anderson, 2013).

2.2 *Herding Behaviour in REIT Markets*

The increasing integration of Real Estate Investment Trusts (REITs) into global financial markets has stimulated growing interest in understanding investor behaviour within the sector. Although REITs are backed by tangible real estate assets, their listed nature exposes

them to many of the same behavioural dynamics observed in conventional equity markets (Lee, 2014; Clayton & MacKinnon, 2003). Consequently, REITs provide a unique setting for examining herding behaviour because they combine real estate fundamentals with stock market characteristics (Boudry et al., 2012).

Existing evidence suggests that herding is present in many REIT markets, although its magnitude and determinants vary across countries and market conditions. In the United States, Philippas et al. (2013) found that herding behaviour intensified during periods of negative market sentiment and was driven more by emotional responses than by economic fundamentals. Extending this analysis, Essa and Giouvris (2023) documented significant sectoral herding across several US REIT subsectors and showed that convergence behaviour becomes stronger during periods of heightened volatility and declining market returns.

Similar evidence emerges from other developed markets. Akinsomi et al. (2018) reported regime-dependent herding behaviour in the UK REIT market, demonstrating that investor mood shifts play an important role in determining whether market participants engage in herding or anti-herding behaviour. During periods of low volatility, investors were more likely to exhibit convergence behaviour, whereas highly volatile conditions were associated with more dispersed trading activity. These findings suggest that market sentiment and uncertainty are important determinants of REIT investor behaviour.

Research has also highlighted the international dimension of REIT herding. Tsai and Lee (2012) found that Asian REIT markets exhibit stronger convergence towards US REIT markets than towards Japanese REIT markets, particularly during periods of financial stress. Their findings indicate that behavioural influences can be transmitted across national boundaries through global capital market integration. Similarly, Lesame et al. (2024) documented widespread herding among international REIT investors during the COVID-19 pandemic and argued that developed REIT markets play a dominant role in transmitting behavioural shocks across countries. However, this evidence contrasts with earlier findings by Mobarek et al. (2014), who reported stronger herding tendencies in emerging markets than in developed economies.

Meanwhile, the existing literature suggests that herding in REIT markets is context-dependent and influenced by market structure, investor composition, volatility regimes, and international market linkages. Nevertheless, the evidence remains fragmented, particularly regarding the role of international diversification and cross-market behavioural spillovers within REIT sectors.

2.3 Herding Behaviour in Emerging and South African REIT Markets

Despite the growing importance of emerging REIT markets, empirical evidence on investor herding remains limited. Most studies on emerging-market REITs have focused on macroeconomic determinants (Cohen et. 2026; Fasanya & Adekoya, 2022; Olanrele et al., 2020), stock market integration (Milan, 2026; Boamah et al., 2024), volatility dynamics and performance characteristics (Isah et al., 2026; Sarma et al., 2026) rather than behavioural

interactions among investors. Consequently, relatively little is known about how herding manifests within emerging REIT markets and whether international integration influences investor behaviour.

South Africa provides a particularly important setting for examining these issues. Since the formal introduction of the REIT regime in 2013, the South African REIT sector has evolved into the largest and most internationally connected REIT market in Africa (Daniel et al., 2026; Ijasan et al., 2021; Akinsomi & Ntuli 2020). The market has experienced substantial growth in both market capitalisation and offshore property exposure, creating a unique environment in which behavioural spillovers may occur between internationally diversified and domestically focused REITs.

However, empirical evidence on herding within the South African REIT market remains scarce. One of the few studies, Akinsomi et al. (2017), investigated whether investors shifted capital from the gold sector into REITs during and after the Global Financial Crisis. Although the study reported evidence of herding behaviour, its findings were derived from a single-sector investment activity and predated the establishment of the South African REIT framework. Consequently, the results may not adequately reflect behavioural dynamics within the contemporary REIT market. Similarly, Lowies et al. (2016) examined herding behaviour in the broader South African equity market but did not specifically focus on listed property securities.

The limited evidence available leaves several important questions unanswered. In particular, it remains unclear whether the growing internationalisation of South African REITs has altered investor behaviour and whether internationally diversified REITs exert behavioural influence on domestically focused REITs. Given evidence from international markets that behavioural effects can be transmitted across market segments and national boundaries, the absence of research examining these dynamics represents a significant gap in the literature.

The foregoing review identifies three important gaps. First, while herding behaviour has been extensively examined in equity markets and selected REIT markets, evidence from African REIT markets remains limited. Second, existing REIT studies largely focus on aggregate market behaviour, with little attention given to behavioural interactions between internationally diversified and domestically focused REITs. Third, the potential role of internationalisation as a channel for behavioural contagion within REIT markets remains largely unexplored. This study addresses these gaps by investigating herding behaviour and behavioural contagion between offshored and localised REITs in South Africa. By distinguishing between internationally diversified and domestically focused REITs, the study provides new insights into whether offshore exposure influences investor behaviour and market dynamics. Furthermore, by examining herding under normal, extreme, and asymmetric market conditions, the study contributes to a deeper understanding of the behavioural implications of REIT internationalisation and their consequences for market efficiency and portfolio diversification.

3. Data and Method

To examine herding behaviour in the South African REIT market, this study employs the Cross-Sectional Standard Deviation (CSSD) model developed by Christie and Huang (1995) and the Cross-Sectional Absolute Deviation (CSAD) approach proposed by Chang et al. (2000) and subsequently extended by Chiang and Zheng (2010). Consistent with Vidal-Tomás et al. (2019), the standard herding framework is modified to account for extreme market conditions by incorporating tail-market dynamics. This extension enables the detection of herding behaviour during periods of unusually high or low market returns, where investor reactions and behavioural biases are expected to be more pronounced.

The CSSD and CSAD methodologies require the construction of a representative market portfolio against which the return dispersion of individual securities can be evaluated. Given the objective of examining behavioural interactions between internationally diversified and domestically focused REITs, the South African REIT is partitioned into two distinct sub-markets. The first comprises offshored REITs, defined as REITs with significant real estate investments outside South Africa, particularly in major international property markets such as Europe and the United States. The second consists of localised REITs, whose property portfolios are predominantly concentrated within South Africa and have limited or no material offshore exposure. Accordingly, two equally weighted sub-market indices are constructed to represent the offshored and localised REIT segments. This classification facilitates the examination of whether behavioural contagion exists between the two segments and whether internationally diversified REITs exert a leadership effect on the trading behaviour of domestically focused REITs. The categorisation brings us to 9 local and 11 international REITs for daily data and 7 local and 11 international REITs for weekly data¹ spanning from October 3, 2017, to March 27, 2024, based on data availability. All data were gleaned from EquityRT (<https://equityrt.com>). In light of Chang et al. (2000) and Chiang and Zheng (2010), we employ an equally-weighted market portfolio to calculate market returns as

$$r_{m,t} = \frac{\sum_{i=1}^N r_{i,t}}{N} \quad (1)$$

where N is the number of local or international REITs, $r_{m,t}$ denotes the local or international REITs market return, and $r_{i,t}$ denotes local or international REITs return. To detect herding towards market consensus CSSD is used as a measure of return dispersion

$$CSSD_{m,t} = \sqrt{\frac{\sum_{i=1}^N (r_{i,t} - r_{m,t})^2}{N-1}} \quad (2)$$

Under the CSSD, herding is detected in the market if there is a low value of dispersion during periods of extreme market movements, given that investors follow the market consensus instead of their own beliefs. In contrast, an increase in dispersion is a sign of no heading and shows that prices are predicted by asset pricing models, since investors beliefs differ from market consensus. To distinguish between the herding phenomenon and rational asset pricing models, Christie and Huang (1995) isolate the study in the lower (5%) and upper (95%) tail of

¹ The REITs used in this study are provided in Table 5 (Appendix).

the distribution of market returns to account for extreme market conditions. This is important because our study period spans the COVID pandemic as well as episodes of wide market swings as can be seen from the plots in Figure 1 and skewness and excess kurtosis values in Table 1. This is done by regressing the CSSD of returns on these extreme market movements as

$$CSSD_{m,t} = \alpha + \beta^R D_t^R + \beta^L D_t^L + U_t, \quad (3)$$

where D_t^R and D_t^L are dummies equal to 1 if the market return on day or week t lies in the extreme upper tail and extreme lower tail, respectively. As in the original CSSD, herding detected for statistically negative coefficient of β^R and β^L , while statistically positive coefficients are predicted by rational asset pricing models (no herding).

Conversely, according to Chang et al. (2000), herding can be seen through CSAD

$$CSAD_{m,t} = \frac{\sum_{i=1}^N |r_{i,t} - r_{m,t}|}{N} \quad (4)$$

as a measure of return dispersion by regressing it on market returns as

$$CSAD_{m,t} = \alpha + \beta_1 r_{m,t} + \beta_2 |r_{m,t}| + \beta_3 r_{m,t}^2 + U_t \quad (5)$$

where $|r_{m,t}|$ is the absolute term and $r_{m,t}^2$ denotes the square of local or international REITs returns. Unlike Christie and Huang (1995) and Chang et al. (2000) surmise that rational asset pricing models also predict that the nexus between CSAD and market returns is linear. Hence, a significant negative coefficient β_3 indicates the suggests herding, while a significant positive coefficient β_3 does not. In keeping with Vidal-Tomás et al. (2019), we form a generalised regression that includes all the market return distributions as well as dichotomise returns into negative and positive considering Chiang and Zheng (2010) for establish herding when the market is up or down as

$$CSAD_{m,t} = \alpha + \beta_1(1-D)r_{m,t} + \beta_2 D r_{m,t} + \beta_3(1-D)r_{m,t}^2 + \beta_4 D r_{m,t}^2 + U_t \quad (6)$$

where $(1-D)$ and D are dummy variables equal to 1 when $r_{m,t} \geq 0$ and $r_{m,t} < 0$, respectively.

Lastly, to examine the strengths of the local versus offshored REITs, we analyse whether the local REITs are herding with the international REITs. Consistent with Chiang and Zheng (2010), when analysing herding in different markets can take

$$CSAD_{lc,t} = \alpha + \beta_1(1-D)r_{lc,t} + \beta_2 D r_{lc,t} + \beta_3(1-D)r_{lc,t}^2 + \beta_4 D r_{lc,t}^2 + \beta_5 CSAD_{in,t} + \beta_6(1-D)r_{in,t}^2 + \beta_7 D r_{in,t}^2 + U_t \quad (7)$$

where the subscript with lc for $CSAD_{lc,t}$, $(1-D)r_{lc,t}$, $D r_{lc,t}$, $(1-D)r_{lc,t}^2$ and $D r_{lc,t}^2$ refers to local REITs, while in refers to international REITs. This approach allows for detecting whether the local REITs are herding towards the mean return of their local market ($r_{lc,t}$) or they follow the mean return of the international market ($r_{in,t}$). It should be noted that, while we do not employ a specific time-varying econometric model, in the extant literature, capturing extreme

market conditions using quantiles and well as up and down returns, also qualify as time-varying. It is clear that these values occur at different times over the life of the asset returns.

4. Results and Discussion

Preliminary results

Table 1 presents the descriptive statistics for the market return and herding measures of localised and offshored South African REITs at both daily and weekly frequencies, while Figure 1&2 illustrate the corresponding time-series plots. Overall, the results reveal substantial evidence of non-normality, asymmetry, and extreme observations across both REIT segments, justifying the adoption of herding models capable of capturing nonlinear and tail-market dynamics. The market return series for both localised and offshored REITs exhibit negative average returns over the sample period, reflecting the challenging market conditions experienced during the study horizon. At the daily frequency, localised REITs recorded a slightly lower mean return (-0.0020) than offshored REITs (-0.0012), while a similar pattern is observed at the weekly frequency. Consistent with the risk–return trade-off argument, offshored REITs display higher return variability and more pronounced distributional asymmetry than localised REITs. The skewness and excess kurtosis statistics indicate significant departures from normality across all variables. In particular, market returns are negatively skewed, suggesting that large negative returns occur more frequently than large positive returns. Furthermore, the exceptionally high excess kurtosis values observed in both daily and weekly series indicate fat-tailed distributions and a greater probability of extreme market outcomes than would be expected under a normal distribution. These characteristics are typical of securitised real estate assets and financial market returns more generally.

The dispersion measures (CSSD and CSAD) also exhibit substantial positive skewness and excess kurtosis, indicating that periods of unusually high return dispersion occur intermittently throughout the sample period. Notably, offshored REITs exhibit higher skewness and kurtosis values than localised REITs, particularly in the daily series, suggesting greater sensitivity to extreme market movements and international shocks. This finding is consistent with the greater exposure of internationally diversified REITs to global economic and financial conditions.

Table 1: Descriptive statistics for local and international REITs herding measures on the South African stock exchange

Daily	MKT RET	CSSD	CSAD	ABS RET	SQD RET
<i>International REITs</i>					
Mean	-0.0012	0.0241	0.0180	0.0187	0.0009
Std. Deviation	0.0294	0.0173	0.0136	0.0227	0.0036
Skewness	-0.8978	4.2085	3.6163	4.2387	12.5170
Exc. Kurtosis	15.0110	35.4562	21.5267	29.4927	194.4039
<i>Local REITs</i>					
Mean	-0.0020	0.0382	0.0248	0.0183	0.0008

Std. Deviation	0.0279	0.0245	0.0164	0.0211	0.0031
Skewness	-0.5614	2.0910	2.4658	4.1264	12.8125
Exc. Kurtosis	13.7761	6.1164	10.4703	29.2085	199.1091

Weekly**International REITs**

Mean	-0.0074	0.0469	0.0392	0.0471	0.0062
Std. Deviation	0.0789	0.0319	0.0136	0.0227	0.0036
Skewness	-2.3952	2.4668	2.7682	5.2285	11.7670
Exc. Kurtosis	22.9055	8.0571	10.0099	41.5256	148.2592

Local REITs

Mean	-0.0104	0.0790	0.0499	0.0528	0.0067
Std. Deviation	0.0812	0.0545	0.0394	0.0625	0.0202
Skewness	-0.7527	1.7066	1.7769	2.9014	7.1715
Exc. Kurtosis	6.8855	3.2561	3.3183	12.0524	64.1766

Note: Market return (MKT RET), absolute market return (ABS RET), squared market return (SQD RET), cross sectional standard deviation (CSSD), and cross-sectional absolute deviation (CSAD).

Figure 1&2 corroborate the statistical findings. Both market return and herding measures display noticeable volatility clustering and several pronounced spikes, particularly during the COVID-19 pandemic period between 2020 and 2021. These episodes are characterised by substantial increases in return dispersion, indicating heightened uncertainty and market stress. The concentration of extreme observations during this period further supports the inclusion of upper (95th percentile) and lower (5th percentile) tail specifications in the empirical analysis. Taken together, the descriptive statistics and graphical analysis provide strong evidence of asymmetry, fat tails, and extreme market conditions within the South African REIT market. These distributional properties validate the use of the modified CSSD and CSAD approaches, which explicitly account for nonlinear herding behaviour under both normal and extreme market regimes.

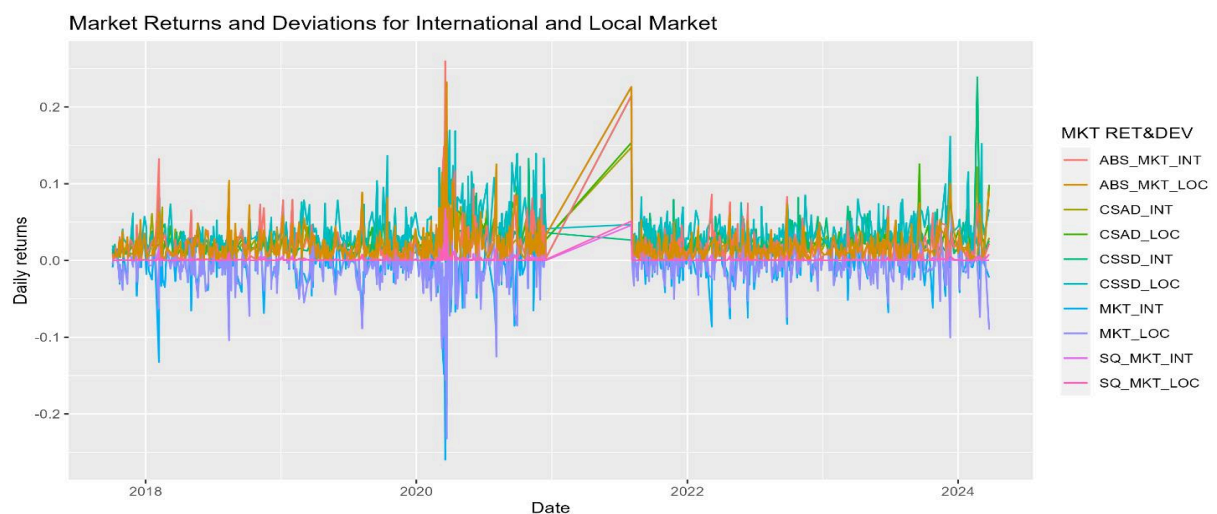


Figure 1: Plots of market returns and herd measures for local and international South African REITs for daily data frequencies

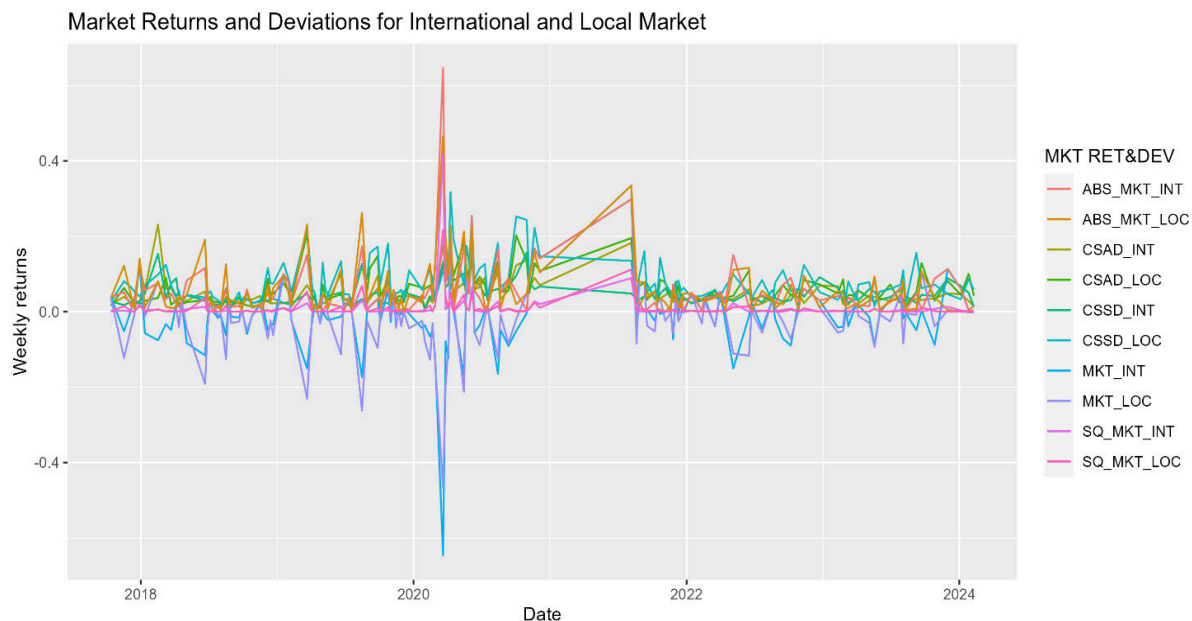


Figure 1: Plots of market returns and herd measures for local and international South African REITs for weekly data frequencies

Main results

Herding Behaviour under Extreme Market Conditions: CSSD Results

In Table 2a and 2b, the results of the estimated regression coefficients of CSSD for daily and weekly data of local and offshored REITs are presented. The herd behaviour was examined for the extreme low (β^L : 5%) and high (β^R : 95%) price movements. For local REITs (Table 2a), the estimated beta coefficient was positive for daily and weekly REITs, indicating non-convergence behaviour among market participants. The absence of herd behaviour was further confirmed by the statistically significant p-value ($p < 0.01$) for both periodicities, except for the weekly trading days at the lower tail in the local REIT market. A similar pattern is observed for offshored REITs (Table 2b). The coefficients remain positive and highly significant across all specifications, providing no evidence of herding behaviour even under extreme market conditions. The consistency of these findings across both REIT segments and data frequencies suggests that market participants continue to rely on asset-specific information and independent assessments during periods of market stress.

These results contrast with evidence reported for several developed and emerging REIT markets. For example, Philippas et al. (2013) and Essa and Giouvris (2023) documented significant herding behaviour in the US REIT market, particularly during market downturns and periods of heightened volatility. Similarly, Tsai and Lee (2012) found that Asian REIT investors exhibited stronger convergence towards US REIT markets during episodes of financial turbulence. The absence of herding in South African REITs therefore suggests that investors in this market may be less susceptible to behavioural contagion than their counterparts in many international REIT markets.

From an investment perspective, the persistence of return dispersion during extreme market conditions indicates that REIT-specific information remains relevant even during periods of uncertainty. Consequently, opportunities for portfolio diversification may remain available because securities do not move uniformly in response to market-wide shocks. However, it should be recognised that the CSSD approach captures herding in a relatively static framework and may be less effective in detecting nonlinear or time-varying behavioural patterns. This motivates the subsequent application of the CSAD methodology

Table 2a: Regression results of $CSSD_{lc,t}$ on market returns for Local REITs

α	β^R	β^L	$\bar{R}^2$
Daily			
0.0357***	0.0325***	0.0242***	0.095
(0.0009)	(0.0039)	(0.0039)	
Weekly			
0.0740***	0.1074***	0.0198	0.131
(0.0043)	(0.0195)	(0.0195)	

***significance at the 1% level. **significance at the 5% level. *Significance at the 10% level
 β^R and β^L indicate right (95%) and left (5%) tails respectively. S.E. are in parenthesis.

Table 2b: Regression results of $CSSD_{in,t}$ on market returns for International REITs

α	β^R	β^L	$\bar{R}^2$
Daily			
0.0218***	0.0176***	0.0165***	0.108***
(0.0004)	(0.0018)	(0.0018)	
Weekly			
0.0452***	0.0488***	0.0435***	0.128
(0.0023)	(0.0102)	(0.0102)	

***significance at the 1% level. **significance at the 5% level. *Significance at the 10% level

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in detecting nonlinear or time-varying behavioural patterns. This motivates the subsequent application of the CSAD methodology

Herding Behaviour under General and Asymmetric Market Conditions: CSAD Results

Tables 3a and 3b present the CSAD results for localised and offshored REITs under both general market conditions and asymmetric market states. For localised REITs (Table 3a), the coefficient associated with the general market specification ($r_{i,t}^2$) is positive and statistically insignificant in both daily and weekly models. Consequently, there is no evidence of market-wide herding during the sample period. The asymmetric specifications yield similar conclusions. During upward market, conditions(1-D) $r_{i,t}^2$, the estimated coefficients are positive and statistically significant, indicating increasing return dispersion rather than convergence. During downward market ((D) $r_{i,t}^2$) conditions, the coefficients become negative but remain statistically insignificant ($p > 0.05$), preventing any conclusive inference regarding herding behaviour.

The results for offshored REITs (Table 3b) largely mirror those obtained for localised REITs. Across both daily and weekly frequencies, the squared market-return coefficients are either positive or statistically insignificant, indicating the absence of herding under both normal and asymmetric market conditions. Thus, investors in internationally diversified REITs appear to behave independently, even during periods of market expansion or contraction. Collectively, the CSAD findings reinforce the evidence obtained from the CSSD analysis. The absence of statistically significant negative coefficients across the various specifications suggests that South African REIT investors do not systematically abandon private information in favour of market consensus. Instead, investment decisions appear to be driven predominantly by firm-specific fundamentals and rational assessments of market conditions.

Table 3a: Regression results of $CSAD_{i,t}$ on market returns. Both generalised form and distinguishing between up and down-market returns, for Local REITs

α	$r_{i,t}$	$ r_{i,t} $	$r_{i,t}^2$	$\bar{R}^2$	α	(1-D) $r_{i,t}$	(D) $r_{i,t}$	(1-D) $r_{i,t}^2$	(D) $r_{i,t}^2$	$\bar{R}^2$
Daily										
0.0194**	0.0869**	0.3728**	0.4430	0.29	0.0205**	0.1723***	-	4.2105***	-0.0763	0.3
*	*	*			*		0.3099***			1
(0.0007)	(0.0173)	(0.0433)	(0.3303)		(0.0007)	(0.0636)	(0.0484)	(0.6926)	(0.3348)	
Weekly										
0.0435**	0.1473**	0.2053*	0.8346	0.30	0.0438**	0.1982	-0.1646	1.6904**	0.0700	0.3
*	*				*					0
(0.0041)	(0.0378)	(0.1219)	(0.5211)		(0.0041)	(0.1514)	(0.1331)	(0.6680)	(0.6404)	

***significance at the 1% level. **significance at the 5% level. *Significance at the 10% level.

Table 3b: Regression results of $CSAD_{in,t}$ on market returns. Both generalised form and distinguishing between up (1-D) and down-market (D) returns, for International REITs

α	$r_{in,t}$	$ r_{in,t} $	$r_{in,t}^2$	$\bar{R}^2$	α	(1-D) $r_{in,t}$	(D) $r_{in,t}$	(1-D) $r_{in,t}^2$	(D) $r_{in,t}^2$	$\bar{R}^2$
Daily										
0.0129**	0.0360**	0.2237**	0.8669**	0.30	0.0132**	0.1605***	-	2.4674***	0.6484***	0.3
*	*	*	*		*		0.1967***			1
(0.0004)	(0.0099)	(0.0240)	(0.2073)		(0.0004)	(0.0349)	(0.0270)	(0.4470)	(0.2131)	
Weekly										
0.0251**	0.0594**	0.2492**	0.1416	0.28	0.026	0.1395*	-	1.1426***	-0.0325	0.3
*	*	*			6***		0.2096***			1
(0.0021)	(0.0217)	(0.0578)	(0.189		(0.00	(0.0768)	(0.0637)	(0.3538)	(0.1934	
			8)		21)				)	

***significance at the 1% level. **significance at the 5% level. *Significance at the 10% level.

Additionally, the findings differ from those reported in previous South African studies, particularly Akinsomi et al. (2017) and Lowies et al. (2016), both of which documented evidence of herding behaviour. One explanation for this divergence lies in differences in data, market structure, and methodological design. For example, Akinsomi et al. (2017) relied on investment activity within the gold mining sector as a proxy for market-wide behaviour in the South African REIT market. Moreover, the study period (2008–2011) preceded the formal establishment of the South African REIT regime in 2013. Consequently, the reported evidence of herding may not accurately reflect the behavioural dynamics of the contemporary REIT market, given both the limited market proxy employed and the subsequent structural transformation of listed property securities into REITs.

Similarly, the findings of Lowies et al. (2016) were derived from the broader South African equity market rather than the listed real estate sector. As such, the behavioural patterns identified in their study may not be directly transferable to REIT investors, whose investment objectives, risk exposures, and information environments differ from those of general equity market participants. Furthermore, unlike most previous studies that treat REIT markets as homogeneous entities, this study explicitly distinguishes between internationally diversified (offshored) and domestically focused (localised) REITs. This segmentation enables the identification of behavioural heterogeneity that may be obscured in aggregate market analyses. The absence of herding within and across these REIT segments suggests that investor behaviour in the South African REIT market is more nuanced than previously documented and is influenced by differences in international exposure, information flows, and market positioning.

Behavioural Contagion between Localised and Offshored REITs

Table 4 examines whether localised REITs exhibit behavioural contagion by following the trading patterns of offshored REITs. This analysis directly addresses the central research

question concerning the influence of internationally diversified REITs on the broader South African REIT market. The results indicate no evidence that localised REITs herd towards offshored REITs. The coefficients associated with localised REIT market returns (1-D) $r_{lc,t}^2$ and (D) $r_{lc,t}^2$ remain positive and statistically significant, implying that return dispersion persists rather than contracts. Consequently, investors in localised REITs do not appear to mimic the trading behaviour of offshored REIT investors during either bullish or bearish market conditions.

Table 4: Regression results of $CSAD_{lc,t}$ on market returns distinguishing between Local and International REITs

α	(1-D) $r_{lc,t}$	(D) $r_{lc,t}$	(1-D) $r_{lc,t}^2$	(D) $r_{lc,t}^2$	$CSAD_{in,t}$	(1-D) $r_{in,t}^2$	(D) $r_{in,t}^2$	$\bar{R}^2$
Daily								
0.0109** (0.0009)	0.3329** (0.0498)	-0.3540** (0.0449)	2.5255** (0.6105)	0.5252 (0.3841)	0.4541** (0.0429)	-2.7242** (0.5776)	-1.2130** (0.2278)	0.43
Weekly								
0.0236** (0.0046)	0.1981 (0.1251)	-0.1704 (0.1268)	0.2264 (0.8250)	0.6813 (0.7261)	0.3629** (0.0891)	0.4428 (0.7743)	-0.4385** (0.2777)	0.38

***significance at the 1% level. **significance at the 5% level. *Significance at the 10% level.

However, a different pattern emerges when considering the influence of offshored REITs on overall market dynamics. For the daily series, the coefficients associated with the offshored REIT market are negative and statistically significant during both upward and downward market conditions. Similar evidence is observed in the weekly data, particularly during market downturns. These findings suggest that while localised REITs do not directly herd towards offshored REITs, internationally diversified REITs exert a dominant influence on the behaviour of the broader REIT market. The positive and highly significant coefficient on the offshored REIT $CSAD_{in,t}$ measure further reinforces this interpretation. Offshored REITs appear to contain information that is more relevant to market participants and therefore play a leadership role in shaping market expectations and price dynamics. Given their greater exposure to international capital markets and global real estate cycles, these REITs may serve as important information transmitters within the South African REIT sector.

These findings partially align with the international evidence on behavioural spillovers and market leadership. Balcilar and Demirer (2015) argue that global risk factors can influence herding dynamics across markets, while Lesame et al. (2024) demonstrate that mature REIT markets often act as sources of behavioural transmission during periods of uncertainty. The present study extends this literature by showing that internationally diversified REITs can influence market dynamics without necessarily inducing herding behaviour among domestic REITs.

In summary, the findings suggest that the South African REIT market is characterised by informational leadership rather than behavioural contagion. Offshored REITs play a dominant role in price formation and market dynamics, yet investors in localised REITs retain independent decision-making behaviour. This combination of market leadership and investor independence supports the view that the South African REIT market exhibits a relatively high degree of informational efficiency. From a portfolio management perspective, the absence of herding and the persistence of return dispersion imply that diversification benefits remain available both within and across REIT segments.

5. Conclusion and Practical Implications

This study examined the presence and dynamics of herding behaviour in the South African REIT market by analysing behavioural interactions between internationally diversified (offshored) and domestically focused (localised) REITs. Using modified CSSD and CSAD models that account for extreme and asymmetric market conditions, the study provides a comprehensive assessment of investor behaviour across daily and weekly frequencies from October 2017 to March 2024. The descriptive analysis revealed significant non-normality, volatility clustering, and fat-tailed return distributions, confirming the relevance of examining herding behaviour under stressed market conditions.

The empirical findings consistently indicate an absence of herding behaviour within both localised and offshored REIT segments. The CSSD and CSAD results show that return dispersion increases rather than decreases during periods of market stress, suggesting that investors do not abandon private information in favour of market consensus. This pattern persists across normal, extreme, bullish, and bearish market conditions, including the COVID-19 period. The findings therefore suggest that investment decisions in the South African REIT market are primarily driven by firm-specific information and rational asset valuation rather than behavioural imitation.

A further contribution of the study is its examination of behavioural contagion between REIT segments. The results reveal that localised REITs do not herd towards offshored REITs. Nevertheless, internationally diversified REITs exert a stronger influence on overall market dynamics, particularly during periods of market expansion and contraction. This finding suggests that offshored REITs function as informational leaders within the South African REIT market, shaping market expectations without inducing irrational convergence among domestic investors. The evidence therefore points to a market characterised by informational efficiency, resilience, and effective price discovery.

The findings have important practical implications for investors, portfolio managers, REIT executives, and policymakers. The absence of herding behaviour implies that diversification opportunities remain available both within and across REIT segments, enhancing portfolio construction and risk management strategies. For REIT managers, the dominant role of offshored REITs highlights the strategic benefits of international diversification in strengthening market relevance and access to growth opportunities. For regulators and policymakers, the results suggest a relatively efficient market environment with limited

susceptibility to speculative crowd behaviour, while also emphasising the need to monitor international transmission channels given the growing influence of globally diversified REITs on domestic market performance.

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Appendix

Table 5: List of REITs used

INTERNATIONAL	LOCAL
<i>DAILY</i>	<i>DAILY</i>
RES - Resilient Reit Ltd.	SAC - SA Corporate Real Estate Ltd.
RDF - Redefine Properties Ltd.	OCT - Octodec Investments Ltd.
GRT - Growthpoint Properties Ltd.	ATT - Attacq Limited
EMI - Emira Property Fund Ltd.	DLT - Delta Property Fund Ltd.
VKE - Vukile Property Fund Ltd.	APF - Accelerate Property Fund
HYP - Hyprop Inv Ltd.	BWN - Balwin Properties Ltd.
SHC - Shaftesbury Capital PLC	SSS - Stor-Age Property REIT Ltd.
NRP - Nepi Rockcastle NV	DIB - Dipula Income Fund Ltd.
FFB - Fortress Real Estate Inves Ltd.	SEA - Spear REIT Ltd.
TEX - Texton Property Fund Ltd.	
SRE - Sirius Real Estate Ltd.	

WEEKLY	WEEKLY
CRP - Capital & Regional PLC	OCT - Octodec Investments Ltd.
EMI - Emira Property Fund Ltd.	SAC - SA Corporate Real Estate Ltd.
GRT - Growthpoint Properties Ltd.	DIB - Dipula Income Fund Ltd.
HYP - Hyprop Inv Ltd.	DLT - Delta Property Fund Ltd.
RDF - Redefine Properties Ltd.	ATT - Attacq Limited
RES - Resilient Reit Ltd.	APF - Accelerate Property Fund
VKE - Vukile Property Fund Ltd.	BWN - Balwin Properties Ltd.
NRP - Nepi Rockcastle NV	
FFB - Fortress Real Estate Inves Ltd.	
SHC - Shaftesbury Capital PLC	
TEX - Texton Property Fund Ltd.	