THE IMPACT OF INVESTOR SENTIMENT ON REITS: AN EMPIRICAL STUDY of THE AUSTRALIAN REIT MARKET

Jiawei Cao and Wejendra Reddy

RMIT University

# Abstract

This study investigates the impact of investor sentiment on the Australian REIT (A-REIT) market. A-REITs trade publicly as stocks, offer high liquidity, and play a critical role in constructing well-diversified portfolios and improving returns. This study drew related behavioural finance theories to formulate literature discussion on investor sentiment and its impact. The empirical study adopted the Fama-French three-factor model using 2006-2021 A-REITs data. In measuring investor sentiment of A-REITs, sentiment proxies are constructed based on Westpac Melbourne Institute Consumer Sentiment Index (WM Index) and ANZ-Roy Morgan Consumer Confidence Index (AR Index). Results of the empirical study indicate that significant relationships can be identified between A-REITs returns and investor sentiment proxies. A-REITs returns increase (decrease) when investor sentiment is optimistic (pessimistic). This study will provide market participants with a better understanding of the risk and return characteristics, and also suggest ways to improve risk management and investment decision-making strategies.

Keywords: REITs, Investor sentiment, Behavioural finance, Australian REITs, Fama-French factors

# 1 INTRODUCTION

With the development of behavioural finance, the impact of investor sentiment on financial markets has received increasing attention. Investor sentiment can be seen as a generalisation of the changes in the mindset and behavioural characteristics of market participants during the investment process. Behavioural finance recognises that investors have varying psychological characteristics which also influence their perception of risk and return when engaging in financial activities. Therefore, it is necessary to integrate the psychological factors of investors with financial market activities (Kapoor & Prosad 2017; Shefrin & Statman 2000; Statman 2014).

Studies on investor sentiment in recent decades are on wider equity markets. However, only a small number of studies have discussed how investor sentiment affects REIT markets. When the search is narrowed down to the Australian REIT (A-REIT) market, the relevant literature is even more limited. The importance of REITs as an investment asset class cannot be ignored. Most REITs can be traded publicly as stocks, this high liquidity attracts investors (Chan, SH, Erickson & Wang 2003). Furthermore, as Stephen and Simon (2005) point out REITs play a critical role in constructing a well-diversified portfolio and improving returns.

In Australia, the market capitalisation of A-REITs is A$138.66 billion as of June 2023 (ASX 2023). A-REITs is one of the key indirect real estate investment vehicles for investors when accessing the Australian real estate market (Rowland 2010). However, in recent years, the A-REITs industry has experienced unparalleled conditions post-COVID-19 pandemic after endured a tremendous shock during the pandemic. Therefore, it is necessary and meaningful to conduct research on investor sentiment for the A-REIT market.

Based on the background, this study will investigate the impact of investor sentiment on the Real Estate Investment Trusts (REITs) in Australia. It will select behavioural finance as the entry point to summarise theories and results related to investor sentiment through literature research and systematically explain the characteristics and measurement techniques of investor sentiment and its impact on the A-REIT market. The purpose of this study is to provide market participants with a better understanding of the risk and return characteristics, as well as the market dynamics, of A-REIT market. Also, it will suggest ways to improve the risk management framework and investment strategies to respond to the impact of investor sentiment.

## 2 LITERATURE REVIEW

## 2.1 Australian Real Estate Investment Trust (A-REIT) Market

Australian Real Estate Investment Trusts, usually abbreviated as Australian REITs or A-REITs, are defined as unit trusts under the regulation in Australia. Generally, Australian REITs are not taxable entities because they have a ‘flow-through’ tax status (Rowland 2010; Simontacchi & Stoschek 2010). The research focus for this paper is specific to Australian REITs that are listed on the Australian Securities Exchange (ASX) and therefore references to Australian REITs and A-REITs in the subsequent narrative and discussion refer to such only.

The history of Australian REIT market can be dated back as far as the early 1970s (Simontacchi & Stoschek 2010). The General Property Trust (now the GPT Group), as the first Australian REIT, listed in the Australian stock market in 1971 (ASX 2022; PCA 2017). Before March 2008, this type of investment vehicle was also called the Listed Property Trusts (LPTs) in Australia, and then it was renamed as REITs to be more consistent with international terms (Rowland 2010).

The Australian REIT market is one of the most developed global REIT markets, and owns approximately 70% of Australian investment-grade properties (PWC 2019; Stevenson & Dimovski 2014). Higgins, DM (2007, p. 10) described Australian REITs are ‘tax transparent, open-ended property investment vehicles that primarily hold, manage and maintain properties for investment’. Australian REITs attract various types of investors because it has been considered as an ideal alternative to the direct real estate investment in Australia, providing investors with tax benefits, high liquidity, high divisibility, and low entry and exit costs (Newell 2013; Wong & Reddy 2018).

A-REITs can be diversified funds or sector-specific, such as retail, office, and industrial. As of the end of June 2023, the market capitalisation of A-REITs is AU$138.66 billion which consisted by 45 listed A-REITs. Among them, the largest share of market capitalization is the industrial A-REITs sub-sector, with 33.12%, followed by the retail A-REITs sub-sector, with 28.51%. In addition, diversified A-REITs and miscellaneous A-REITs sub-sectors contribute similar market share, at 15.38% and 13.22%, respectively. The sub-sectors with a smaller market capitalisation are specialised A-REITs and residential A-REITs, at 7.04% and 2.72%, respectively (ASX 2023).

When reviewing previous research about A-REITs, most researchers focus on the following topics:

* Impact of a certain factor on the performance of A-REITs, such as Newell and Lee (2012), Yong and Singh (2015), Reddy and Wong (2018), Westermann, Niblock and Kortt (2018), Wong and Reddy (2018), and Westermann, Niblock and Kortt (2022);
* IPO and IPO pricing, such as Dimovski, W and Brooks (2006), Dimovski, W (2010), Dimovski, W and Ratcliffe (2011), and Dimovski, B (2016);
* NAV premium, such as Erol and Tyvimaa (2019);
* Risk and decision-making, such as De Francesco and Hartigan (2009), Higgins, D and Ng (2009), and Parker (2014);
* REIT futures market, such as Lee, CL (2009), Newell (2010), Lin Lee and Lee (2012), and Lee, M-T et al. (2016);
* REITs and GFC, such as Zarebski and Dimovski (2012), and Newell (2013).

To better understand the performance of A-REIT market, this study adopts the S&P/ASX 200 A-REITs index as the benchmark of the entire A-REIT market to compare with the Australian equity market. Figure 1 shows the trend of price return of S&P/ASX 200 A-REITs and S&P/ASX 200 in recent 10 years. For the most time, the S&P/ASX 200 A-REITs index has outperformed the S&P/ASX 200 index, but in the most recent year, the opposite trend has occurred. The annualised 10-year price returns of S&P/ASX 200 A-REITs and S&P/ASX 200 are 3.02% and 3.65%, respectively.

A graph of a stock market

Description automatically generated

Figure Price Return of S&P/ASX 200 A-REITs and S&P/ASX 200 (Data has been based at 100)

Source: Author, adopted data from S&P Global (2023)

## 2.2 Behavioural Finance and Investor Sentiment

The efficient markets hypothesis (EMH) in neoclassical finance reached its heyday in academia around the 1970s (Shiller 2003). This is one of the most familiar theories to academics and practitioners in the field of finance and investment. The EMH is based on the controversial premise that investors participating in the market are homogeneous and sufficiently rational and able to respond quickly and reasonably to all market information (Hirshleifer 2015; Shiller 2003). Since proposed, the EMH has become a popular topic for empirical research on capital markets, with many voices both for and against it. Behavioural finance provides an alternative view.

In contrast to the EMH's belief that investors are rational, and markets are efficient, behavioural finance believes that investors may behave irrationally, and also markets are not always efficient. Ramiah, Xu and Moosa (2015) pointed out that market participants are subject to common human errors due to heuristics[[1]](#footnote-2) and biases. This implies that investors are heterogeneous and limited rational. The term ‘bounded rationality[[2]](#footnote-3)’ is used to describe this situation (Sent 2018). Such investors with irrational behaviour are often referred to as noise traders or irrational investors in behavioural finance research. De Long et al. (1990) stated that the trading behaviour of noise traders is capable of explaining the divergence between market prices and the underlying value of assets. In addition, a large body of empirical research-based evidence has confirmed that noise traders are active market participants, and their participation triggers market anomalies (De Long et al. 1990; Ramiah, Xu & Moosa 2015; Yalçın 2010).

The study of noise traders aims to analyse the impact of the mindset or investment behaviour of irrational groups on the market. This also introduces the research topic of this study, which is investor sentiment. Investor sentiment can be seen as a generalisation of the changes in the mindset and behavioural characteristics of market participants during the investment process. Behavioural finance recognises that investors have varying psychological characteristics which also influence their perception of risk and return when engaging in financial activities. Therefore, it is necessary to integrate the psychological factors of investors with financial market activities (Kapoor & Prosad 2017; Shefrin & Statman 2000; Statman 2014).

One challenge when studying investor sentiment is how to measure investor sentiment. However, there is no consensus among scholars on the criteria for selecting sentiment indicators in relevant studies, i.e., which measure is the best or the most accurate. This means the indicators used for measuring investors' sentiment are diverse in practice. In the previous literature, three main types of techniques have been used to measure investor sentiment: the implicit indicator method (market-based indicators), the explicit indicator method (survey-based indicators), and the composite indicator method.

Market-based sentiment indicators were a common tool used by behavioural finance scholars in the early 1990s to explain bullish and bearish market sentiment (Brown & Cliff 2004). This method uses financial data from the market that reflects investors' expectations of the market and processes them through certain statistical techniques to obtain a proxy for investor sentiment, which is an indirect measure of investor sentiment. Throughout previous studies, the mainstream financial data used to construct sentiment proxies are indicators that demonstrate the degree of capital market activism, such as closed-end fund discount rate, return on initial public offering (IPO), number of IPOs, mutual fund flows, and trading volume. Their obvious advantages are accessibility and frequent updates. However, as Aggarwal (2022) points out, a major limitation of all these measures using market-based indicators is that they do not build the measurement of investor sentiment on a basis with a clear definition of sentiment, but instead narrowly use market indicators directly as a proxy for sentiment.

Survey-based indicators can be used more directly to measure investor sentiment than marked-based indicators. This is because the data sources for explicit indicators are generally obtained through direct surveys of investors or, more broadly, market participants. Generally, survey-based sentiment indices are published regularly, usually at weekly or monthly intervals, by specialist survey companies or organisations. Depending on the content of the survey, the proxy indicators constructed from the survey results can be divided into two types: one is an indicator that provides a judgment on market trends, such as bullish or bearish, and the other is an indicator built on the basis of confidence in the future of the economy. One of the advantages of survey-based indicators is they are able to distinguish between individual and institutional investor sentiment depending on the survey respondents. As a result, many prior studies that have explored the differences in the impact of individual and institutional investor sentiment on the market have used measurement techniques based on survey-based indicators (Aggarwal 2022). However, in previous literature, the disadvantages of survey-based indicators have also been pointed out, including the infrequency of updates and the difficulty of guaranteeing survey quality (Aggarwal 2022; Singer 2002; Zhou 2018).

Despite these drawbacks, survey-based sentiment indicators still have a contribution to make in relevant research that cannot be ignored. It is they are often used as benchmark indicators to validate other sentiment measures because survey-based indicators are the most direct type of sentiment measure. The practice of using correlations with direct survey-based sentiment indicators to illustrate the validity of market-based sentiment indicators or proxies constructed by composite methods has been widely adopted in the prior literature. For example, Lemmon and Portniaguina (2006) state that consumer confidence indices are ideal proxies of sentiment, because they show a strong correlation with Bull-Bear spread.

The composite indicator method allows scholars to study sentiment from multiple perspectives in an integrated manner. A common approach is to combine market-based sentiment indicators and survey-based indicators. A widely used example is the Baker and Wurgler Sentiment Index (BW Sentiment Index) proposed by Baker and Wurgler (2006, 2007). They adopt Principal Component Analysis (PCA) to construct the index and choose multiple market-based indicators as the variables to include, i.e. closed-end fund discount, turnover rate, number of IPOs, IPO first-day returns, dividend premium and proportion of new shares issued. In addition, using sentiment analysis techniques to construct the sentiment proxy is welcomed in recent studies. This is a computational technique that can help researchers dissect the sentiment information hidden in the textual language (Pang & Lee 2008). Several researchers have attempted to build proxy indices of investor sentiment through sentiment analysis and have used a variety of data sources, such as textual material, social media data, and Internet search trends. Sentiment analysis of textual materials and media sources to construct sentiment proxies is not a mainstream practice in investor sentiment research, but with the current rapid development of computer technology, learning algorithms and dictionaries, it is gaining interest and popularity (Zhou 2018).

Considering the data availability, this study will use survey-based sentiment indicators to construct the sentiment proxy of A-REIT market. There are two available sources in Australia: Westpac Melbourne Institute Consumer Sentiment Index (WM Index) and ANZ-Roy Morgan Consumer Confidence Index (AR Index). Both surveys have a similar set of five core questions and the index calculation methods are same. However, there are some methodological differences between the two surveys, as Table 1 shows.

Table Comparison of Australian Consumer Sentiment Survey

|  |  |  |
| --- | --- | --- |
|  | *ANZ-Roy Morgan* | *Westpac and Melbourne Institute* |
| Frequency | Every Tuesday | Second Wednesday of each month |
| Sample Size | 1000 | 1200 |
| Sample Period | Weekend before release | Week before release |
| Coverage | Respondent must be older than 14 years | Respondent must be older than 18 years |
| Interview Method | Face to face | Over the phone |
| Commenced | Monthly since Mar 1973. Weekly since Aug 2008 | Sep 1974 |
| Sample Methodology | -- | Stratified to reflect Australian demographics |

Source: Wang and Berger-Thomson (2015), ANZ-Roy Morgen, RBA, and Westpac and Melbourne Institute

## 2.3 Investor Sentiment and REIT Markets

The relationship between investor sentiment and REITs returns has been explored by some previous academics. Chan, KC, Hendershott and Sanders (1990) used a multifactor arbitrage pricing model to test whether there is some relationship between equity REIT returns and changes in investor sentiment. In their study, they employed the closed-end fund discounts as the indicator of investor sentiment, and confirmed that changes in the discount on closed‐end stock was one of the drivers of equity REIT return. They pointed out that the discount variable is not simply proxying for the macroeconomic factors but has an independent influence on REIT returns. Additionally, they further included the leverage factor in their regression and their results supported that a more significant impact can be observed in those highly levered REITs.

Lin, Rahman and Yung (2008) further explain the impact of investor sentiment on REITs returns on the basis of the study by Chan, KC, Hendershott and Sanders (1990). They use the behavioural impact of investor sentiment on REIT returns as an entry point for the research and delve into the process of REIT return generation. Closed-end fund discount is used as the proxy of investor sentiment and changes in REIT institution ownership is adopted as one of the control factors to isolate the impact of professional investors. The results of empirical analysis show that the relationship between investor sentiment and REITs return is positive and significant. Specifically, REITs returns will increase (decrease) when investors feel optimistic (pessimistic). This finding is in line with conclusions from previous research for stock markets, which show a positive relationship between investor sentiment and stock returns, such as the studies conducted by Neal and Wheatley (1998), Lee, WY, Jiang and Indro (2002), Brown and Cliff (2004), and Baker and Wurgler (2007).

Furthermore, the study by Huerta-Sanchez and Escobari (2018) is the first to use a dynamic model to analyse the relationship between heterogeneous investor sentiment indicators and REITs returns and volatility. Their research firstly confirms that trading behaviour by noise traders, as a kind of systematic risk, has a significant impact on the realisation of REITs return, which also verified the view of De Long et al. (1990).

# 3 RESEARCH DESIGN

According to the review of previous studies, the regression model is a common and valid analysis method to explore the relationship between investor sentiment and investment returns. This study will follow the empirical framework proposed by Lin, Rahman and Yung (2008) to use a series of regression models to test the impact of investor sentiment and A-REITs returns. Regression models used include univariate and multivariate regressions. Its theoretical basis is adding core explanatory variables based on the Fama-French Three Factor Model to test whether there is a relationship between core explanatory variables and asset returns. The core explanatory variables in this study are individual and institutional sentiment.

The Fame-French Three Factor Model was developed by Fama and French (1992) as an extension to the classical Capital Asset Pricing Model (CAPM), which adds two variables, SMB and HML, to improve the explanatory power of CAPM. SMB (small minus big) is the size risk factor, which measures size premium (excess return premium of small capitalisation stocks to large capitalisation stocks). HML (high minus low) is the value risk factor, which measures value premium (excess return premium of value stocks to growth stocks[[3]](#footnote-4)). SMB and HML factors in this study will be calculated separately on a sample basis. This study will use the following regression models to test the impact of investor sentiment on A-REITs returns.

Eq. (1) is to explore the relationship between A-REITs returns and investor sentiment, as follows:

(1)

where:

is the monthly return of A-REIT in month ;

is the monthly risk-free rate of return in month , measured by the return of Commonwealth government bonds (10 years maturity);

is the monthly sentiment proxies in month .

Next, Eq. (3) will combine the investor sentiment factor and CAPM (Eq. (2)):

(2)

(3)

where:

is the monthly return of A-REIT market in month , measured by the monthly change rate of S&P/ASX 200 A-REITs Index.

Next, Eq. (5) will add investor sentiment factor to Fame-French Three Factor Model (Eq. (4)):

(4)

(5)

where:

is the size premium in month ;

is the value premium in month .

# 4 DATA

## 4.1 Sampling Strategy

The study investigates the impact of investor sentiment on the A-REIT market. The A-REITs sample is taken from A-REITs listed and traded on the ASX (Australian Securities Exchange). Considering the accessibility and availability of data, the study will narrow down the initial sample to all listed A-REITs in existence from 2006 to 2021. This time period (2006-2021) was picked to conduct the empirical study due to data availability concerns. The difficulty of collecting the required data for the last 15 years is moderate and it is possible to assess the accuracy and validity of the data. Secondly, this time period contains events that have a significant impact on the market, such as the global financial crisis and the COVID-19 pandemic. This facilitates the expansion and refinement of future studies. Based on this timeframe, after reviewing the accuracy of data, the initial sample includes 17 A-REITs that traded on the ASX from 1 January 2006 to 31 December 2021.

Additionally, Westfield Corporation (WFD) and Novion Property Group (NVN) were included in the study for continuity of data. It should be noted that Scentre Group (SCG) and Westfield Corporation (WFD) are related, and their portfolios have a high degree of overlap. The Scentra Group was established on 30 June 2014 by the restructuring of Westfield Retail Trust and Westfield Group’s Australian and New Zealand management business (SCG 2023a). As of the end of 31 December 2022, Scentre Group owns and operates 42 Westfield real estate assets (SCG 2023b). Similarly, Vicinity Centres (VCX) and Novion Property Group (NVN) are related. Novion Property Group and Federation Centres merged in 2015 to form Vicinity (VCG 2023).

Finally, after including the above additions to the initial sample, the final sample size for this study was 21. Among them, 15 A-REITs are with stapled structures, and the remaining 6 A-REITs type are units. Table 2 presents the detailed information of A-REITs in the final sample of this study, with the blue highlighted rows being the A-REITs included in the initial sample, and the green highlighted rows being the additions.

Table The List of Final Sample

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| ASX Code | Fund Name | Type | Listed  Date | Delisted Date | Market Capitalisation  (as of 31/12/2021  or before delisted) | |
| **$m** | **%** |
| GMG | Goodman Group | Stapled | 02/02/2005 |  | 49,507.90 | 27.65% |
| SCG | Scentre Group | Stapled | 25/06/2014 |  | 16,401.60 | 9.16% |
| WFD | Westfield Corporation | Stapled | 05/07/2004 | 11/06/2018 | 18,370.31 | 14.11%[[4]](#footnote-5) |
| DXS | Dexus | Stapled | 06/10/2004 |  | 11,960.29 | 6.68% |
| MGR | Mirvac Group | Stapled | 18/06/1999 |  | 11,473.16 | 6.41% |
| GPT | GPT Group | Stapled | 29/04/1971 |  | 10,382.43 | 5.80% |
| SGP | Stockland | Stapled | 12/02/1988 |  | 10,121.61 | 5.65% |
| CHC | Charter Hall Group | Stapled | 10/06/2005 |  | 9,585.69 | 5.35% |
| VCX | Vicinity Centres | Stapled | 05/12/2011 |  | 7,693.35 | 4.30% |
| NVN | Novion Property Group | Stapled | 07/04/1994 | 15/06/2015 | 7,508.40 | 6.20%[[5]](#footnote-6) |
| ABP | Abacus Property Group | Stapled | 14/11/2002 |  | 3,152.61 | 1.76% |
| BWP | BWP Trust | Units | 16/09/1998 |  | 2,665.89 | 1.49% |
| INA | Ingenia Communities Group | Stapled | 01/07/2004 |  | 2,527.96 | 1.41% |
| CQR | Charter Hall Retail REIT | Units | 15/11/1996 |  | 2,463.90 | 1.38% |
| CMW | Cromwell Property Group | Stapled | 22/02/1973 |  | 2,278.41 | 1.27% |
| CQE | Charter Hall Social Infrastructure REIT | Units | 22/05/2003 |  | 1,503.94 | 0.84% |
| CDP | Carindale Property Trust | Units | 17/06/1999 |  | 333.60 | 0.19% |
| APZ | Aspen Group | Stapled | 11/04/1991 |  | 241.45 | 0.13% |
| TGP | 360 Capital Group | Stapled | 26/07/2005 |  | 180.67 | 0.10% |
| APW | Aims Property Securities Fund | Units | 17/12/2004 |  | 54.42 | 0.03% |
| AGJ | Agricultural Land Trust | Units | 10/04/2003 | 14/07/2022 | 3.66 | 0.00% |

Source: Author, adopted from ASX (2021) and Morningstar

## 4.2 Data Collection

According to the nature and purpose of this study, there are three categories of data that need to be collected: market data of A-REITs, investor sentiment data, and economic indicators. Also, according to the nature of the data required in this study, all raw data are secondary data.

Monthly return data of A-REITs are collected from the Morningstar database for the sample period from January 2006 to December 2021. For the study, the monthly returns here is defined as monthly excess return, i.e., the difference between the monthly return of individual A-REIT and the monthly return of Commonwealth Government Bonds (10 years maturity). The data of Yields on Commonwealth Government Bonds (10 years maturity) are obtained from the Australian Bureau of Statistics. The data of market capitalisation and book value of A-REITs are collected from the Refinitiv database, and used in the calculation of SMB and HML factors. Monthly data of Westpac Melbourne Institute Consumer Sentiment Index (WM Index) and ANZ-Roy Morgan Consumer Confidence Index (AR Index) are obtained from the DataStream database. They are used as the proxies of investor sentiment in the A-REIT market.

## 4.3 Data Statistics

To construct the proxies of investor sentiment of A-REITs, this study collected the raw data of WM Index and AR Index, as Figure 2 shows. Both indices use relative values on a 100 basis as the indicators of consumer sentiment for each month. They show a generally similar trend, but the overall value of AR index (red line) is 10 units higher than WM index in most time of this period. Two periods of sharp volatility occurred between 2008-2010 and 2020-2021, which coincide with the timing of the global financial crisis and the COVID-19 epidemic.

Figure Trends of WM Index and AR Index

Source: Author (2023), data adopted from DataStream

In order to minimise the impact caused by the differences between their statistical approaches of these two consumer sentiment indices, this study will use their monthly rates of change as the proxies for investor sentiment of the A-REIT market, calculated as follows:

where:

is the monthly sentiment proxy of A-REITs investors in month ;

and are the values of WM Index or AR Index in month and , respectively.

Table 3 shows the descriptive statistics of the sentiment proxies of A-REITs investors. Both WM Index and AR Index have 192 monthly change rates, which covered the required sample period. WM index has a mean of 0.1440%, with a standard deviation of 5.2170. Its maximum and minimum values are 18.00% and -17.73%, respectively. AR index has a mean of 0.0298%, with a standard deviation of 3.8990. Its maximum and minimum values are 16.04% and -18.36%, respectively. Based on their standard deviation, it can be seen that the monthly change rate of WM Index (blue line) is more dispersed and more volatile, which is in line with their trends chart, as Figure 3 shows.

Table Summary of Investor Sentiment Proxies

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Variable | N | Mean | SD | Min | Max |
| WM Index | 192 | 0.1440 | 5.2170 | -17.7300 | 18.0000 |
| AR Index | 192 | 0.0298 | 3.8990 | -18.3600 | 16.0400 |

Source: Author (2023)

Figure Trends of Investor Sentiment Proxies

Source: Author (2023)

To understand the relationship between A-REITs returns and the constructed sentiment proxies, this study conducts the correlation analysis. There are two variables used for measuring A-REITs returns in the correlation analysis:

where:

is the monthly excess return of individual A-REIT in month ;

is the monthly return of individual A-REIT in month ;

is the monthly return on Commonwealth government bonds (10 years maturity) as the risk-free rate in month ;

is the monthly excess return of A-REIT market (S&P/ASX 200 A-REITs Index) in month ;

is the monthly return of A-REIT market (S&P/ASX 200 A-REITs Index) in month .

Table 4 shows the correlation between A-REITs returns and sentiment proxies of A-REITs investors. Both WM Index and AR Index show a significant relationship with A-REITs return when using as the return indicator.

Table Correlation Matrix

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | RRf | WM Index | AR Index | RmRf | SMB | HML |
| RRf | 1 |  |  |  |  |  |
| WM Index | 0.115\*\*\* | 1 |  |  |  |  |
| AR Index | 0.217\*\*\* | 0.627\*\*\* | 1 |  |  |  |
| RmRf | 0.621\*\*\* | 0.100\*\*\* | 0.285\*\*\* | 1 |  |  |
| SMB | -0.139\*\*\* | 0.051\*\*\* | -0.066\*\*\* | -0.379\*\*\* | 1 |  |
| HML | 0.320\*\*\* | 0.118\*\*\* | 0.238\*\*\* | 0.376\*\*\* | -0.214\*\*\* | 1 |

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1 Source: Author (2023)

# 5 RESULTS

Estimation results of regression models (1) to (5) for the full sample period from January 2006 to December 2021 are summarised in Table 5 (WM Index) and Table 6 (AR Index). When using WM Index as the sentiment proxy of A-REITs investors, all the coefficients of the change rate of WM Index are positive and significant at the 5% level. This result is in line with previous studies, such as Huerta, Jackson and Ngo (2015); Huerta-Sanchez and Escobari (2018) and Lin, Rahman and Yung (2008). The positive correlation implies that when investor sentiment becomes optimistic (WM Index's rate of change is positive), the returns of A-REITs increase, and conversely, when investor sentiment becomes pessimistic (WM Index's rate of change is negative), the returns of A-REITs decrease. In addition, all the coefficients of the three Fama-French factors (RmRf, SMB and HML) are positive and significant at the 1% level. This affirms the validity of the Fama-French Three Factor Model in the A-REIT market. In model (5), the WM Index still be significant when Fama-French three factors have been included, which suggests that the investor sentiment has an independent effect. The explanatory power of this series of models, which is explained by Adjusted R-Square, is significantly increased. The highest Adjusted R-Square is 0.408 in the model (5), which includes investor sentiment proxy and Fama-French three factors.

Table Regression Results (WM Index)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| VARIABLES | (1) | (2) | (3) | (4) | (5) |
| RRf | RRf | RRf | RRf | RRf |
| Constant | -3.106\*\*\* | -0.672\*\*\* | -0.713\*\*\* | -0.516\*\*\* | -0.546\*\*\* |
| (-17.96) | (-4.56) | (-4.84) | (-3.40) | (-3.59) |
| WM\_Index | 0.207\*\*\* |  | 0.095\*\*\* |  | 0.060\*\* |
| (6.24) |  | (3.63) |  | (2.31) |
| RmRf |  | 0.936\*\*\* | 0.928\*\*\* | 0.943\*\*\* | 0.937\*\*\* |
|  | (42.81) | (42.32) | (38.38) | (38.03) |
| SMB |  |  |  | 0.263\*\*\* | 0.255\*\*\* |
|  |  |  | (7.88) | (7.60) |
| HML |  |  |  | 0.144\*\*\* | 0.140\*\*\* |
|  |  |  | (7.20) | (6.95) |
| Observations | 2,926 | 2,926 | 2,926 | 2,926 | 2,926 |
| R-squared | 0.013 | 0.385 | 0.388 | 0.407 | 0.408 |
| F test | 5.03e-10 | 0 | 0 | 0 | 0 |
| Adj. R-squared | 0.0128 | 0.385 | 0.388 | 0.406 | 0.407 |
| F | 38.93 | 1833 | 926.9 | 667.7 | 502.9 |

t-statistics in parentheses, \*\*\* p<0.01, \*\* p<0.05, \* p<0.1 Source: Author (2023)

Table Regression Results (AR Index)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| VARIABLES | (1) | (2) | (3) | (4) | (5) |
| RRf | RRf | RRf | RRf | RRf |
| Constant | -3.094\*\*\* | -0.672\*\*\* | -0.726\*\*\* | -0.516\*\*\* | -0.542\*\*\* |
| (-18.22) | (-4.56) | (-4.90) | (-3.40) | (-3.56) |
| AR\_Index | 0.503\*\*\* |  | 0.101\*\*\* |  | 0.052 |
| (12.00) |  | (2.87) |  | (1.50) |
| RmRf |  | 0.936\*\*\* | 0.917\*\*\* | 0.943\*\*\* | 0.934\*\*\* |
|  | (42.81) | (40.27) | (38.38) | (37.07) |
| SMB |  |  |  | 0.263\*\*\* | 0.260\*\*\* |
|  |  |  | (7.88) | (7.78) |
| HML |  |  |  | 0.144\*\*\* | 0.140\*\*\* |
|  |  |  | (7.20) | (6.89) |
| Observations | 2,926 | 2,926 | 2,926 | 2,926 | 2,926 |
| R-squared | 0.047 | 0.385 | 0.387 | 0.407 | 0.407 |
| F test | 0 | 0 | 0 | 0 | 0 |
| Adj. R-squared | 0.0466 | 0.385 | 0.387 | 0.406 | 0.406 |
| F | 144.0 | 1833 | 923.0 | 667.7 | 501.5 |

t-statistics in parentheses, \*\*\* p<0.01, \*\* p<0.05, \* p<0.1 Source: Author (2023)

When using AR Index as the sentiment proxy of A-REITs investors, the coefficients of the change rate of AR Index are positive and significant at the 1% level in model (1) and model (3), but not significant in model (5). One possible reason is that the sentiment information implied by the AR Index could be explained by the three Fama-French factors, as evidenced by the identical Adjusted R-Square in models (4) and (5). Therefore, by comparing the two sets of models that use WM Index and AR Index as proxies for investor sentiment respectively, this study suggests that WM Index should be the more effective investor sentiment proxy for the A-REIT market.

# 6 CONCLUSION

The development of behavioural finance has provided scholars and market participants with more diverse perspectives for understanding market mechanisms and operations. Investor sentiment is one such topic that has attracted many researchers. Through the literature review, this study recognises the need and significance of conducting investor sentiment research on the REITs sector. Considering investor sentiment as a non fundamental factor, for market participants, could help them to better understand the risk and return characteristics of REITs and to make investment decisions (Huerta-Sanchez & Escobari 2018; Lin, Rahman & Yung 2008). When looking at Australia, there is very limited research focusing on the impact of changes in investor sentiment on the A-REIT market. Thus, this is the research gap that this study would like to address.

Based on this background, this study unfolded on the basis of the psychology and behaviour of investors, to clarify the impact of investor sentiment on REITs, and to include the sentiment factors in the risk management framework and investment decision-making process. In the empirical study section, this study measured investors sentiment in the A-REIT market and used the monthly change rate of two different sources of consumer sentiment index to construct the sentiment proxies for A-REITs investors. In total 21 A-REITs that were listed on ASX between January 2006 to December 2021 were used as the sample to evaluate and analyse the impact of investor sentiment on the A-REIT market. The results suggest that WM Index (Westpac Melbourne Institute Consumer Sentiment Index) is a more effective proxy for investor sentiment in the A-REIT market, compared to AR (ANZ-Roy Morgan Consumer Confidence Index). This paper suggests the following possible reasons. First, WM Index has a larger sample size than AR. Second, WM Index has more stringent age requirements for respondents. Third, the difference in survey methods. WM Index completes the survey by telephone, while AR Index completes the survey through face-to-face interviews. For respondents, telephone surveys are more convenient and easier to participate in, and they may be more willing to express their true opinions over the phone. As Singer (2002) pointed out these sentiment surveys may lack the mechanism to encourage or make sure respondents answer questions truthfully and conscientiously, especially when the questions are sensitive or personal. Meanwhile, the veracity of survey respondents as representatives of a particular type of investor is questionable (Aggarwal 2022).

In addition, by employing a series of models based on the CAPM and Fama-French Three Factor Model, this study validates the impact of investor sentiment on the A-REIT market. The results are robust after considering conventional control variables. According to the result of the most comprehensive model (5), both the investor sentiment variable (WM Index) and the Fama-French variable are significant at the 5% level. Based on the parameter estimations, holding all other factors constant, the value of the monthly excess return of individual A-REIT (RRf) will increase by about 0.060 for a unit increase in WM Index's rate of change. That is, when investor sentiment becomes optimistic, the returns of A-REITs increase, and conversely, when investor sentiment becomes pessimistic, the returns of A-REITs decrease. The findings are consistent with similar studies conducted on the US and European REIT markets.

There are some limitations to the findings of this study. The sentiment proxies constructed in this study are based on two survey-based sentiment indicators in Australia, but it is important to note that they were not developed specifically for the A-REIT market and their respondents are not necessarily participants in the A-REIT market. As such, the proxies may not fully characterise the sentiment of investors in the A-REIT market. In addition, the scope of the data sample analysed is limited. The sample size is relatively small compared to studies based on the US REIT market. Bridging these gaps is also the way to pursue this topic in the future.

# REFERENCE

Aggarwal, D 2022, 'Defining and measuring market sentiments: a review of the literature', *Qualitative Research in Financial Markets*, vol. 14, no. 2, pp. 270-288.

ASX 2021, *ASX Investment Prodects Monthly Update - December 2021*.

ASX 2022, *ASX Investment Products - A-REITs*, viewed 25 July, <<https://www2.asx.com.au/markets/trade-our-cash-market/asx-investment-products-directory/areits>>.

ASX 2023, *ASX Investment Products Monthly Update - June 2023*.

Baker, M & Wurgler, J 2006, 'Investor Sentiment and the Cross‐Section of Stock Returns', *Journal of Finance*, vol. 61, no. 4, pp. 1645-1680.

Baker, M & Wurgler, J 2007, 'Investor Sentiment in the Stock Market', *Journal of Economic Perspectives*, vol. 21, no. 2, pp. 129-152.

Brown, GW & Cliff, MT 2004, 'Investor sentiment and the near-term stock market', *Journal of Empirical Finance*, vol. 11, no. 1, pp. 1-27.

Chan, KC, Hendershott, P & Sanders, AB 1990, 'Risk and Return on Real Estate: Evidence from Equity REITs', *Real Estate Economics*, vol. 18, no. 4, pp. 431-452.

Chan, SH, Erickson, J & Wang, K 2003, *Real estate investment trusts : structure, performance, and investment opportunities*, Financial Management Association survey and synthesis series, Oxford University Press, Oxford.

De Francesco, AJ & Hartigan, LR 2009, 'The impact of changing risk characteristics in the A‐REIT sector', *Journal of Property Investment & Finance*.

De Long, JB, Shleifer, A, Summers, LH & Waldmann, RJ 1990, 'Noise Trader Risk in Financial Markets', *Journal of Political Economy*, vol. 98, no. 4, pp. 703-738.

Dimovski, B 2016, 'Differences in underpricing of A-REIT IPOs and Australian property company IPOs', *Journal of Property Investment & Finance*.

Dimovski, W 2010, 'The underpricing of A-REIT IPOs in Australia during 2002 to 2008', *Pacific Rim Property Research Journal*, vol. 16, no. 1, pp. 39-51.

Dimovski, W & Brooks, R 2006, 'The pricing of property trust IPOs in Australia', *The Journal of Real Estate Finance and Economics*, vol. 32, no. 2, pp. 185-199.

Dimovski, W & Ratcliffe, C 2011, 'A duration analysis of the time from prospectus to listing for A-REIT IPOs', *Pacific Rim Property Research Journal*, vol. 17, no. 2, pp. 248-259.

Erol, I & Tyvimaa, T 2019, 'Explaining the premium to NAV in publicly traded Australian REITs, 2008–2018', *Journal of Property Investment & Finance*.

Fama, EF & French, KR 1992, 'The Cross-Section of Expected Stock Returns', *The Journal of finance (New York)*, vol. 47, no. 2, pp. 427-465.

Higgins, D & Ng, B 2009, 'Australian securitised property funds: an examination of their risk‐adjusted performance', *Journal of Property Investment & Finance*.

Higgins, DM 2007, 'Placing commercial property in the Australian capital market', *RICS Research paper series*.

Hirshleifer, D 2015, 'Behavioral finance', *Annual Review of Financial Economics*, vol. 7, pp. 133-159.

Huerta, D, Jackson, DO & Ngo, T 2015, 'Categorizing sentiment and its impact on REIT returns', *Managerial Finance*, vol. 41, no. 9, pp. 958-973.

Huerta-Sanchez, D & Escobari, D 2018, 'Changes in sentiment on REIT industry excess returns and volatility', *Financial Markets and Portfolio Management*, vol. 32, no. 3, pp. 239-274.

Kapoor, S & Prosad, JM 2017, 'Behavioural finance: A review', *Procedia computer science*, vol. 122, pp. 50-54.

Lee, CL 2009, 'Volatility transmission in Australian REIT futures', *Journal of Real Estate Portfolio Management*, vol. 15, no. 3, pp. 221-238.

Lee, M-T, Kuo, S-H, Lee, M-L & Lee, CL 2016, 'Price discovery and volatility transmission in Australian REIT cash and futures markets', *International Journal of Strategic Property Management*, vol. 20, no. 2, pp. 113-129.

Lee, WY, Jiang, CX & Indro, DC 2002, 'Stock market volatility, excess returns, and the role of investor sentiment', *Journal of Banking &amp; Finance*, vol. 26, no. 12, pp. 2277-2299.

Lemmon, M & Portniaguina, E 2006, 'Consumer confidence and asset prices: Some empirical evidence', *The Review of Financial Studies*, vol. 19, no. 4, pp. 1499-1529.

Lin, CY, Rahman, H & Yung, K 2008, 'Investor Sentiment and REIT Returns', *The Journal of Real Estate Finance and Economics*, vol. 39, no. 4, p. 450.

Lin Lee, C & Lee, ML 2012, 'Hedging effectiveness of REIT futures', *Journal of Property Investment & Finance*, vol. 30, no. 3, pp. 257-281.

Neal, R & Wheatley, SM 1998, 'Do Measures of Investor Sentiment Predict Returns?', *Journal of Financial and Quantitative Analysis*, vol. 33, no. 4, pp. 523-547.

Newell, G 2010, 'The effectiveness of A-REIT futures as a risk management strategy in the global financial crisis', *Pacific Rim Property Research Journal*, vol. 16, no. 3, pp. 339-357.

Newell, G 2013, 'REITs in Australia: Moving forward from the GFC', in R Sotelo & S McGreal (eds), *Real Estate Investment Trusts in Europe: Evolution, Regulation, and Opportunities for Growth*, Springer Berlin Heidelberg, Berlin, Heidelberg, <<https://doi.org/10.1007/978-3-642-36856-1_6>>, pp. 69-76.

Newell, G & Lee, CL 2012, 'Influence of the corporate social responsibility factors and financial factors on REIT performance in Australia', *Journal of Property Investment & Finance*.

Pang, B & Lee, L 2008, 'Opinion Mining and Sentiment Analysis', *Found. Trends Inf. Retr.*, vol. 2, no. 1–2, pp. 1–135.

Parker, D 2014, 'Property investment decision making by Australian REITs', *Journal of Property Investment & Finance*.

PCA 2017, *Stapled Structures Consultation Paper*, Property Council of Australia, <<https://treasury.gov.au/sites/default/files/2019-03/c2017-t240634-Property-Council.pdf>>.

PWC 2019, *Worldwide Real Estate Investment Trust (REIT) Regimes*, Compare and contrast.

Ramiah, V, Xu, X & Moosa, IA 2015, 'Neoclassical finance, behavioral finance and noise traders: A review and assessment of the literature', *International Review of Financial Analysis*, vol. 41, pp. 89-100.

Reddy, W & Wong, W-W 2018, 'Australian interest rate movements and A-REITs performance: an analysis by industry sector', *Pacific Rim Property Research Journal*, vol. 24, no. 1, pp. 85-103.

Rowland, PJ 2010, *Australian property investment and financing*, Thomson Reuters (Professional) Australia.

SCG 2023a, *About Us - History*, Scentre Group, <<https://www.scentregroup.com/about-us/history>>.

SCG 2023b, *Scentre Group Annual Financial Report 2022*.

Sent, E-M 2018, 'Rationality and bounded rationality: You can’t have one without the other', *The European Journal of the History of Economic Thought*, vol. 25, no. 6, pp. 1370-1386.

Shefrin, H & Statman, M 2000, 'Behavioral portfolio theory', *Journal of Financial and Quantitative Analysis*, vol. 35, no. 2, pp. 127-151.

Shiller, RJ 2003, 'From efficient markets theory to behavioral finance', *Journal of Economic Perspectives*, vol. 17, no. 1, pp. 83-104.

Simontacchi, S & Stoschek, U 2010, *Guide to global real estate investment trusts*, Wolters Kluwer, Law & Business ; Distributed by Turpin Distribution Services, Austin, Tex. : Biggleswade.

Singer, E 2002, 'The use of incentives to reduce nonresponse in household surveys', *Survey nonresponse*, vol. 51, no. 1, pp. 163-177.

Statman, M 2014, 'Behavioral finance: Finance with normal people', *Borsa Istanbul Review*, vol. 14, no. 2, pp. 65-73.

Stephen, L & Simon, S 2005, 'The case for REITs in the mixed-asset portfolio in the short and long run', *Journal of Real Estate Portfolio Management*, vol. 11, no. 1, pp. 55-80.

Stevenson, S & Dimovski, B 2014, 'The long-term performance of Australian REIT IPOs', *Journal of Real Estate Literature*, vol. 20, no. 3, pp. 151-165.

VCG 2023, *About Us - Our Story*, <<https://www.vicinity.com.au/about-us/who-we-are>>.

Wang, JC & Berger-Thomson, L 2015, *Bulletin | Consumer Sentiment Survey*.

Westermann, S, Niblock, S & Kortt, M 2018, 'Corporate social responsibility and the performance of Australian REITs: A rolling regression approach', *Journal of Asset Management*, vol. 19, pp. 222-234.

Westermann, S, Niblock, SJ & Kortt, MA 2022, 'Does it pay to be responsible? Evidence on corporate social responsibility and the investment performance of Australian REITs', *Asia-Pacific Journal of Accounting & Economics*, vol. 29, no. 4, pp. 1102-1119.

Wong, WW & Reddy, W 2018, 'Evaluation of Australian REIT performance and the impact of interest rates and leverage', *International Real Estate Review*, vol. 21, no. 1, pp. 41-70.

Yalçın, KC 2010, 'Market rationality: Efficient market hypothesis versus market anomalies', *European Journal of Economic and Political Studies*, vol. 3, no. 2, pp. 23-38.

Yong, J & Singh, A 2015, 'Interest rate risk of Australian REITS: A panel analysis', *Pacific Rim Property Research Journal*, vol. 21, no. 1, pp. 77-88.

Zarebski, P & Dimovski, B 2012, 'Determinants of capital structure of A-REITS and the global financial crisis', *Pacific Rim Property Research Journal*, vol. 18, no. 1, pp. 3-19.

Zhou, G 2018, 'Measuring investor sentiment', *Annual Review of Financial Economics*, vol. 10, pp. 239-259.

1. An approach of solving problems by learning from past experience and practical ways. [↑](#footnote-ref-2)
2. Bounded rationality refers to the idea that individuals have limited rationality in making decision, and under this limitation, a rational individual would choose the satisfactory decision rather than optimal one. [↑](#footnote-ref-3)
3. Value stocks have high book-to-market rations, while growth stocks have low book-to-market rations. [↑](#footnote-ref-4)
4. The share of market capitalisation is calculated based on the market capitalisation of WFD ($18,370.31m) on the last trading day (30 May 2018) and the total market capitalisation of the A-REIT market ($130.17bn) on that day. [↑](#footnote-ref-5)
5. The share of market capitalisation is calculated based on the market capitalisation of NVN ($7,508.40m) on the last trading day (29 May 2015) and the total market capitalisation of the A-REIT market ($121.20bn) on that day. [↑](#footnote-ref-6)