**Literature Review**

The papers below document whether a relationship exists between sentiment and stock market returns, by using either time-series or cross-sectional data. Different papers use sentiment variables that are regarded as either explicit or implicit. Explicit sentiment is classified as sentiment collected from the use of surveys, whereas implicit sentiment can be derived from informal changes such as volatility. Investors have been quoted over the years with varying degrees of attitude to stock market movements. Warren Buffet follows his philosophy of; “*Be fearful when others are greedy. Be greedy when others are fearful*.” This suggests that the best time to buy is when sentiment is at its lows and to sell when sentiment approaches its peak.

Warren Buffet is backed up by these papers which concluded a **negative relationship** between sentiment and market returns:

A study by Fisher and Statman (2000) studied three groups of investors; large, medium, and small with the Merrill Lynch sell-side strategist survey (MLSS), Investment Intelligence Survey (IIS) and the American Association of Individual Investors (AAII) used as proxies for this. Fisher and Statman concluded that the usage of small investors and large investors in the study were reliable indicators for future S&P 500 returns. The relationship was found to be negatively correlated but drew upon the need for further study to map implicit as well as explicit sentiment.

In a later study Fisher and Statman (2003) studied the use of the University of Michigan’s consumer confidence index and the Conference board consumer confidence index as measures for public confidence in the states of the economy. Building upon the previous 2000 study, the MLSS and AAII were re-introduced and used to provide a comparison to the 2 measures of consumer confidence. The conclusion of this study demonstrated once again a negative relationship between the level of consumer confidence and next month stock market returns.

A more recent study by P-E Lee (2019) explored investor sentiment and behaviour on Taiwan stock exchange returns between 2009-2016. Proxies used included a sentiment index, the volatility index (VIX) and similar to this study, consumer confidence index. A significant negative relationship between CCI and stock returns was observed, which agrees with previous literature in this paper.

Charoenrook (2003) measured sentiment using yearly changes in the University of Michigan Consumer Sentiment Index and compared this to stock returns. The study concluded that changes in consumer sentiment reliably predicts stock returns over 1 month and 1 year horizons over 1979-2000 and 1955-2000 periods demonstrating negative correlation. Interestingly, Charoenrook calculated market returns by using the Center for Research in Security Prices market indices minus Treasury bill 1 month returns.

Schmeling (2009) used consumer confidence as a proxy for individual investor sentiment and whether this affects expected stock returns across 18 industrialised countries. The study concluded that high sentiment typically followed with lower future stock returns on average across the countries, suggesting a negative relationship. The relation was observed to hold across different forecast horizons and classification of stocks e.g. growth and value. The paper also referenced this typical regression equation for determining the relationship, which is also used in this paper:

Rt+1 = α + β⋅sentimentt + ηt

Another modern study conducted by Concetto and Ravazzolo (2019) explored investor sentiment and its predictability on stock market returns across the EU and US. Analysis was also applied to spill over effects of US or EU sentiment affecting each other’s stock returns. The index’s used were the S&P 500 and EU Stoxx 50 as a proxy for market returns. A number of different calculated index’s for investor confidence were used, including the EU Consumer Confidence Index used in this paper. The results showed a significant negative relationship between sentiment and US stock market returns and no significant relationship between EU stock returns and sentiment. The results also noted the spill over effects between the two markets, which suggests that the US and EU are two interdependent markets.

However, we can also find a small number of papers suggesting a **positive relationship** between sentiment and market returns:

A paper by Yang and Copeland (2014) analysed the UK stock market using the sentiment-augmented EGARCH component model due to the original EGARCH model not taking investor sentiment into account. The study concluded that market excess returns are significantly positively related to investor sentiment by supplementing Adrian and Rosenberg’s EGARCH model.

Brad and Oprea (2014) wrote a paper on the relationship between the consumer confidence index and its correlation to the stock market for Romania. This paper also compared the influence of sentiment on harder to value stocks subjected to arbitrage. The study concluded that stock prices were affected by sentiment and that it has a greater effect on lower market cap, more illiquid stocks. It was demonstrated that there was a positive correlation between the consumer confidence index and stock market returns, which will be explored further in this paper.

Others argued that **sentiment was not a driver** of stock market returns and instead reacted to changes within the stock market:

Wang, Keswani and Taylor (2006) took this separate approach, claiming that stock returns and volatility were drivers of sentiment as opposed to the traditional literature. They noted that the inclusion of returns as a forecasting variable limits the forecasting power of sentiment variables, this suggests that papers have potentially overestimated the role of sentiment in predicting volatility. Final conclusions suggested limited evidence that sentiment provided information for forecasts of returns and volatility, however this paper seeks only to prove that there is a significant relationship occurring.

Dergiades (2012) also took this approach and used the same investors sentiment as Baker and Wurgler (2007), data for US stock market prices were obtained as an index. He concluded that the empirical findings demonstrated reasonable statistical evidence that sentiment having significant predictive power over stock market returns. The direction of causality was attributed to sentiment predicting excess stock market returns as opposed to the original argument.

In the cases of the literature reviewed, separate correlating relationships are noted between sentiment and stock market returns, which provides a good degree of scope for this piece of research. We are testing whether there is a significant relationship between Portuguese stock market returns and sentiment with and without the inclusion of fundamental factors. Portugal was chosen as the country for this study due to a high level of accurate data that can be sourced from the European Commission and Lisbon Exchange. Furthermore, the low relative value of Portuguese stocks vs other Western nations, provide an attractive buying opportunity for investors:

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| **Tracker Fund** | **Price/Earnings Ratio (2018)** |
| Global X MSCI Portugal (PGAL) | 15 |
| Vanguard FTSE Europe (VGK) | 17 |
| Vanguard Total World Stocks (VT) | 19 |
| SPDR S&P 500 (SPY) | 22 |

The P/E ratio can be used to determine whether a market or stock is currently over or under-valued when compared to its mean.