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Contagious Investor Sentiment: Is the Portuguese Stock Market Influenced by US Market Sentiment?*

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Investor sentiment has a role in shaping stock market dynamics, influencing price movements beyond fundamental factors. In an increasingly interconnected financial landscape, sentiment-driven contagion can transmit market trends from one market to another. This paper studies how local and global investor sentiment affects stock market returns. We test local and global investor sentiment proxies to explain Portuguese aggregate stock returns. We find that sentiment negatively influences future market returns. Both global and local sentiment are contrarian predictors of aggregate stock returns: when local or US sentiment is high, future returns are low. The evidence shows a contagious effect of the US investor sentiment on Portuguese stock market returns. Moreover, financial companies are more exposed to investor sentiment than non-financial ones, and investor sentiment influence is stronger during economic recessions. These results reveal the importance of investor sentiment in shaping market dynamics and highlight the vulnerability of smaller markets to global sentiment shifts. The findings have implications for investors and regulators.

Keywords: Investor sentiment; contagious sentiment; stock market returns; contrarian predictors; economic cycles.

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1. Introduction

The literature on investor sentiment has grown in the last few decades. Baker and Wurgler's (2007) define investor sentiment as a belief about future cash flows and investment risks not justified by the available information. Chang, Hsieh and Lai(2009) suggest that investor sentiment corresponds to the investor's opinion about future cash flows and risks, influenced by emotion. In general, investor sentiment can be defined as the tone of the market driven by investors' emotions and feelings beyond fundamental value. Additionally, Schmeling (2009) argues that waves of irrational sentiment, namely times of overly optimistic or pessimistic expectations, can persist and affect asset prices for significant periods. Several authors studied the impact of investor sentiment on the stock markets for different markets, periods and under different measures of sentiment (e.g.: Aissia (2016), Baker and Wurgler (2006, 2007), Brown and Cliff (2005), Fernandes, Gonçalves, and Vieira (2013), Fisher and Statman (2000), Jansen and Nahuis (2003), Lemmon and Portniaguina (2006), Schmeling (2009), Su, Cai, and Tao (2020) and Zhou, Chen, and Huang (2023)). The question is no longer whether investor sentiment affects stock prices, but rather how to measure investor sentiment and quantify its effects (Baker & Wurgler, 2007; Maurya, Bansal & Mishra, 2025; Ung, Gebka & Anderson, 2024).

We examine whether investor sentiment can explain equity returns. The first goal of our study is to determine whether Portuguese equity returns are influenced by waves of investor sentiment. We examine the effect of sentiment on the aggregated stock returns. The second goal considers whether the sentiment is contagious. There are several reasons to expect a contagious effect. Firstly, the globalization of the market and, secondly, the small size of the Portuguese stock market make it much more dependent on international trends and moods. In small and less developed markets, investors are expected to be less sophisticated and, thus, more prone to behavioral motivations. Furthermore, according to Schmeling (2009), stock markets at the aggregated country level are hard to value and arbitrage. Consequently, it seems plausible that the Portuguese stock market can be exposed to the impact of external investor sentiment. We use US market sentiment indicators to analyze whether US sentiment propagates and influences Portuguese aggregate stock returns.

The third goal of this study is to analyze whether there are differences in the impact of investor sentiment on financial and non-financial companies. The 2008 crisis made the markets aware of the potentiality of contagion across financial companies and it raises the question of whether financial companies are more exposed to investor sentiment.

Finally, the fourth goal is to determine whether the investor sentiment impact on the market returns varies according to the business cycle for the entire market and across

financial and non-financial companies. This hypothesis is motivated by several studies that argue that overvaluation is more prone to happen during economic expansions, whereas undervaluation is more common during economic downturns (Chung, Hung & Yeh, 2012; Feldman & Liu, 2017 and Yuan, Wang & Jin, 2022). During economic expansions, the aggregate confidence level increases, leading to a rise in transactions and, in extreme cases, a bull market, which can create a speculative bubble. Additionally, during these times, the noise trader risk and the fear of being forced to close their position discourage the arbitrageur's actions. However, during economic downturns, in response to drastic declines in stock prices, regulators often place restrictions on short sales and discourage securities lending, thereby preventing drastic changes in the market price. Consequently, the authors argue that due to arbitrage limits and short-sales constraints, overvaluation can be more persistent than undervaluation. Their results show investor sentiment only impacts future returns during economic expansions. On the contrary, Chen (2011) argues that economic agents will behave as financially constrained in the presence of asymmetric information, which is more likely to occur during a bear market. Additionally, the presence of loss-averse investors supports the theory that investor sentiment impact on the returns is larger during bear markets.

The period under study is from January 31, 2002, to December 31, 2014. This period was selected due to its unique characteristics in capturing the dynamics of investor sentiment and contagion effects in financial markets. It encompasses critical financial events that provide a suitable framework for analyzing the transmission of sentiment, particularly from the U.S. to the Portuguese stock market. The global financial crisis of 2008 represents an unprecedented shock that originated in the U.S. and rapidly spread across international financial markets, making it interesting to examine sentiment-driven contagion, especially in smaller and less liquid markets like Portugal. Moreover, this period allows the effects of investor sentiment across different market conditions. It covers both economic expansions and contractions, including the pre-crisis buildup, the sharp market downturn during the financial collapse, and the subsequent recovery period, which is relevant for assessing whether investor sentiment exhibits varying degrees of influence depending on the business cycle, as suggested by previous literature. Thus, this period captures the core mechanisms of sentiment contagion and its impact on stock returns. While sentiment-driven contagion has been extensively studied in major financial markets, its effects on the Portuguese stock market remain largely unexplored. Furthermore, selecting this period allows for the examination of specific dynamics within the Portuguese stock market, which, due to its relatively small size and lower liquidity, may be more susceptible to behavioral effects and contagion from larger markets, as argued by Debata, Dash, and Mahakud (2021).

We use local and global investor sentiment proxies to test their capability to explain Portuguese aggregate stock returns. As to local investor sentiment, we use the Consumer Confidence Index and the Economic Sentiment Index for the Portuguese market. With regard to the global investor sentiment, we use the Investor Intelligence Index and the Baker and Wurgler (2007) Sentiment Index, both for the US market. The US market is a reference market that makes sense to study in the case of contagious sentiment. As Baker et al. (2012) state that the US is widely considered the world's bellwether market and find some evidence of contagious to international markets. Verma and Soydemir (2006) also corroborate these findings.

We find that the sentiment has a negative impact on future market returns, and that impact is stronger for financial companies. Both global and local sentiment are contrarian predictors of aggregate stock returns: when local or US sentiment is high, future returns are low. Our evidence shows a contagious effect of the US investor sentiment on Portuguese stock market returns. Moreover, we find evidence that the investor sentiment impact is stronger during economic recessions.

The remainder of this paper is organized as follows. Section 2 reviews the literature, and section 3 describes the data and methodology. Section 4 describes and discusses the results. Section 5 concludes.

2. Literature review

"*Classical finance theory leaves no role for investment sentiment*" (Baker Wurgler, 2006, p.1645). As explained by the authors, according to classical finance, the competition among rational investors (to get optimal portfolios) will lead to an equilibrium in which prices equal the discount value of expected cash flows. Even in the presence of irrational investors, the classical theory argues that arbitrage actions will be enough to offset their impacts.

However, several studies show that classic theories fail to explain price movements. The stock market collapse in 1987, the Japanese bubble in the 80s, the Asian crises in 1997 and the financial crisis in 2008 are some events hard to explain by the classical theories (De Bondt, Muradoglu, Shefrin, & Staikouras, 2008). In line with this argument, Shefrin, (2009) argues that the 2008 crisis was mostly a result of psychological factors. According to the author, the psychological reaction to fundamental factors leads the financial system to the brink of collapse. The behavioral finance analyses investor behavior, namely the decision process, and analyses how investor actions affect the financial markets and its institutions (De Bondt et al., 2008). According to this view, there are normal investors who are affected by cognitive bias and emotions (Statman, 2014).

According to behavioral finance, cognitive bias may cause changes in prices that are not explained by fundamentals if the sentiment is cross-sectionally correlated and when there are limits to arbitrage (Fernandes et al., 2013). Therefore, the market can be influenced by investor sentiment. For Baker and Wurgler (2007), investor sentiment is generically defined as expectations about future cash flows and risk that are not fully justified by the information. Brown and Cliff (2004) consider that sentiment represents the expectations of market participants relative to a norm: a bullish investor expects returns above the average and a bearish investor expects returns below average. According to the authors, when investors trade based on noise signals, not correlated with the fundamental value, the prices will deviate from their intrinsic values. Baker and Stein (2004) consider in their study investor prone to sentiment as investors are excessively confident. By confidence, they contemplate the tendency to overvalue their information and undervalue other people's information.

In this paper, as Baker and Wurgler (2007), we assume that investor sentiment refers to the expectations about future cash flows and risk that are not fully justified by the information available. As Schmeling (2009), we assume that waves of irrational sentiment generate overly optimistic or pessimistic expectations that can persist and affect asset prices for significant periods of time.

Although there is still a heavy debate in the literature about investor sentiment influence on the stock market, there are several studies that have studied this phenomenon. Baker and Wurgler (2007) analyzed the investor sentiment impact on aggregate stock returns at a transversal level. Their results showed that it is possible to measure investor sentiment and that sentiment waves clearly affect the aggregated stock market. According to their results, investor sentiment is bigger when considering stocks whose valuation is highly subjective and difficult to arbitrage[**]. They also found that when sentiment is considered as high (low), lower (higher) returns tend to follow.

In a more recent study, Baker, Wurgler and Yuan (2012) studied the investor sentiment impact on the aggregated future stock market returns for the French, US, Japanese, German, UK, and Canadian stock markets. At a transversal level, their results showed an inverse relation between investor sentiment and future returns for stocks whose valuation is highly subjective and difficult to arbitrage. Additionally, they concluded that investor sentiment is contagious among markets, believing that capital flows are the main conductor.

[**] Young stocks, small stocks, unprofitable stocks, non-dividend-payer stocks, high volatility stocks, extreme growth stocks, and distressed stocks.

Nonetheless, they are still alert that other propagation channels should also be considered, namely social media and word-of-mouth.

Jansen and Nahuis (2003) analyze the relationship between the stock market and consumer confidence for eleven European countries[††], including Portugal. According to their results, there is a positive correlation between stock market returns and investor sentiment changes for nine countries, the German market is the main exception. The authors also found that the stock returns Granger-cause consumer confidence at short horizons (2 weeks - 1 month), but not vice versa.

Niţoi and Pochea (2020) investigate the dependence patterns in 24 European equity markets, focusing on whether the global financial crisis and sovereign debt crisis triggered contagion. The findings reveal that investor sentiment, particularly negative sentiments like fear, increases correlations among markets, especially during crises, suggesting that investor perceptions play a significant role in market movements.

Lemmon and Portniaguina (2006) also analyze the relationship between investor sentiment and stock returns, and according to their findings, the evidence suggests that investors tend to overestimate small stocks relative to large stocks during periods of high sentiment and vice versa. One possible explanation is that small stocks are more prone to sentiment because they are held mainly by individual investors who are more prone to be influenced by sentiment. Their data showed that stocks with low institutional ownership exhibited low (high) returns following periods of high (low) sentiment.

Chung et al. (2012) also analyzed the predictive power of investor sentiment over the transversal stock market returns, but the authors studied if that effect varies according to the business cycle. They have two pillars for this hypothesis. First, they assumed that overvaluation occurs when the economic outlook is positive and undervaluation happens during economic downturns. During economic expansions, the aggregate confidence level increases, which can lead to a rise in transactions and, in extreme cases, a bull market, which can create a speculative bubble. Additionally, during those times, the noise trader risk and the fear of being obliged to close their position discourage the arbitrageurs. However, during economic downturns, it is very simple to buy undervalued stocks. Furthermore, in response to drastic declines in stock prices, regulators often place restrictions on short sales and discourage securities lending, thereby preventing drastic changes in the market price. Consequently, the authors argue that due to arbitrage limits and short-sales constraints, overvaluation tends to be more persistent than undervaluation. Their results show investor sentiment only impacts future returns during economic expansions. Similarly, Chen (2011)

[††] Belgium, Denmark, France, Germany, Greece, Ireland, Italy, Netherlands, Portugal, Spain and UK.

examined the possibility that consumer confidence changes affect stock market returns differently through bull and bear markets. He also studied if a decrease in the confidence level can lead the market to a bear period. The author hypothesizes that in the presence of asymmetric information, the individuals will likely behave as if they were financially constrained, which is more likely to occur during bear markets. Furthermore, when the market faces a pessimistic outlook, loss aversion — the tendency to prioritize avoiding losses over seeking gains — reinforces the hypothesis that investor sentiment has a stronger impact on stock returns during bear markets. The author concluded that a decrease in the confidence level affects the stock returns more heavily during bear markets. They also showed that high pessimism levels can lead the market to a bear period.

In concrete for the Portuguese stock market, Fernandes et al. (2013) investigated whether investor sentiment predicts future aggregate stock market returns and industrial indices returns. Additionally, the authors studied whether the US investor sentiment affects the Portuguese stock market at aggregate and industry levels. The results confirm that the Portuguese sentiment hurt future market returns for forecast horizons of 1, 3, 6, and 12 months. Regarding the USA sentiment indicator, they did not find a contagious effect of USA investor sentiment in the Portuguese market and industry returns. However, they did find some interesting results in their robustness tests. When the authors analyzed the impact of the German sentiment (measured by the German confidence indicator) they found a negative and statistically significant impact on the future aggregate stock returns and the future returns of the PSI Basic Material.

3. Data and methodology

The dataset covers the period from 31 January 2002 to 31 December 2014. All indicators were obtained from the Datastream database on a monthly basis and standardized for comparability. The Baker and Wurgler (2007) sentiment index was sourced from Professor Jeffrey Wurgler's personal website.

Several measures of investor sentiment are described in the literature, and there is no consensus about which measure is best or the most adequate. Therefore, we apply investor sentiment measures to analyze how they impact the Portuguese stock market returns. Specifically, we employed three direct measures: (1) the consumer confidence index, (2) the economic sentiment index, and (3) the investor intelligence index; and an indirect measure: (4) the Baker and Wurgler (2007) sentiment index.

The Consumer Confidence Index is a standard measure of investor sentiment, Jansen and Nahuis (2003) and Schmeling (2009) employ this measure in their studies. The

Portuguese consumer confidence index is provided by the European Commission (EC) and by the Portuguese Statistical Institute.

The economic sentiment indicator (ESI) is also constructed for different countries and is available for reasonable periods of time. The EC provides this indicator. The advantage of this measure over the consumer confidence index is that this indicator contemplates five different economic sectors. The ESI is constructed as a weighted average of monthly survey results from five sectors: industry (with a weight of 40%), services (30%), consumers (20%), retail trade (5%) and construction (5%). We believe that this broader indicator may better reflect the Portuguese reality. Ho and Hung (2012) also use this measure in their study.

The Investors Intelligence Sentiment Index analyzes around 150 market newsletters categorized as bullish, bearish, or neutral. Since many of the authors of these newsletters are current or retired market professionals, we interpret the Investors Intelligence data as a proxy for institutional sentiment. Following the Brown and Cliff (2004) study, we use the survey measures of the percentage of bullish investors minus the percentage bearish to measure investor sentiment. This measure was also used by Brown and Cliff (2005) and Verma and Soydemir (2006).

Finally, the Baker and Wurgler (2007) sentiment index is also widely used in the literature. However, the Portuguese stock market was never analyzed using this or another indicator with a similar construction methodology. The index is the first principal component of the six sentiment proxies: the trading volume, the dividend premium, the closed-end fund discount, the number and first-day returns on initial public offerings (IPOs), and the equity share in new issues.

Using two investor sentiment measures constructed with the USA market in mind – the investor intelligence sentiment index and the Baker and Wurgler (2007) sentiment index – can be justified by the fact that the USA market is viewed as a benchmark. Prasad, Mohapatra, Rahman, and Puniyani (2022) highlight the predominance of the Baker & Wurgler Sentiment Index as a proxy for sentiment analysis in the literature. The authors examined the degree to which the US investor sentiment propagates abroad[‡‡]. Their results showed that the American institutional investor sentiment strongly affects the UK's and Latin America's returns. Regarding the individual investor sentiment, they could only find a statistically significant impact on the UK returns. The conclusions of Baker et al. (2012) also support the hypothesis that investor sentiment can be contagious among markets.

[‡‡] The authors analyzed the Mexican, Brazilian, Chilean and UK markets.

The stock market index used in this study is the Main Index PSI-20, as Fernandes et al. (2013) and Jansen and Nahuis (2003). We also use the Datastream index of financial and non-financial companies. To capture event-adjusted returns, we collect the total return index.

The returns were determined by:

$$R_t = \ln\left(\frac{P_t}{P_{t-1}}\right) x100 \qquad (1)$$

where P_t is the total return index.

To account for the macroeconomic scenario, since it is only natural that the investor sentiment measures reflect, at some level, economic fundamentals, we use several macroeconomic indicators as control variables. We use the National Bureau of Economic Research (NBER) business cycle indicator, a dummy variable with the value of one in recessions and zero in expansions, the industrial production index (% change), the unemployed rate (%), the indicator of private consume (%) and the consumer price index (% change).

Table 1 provides descriptive statistics for the stock returns and investor sentiment indicators. We consider the period from January 2002 to December 2014 for all variables with the exception of the Baker and Wurgler (2007) variable, for which we use the period from January 2002 to December 2010. The columns also report the maximum and minimum values, where the PSI-20 returns and the non-financial/financial returns vary substantially.

Table 1 - Descriptive Statistics

This table describes the data. N is the number of observations, μ represents the mean value, σ is the standard deviation, Min represents the minimum values and MAX the maximum values.

	N	μ	σ	Min	Max
PSI-20 All companies	156	-0.0185	5,554	-23.20	11.49
PSI-20 non-financial companies	156	-1.307	9,977	-31.94	23.70
PSI-20 financial companies	156	0.333	5,004	-23.40	9.091
Baker and Wurgler (2007)	108	-0.0891	0,375	-1.061	0.898

CCI	156	0	1	-2.169	1.852
ESI	156	0	1	-2.372	1.640
Investor Intelligence Index	156	0	1	-3.315	2.033

To examine whether the investor sentiment affects stock market returns in Portugal, we estimated the following regression for horizons of 1, 3 and 6 months:

$$R_t = \alpha + \beta_1 IS_t + \beta_2 IP_t + \beta_3 CPI_t + \beta_4 UR_t + \beta_5 CONS_t + \beta_6 BC_t + \beta_7 IP_{t-k} + \beta_8 CPI_{t-k} + \beta_9 UR_{t-k} + \beta_{10} CONS_{t-k} + \mu_t \quad (2)$$

Where R_t is the monthly PSI-20 returns (or the monthly non-financial companies returns or the monthly financial companies returns) at time t, and IS is the proxy for the investor sentiment, IP is the industrial production, CPI is the consumer price index, UR is the unemployed rate, CONS is the coincident indicator of private consume, BC is the recession indicator and μ_t is the error term. The investor sentiment impact on the Portuguese returns was analyzed in forecast horizons of 1, 3 and 6 months.

Additionally, to study how investor sentiment affects stock market returns during economic recessions or expansions, we applied:

$$R_t = \alpha + \beta_1 IS_t + \beta_2 IS_t xBC + \beta_3 IP_t + \beta_4 CPI_t + \beta_5 UR_t + \beta_6 CONS_t + \beta_7 BC_t + \beta_8 IP_{t-k} + \beta_9 CPI_{t-k} + \beta_{10} UR_{t-k} + \beta_{11} CONS_{t-k} + \mu_t \quad (3)$$

Where $R_t$is the PSI-20 returns (or the non-financial companies returns or the financial companies returns) at time t, and IS is the proxy for investor sentiment, IP is the industrial production, CPI is the consumer price index, UR is the unemployment rate, CONS is the coincident indicator of private consumption, BC is the recession indicator and μ_t is the error term.

The difference between equations (2) and (3) is that in the latest, we insert an interaction variable between the investor sentiment proxy and the recession indicator. A similar approach was used by Chen (2012) and also by Chen (2011) in robustness tests.

4. Results

This section presents the results for estimating the PSI-20 Stock Market Index returns for horizons of 1, 3, and 6 months. The variables of interest are the proxies of investor sentiment. We also control for several macroeconomic variables and the business cycle. Firstly, we report the local sentiment measures and, afterward, the US proxies of investor sentiment as explanatory variables of the aggregate stock returns.

Table 2 presents the estimates of the impact of the Consumer Confidence Index on the aggregated stock market returns and the financial and financial companies' stock returns. Consumer confidence has explanatory power for the PSI-20 returns for horizons of 1 and 3 months. In line with previous studies, investor sentiment has a negative impact on aggregated stock market returns. In other words, following periods of high sentiment market returns decline. In this case, an increase in the standard deviation level is associated, on average, with a 3.127 and 2.656 percent decrease in PSI-20 returns when considering time frames of 1 and 3 months, respectively.

Regarding the returns of non-financial companies, we find that the CCI also negatively impacts future returns. Considering time frames of 1 and 3 months, an increase in the standard deviation level is associated, on average, with a 2.623 and 2.123 percent decrease in the non-financial companies' index returns. Regarding the returns of financial companies, the impact is stronger and holds for every considered time horizon. The one percent increase in the standard deviation level is associated, on average, with a 5.052, 4.992, and 4.992 percent decrease in the financial companies' stock returns for time frames of 1, 3, and 6 months, respectively.

These results are consistent with Schmeling (2009), who also find that the CCI has explanatory power on stock market returns for horizons of 1 to 6 months. The author also observed, as did we, that the impact of sentiment on future returns declines with the forecast horizon. These findings have statistical and economic implications. Statistically, spurious regressions tend to produce significant results as the time horizon increases. Economically, the diminishing impact suggests that noise trading effects fade over longer periods, indicating that limits to arbitrage weaken as the horizon extends.

Table 3 presents the impact of the Economic Sentiment Index on the stock market returns. The results show that the Economic Sentiment Index has explanatory power for the PSI-20 stock returns. In this case, an increase in the standard deviation level is associated, on

average, with a 2.714, 4.083, and 5.385 percent decrease in PSI-20 returns when considering time frames of 1, 3, and 6 months, respectively.

Regarding the returns of non-financial companies, we conclude that the Economic Sentiment Index also negatively impacts future returns. Considering time frames of 1, 3, and 6 months, an increase in the standard deviation level is associated, on average, with a 2.293, 3, and 4.374 percent decrease in the non-financial companies' returns. Regarding the returns of financial companies, an increase in the standard deviation level is associated, on average, with a 5.367, 8.191, and 7.617 percent decrease in the financial companies' returns when considering time frames of 1, 3 and 6 months, respectively.

The results are consistent with Fernandes et al. (2013). The authors show that the Economic Sentiment Index has explanatory power statistically significant on the Portuguese aggregated stock market returns in time frames of 1, 3, 6 and 12 months.

Overall, we conclude that the Consumer Confidence Index, as well as the Economic Sentiment Index, influence the estimates of future stock returns. However, the Consumer Confidence Index has a more immediate impact: the stronger impact is for one-month horizons, decreases for 3 months time-horizons and has no longer impact for 6 months horizons. The Economic Sentiment Index is a broader proxy that comprises the Consumer Confidence Index in its construction and has a stronger impact on future stock returns. Moreover, its impact takes longer to be incorporated in prices: we find impact in every considered time-horizon but stronger as the horizon increases. We also find for both proxies of investor sentiment that financial companies are more exposed to investor sentiment than non-financial ones.

Table 2 - Regression results for the Consumer Confidence Index (CCI) impact on the PSI-20 returns

This Table reports the results of the predictive regressions that estimate the future PSI-20 Stock Market Index returns for horizons of 1, 3 and 6 months. The CCI is the Consumer Confidence Index. Macroeconomic control variables: IP refers to the industrial production (%); CPI refers to the Consumer Prices Index; UR refers to the unemployment rate; CONS refers to the private consume; BC refers to the business cycle. L.IP, L.CPI; L.UR and L.CONS refer to the prior variables lagged one month. *, ** and *** stand for statistical significance at 10%, 5%, and 1%, respectively.

	PSI-20 All companies			**PSI-20 non-financial companies**			**PSI-20 financial companies**		
Forecast Horizon	1 Month	3 Months	6 Months	1 Month	3 Months	6 Months	1 Month	3 Months	6 Months
CCI	-3.127***	-2.656**	-1.860	-2.623**	-2.123**	-1.357	-5.052**	-4.992**	-4.992**
	(0.923)	(1.201)	(1.350)	(1.033)	(0.981)	(1.220)	(2.162)	(2.349)	(2.233)
IP	0.0576	0.0186	-0.0204	0.0709	0.00824	0.0328	0.0363	0.0584	0.0584
	(0.128)	(0.133)	(0.133)	(0.131)	(0.116)	(0.112)	(0.222)	(0.202)	(0.226)
CPI	-1.357	-2.992***	-1.985	-1.248	-2.845***	-1.191	-2.320	-3.067	-3.067
	(1.424)	(1.132)	(1.409)	(1.087)	(0.969)	(0.976)	(2.349)	(2.119)	(2.051)
UR	1.124	-0.0804	-0.918	0.765	0.740	-1.116	-0.499	5.464	5.464
	(2.358)	(2.298)	(2.156)	(2.423)	(1.927)	(2.602)	(5.615)	(5.931)	(4.518)
CONS	4.769**	3.412	1.264	2.867	1.866	0.472	11.56***	11.79**	11.79***
	(2.101)	(2.604)	(2.233)	(1.905)	(1.709)	(1.664)	(4.238)	(4.697)	(4.122)

BC	-4.499*	-3.102	-3.312*	-4.661**	-3.416*	-2.596	-5.575	-1.737	-1.737
	(2.510)	(2.609)	(2.011)	(2.325)	(1.989)	(2.396)	(3.457)	(3.287)	(3.313)
L.IP	0.0521	0.0910	0.0521	0.00749	0.117	0.102	0.0802	0.0873	0.0873
	(0.104)	(0.109)	(0.180)	(0.0938)	(0.110)	(0.136)	(0.269)	(0.196)	(0.230)
L.CPI	0.557	2.377**	1.521	0.351	2.100**	0.551	1.854	3.020	3.020
	(1.290)	(1.116)	(1.370)	(1.032)	(0.827)	(1.045)	(2.000)	(1.973)	(2.093)
L.UR	-1.908	-0.640	0.157	-1.481	-1.382	0.353	-0.742	-6.544	-6.544
	(2.348)	(2.204)	(2.138)	(2.401)	(1.928)	(2.585)	(5.600)	(5.813)	(4.404)
L.CONS	-4.476**	-3.331	-1.514	-2.660	-1.849	-0.929	-10.94***	-11.17***	-11.17***
	(2.003)	(2.384)	(1.910)	(1.704)	(1.575)	(1.390)	(3.850)	(4.163)	(3.651)
Constant	10.45**	9.209**	9.469**	10.31***	9.060***	10.34***	13.40	9.923	9.923
	(5.045)	(4.528)	(3.949)	(3.510)	(3.457)	(2.883)	(9.399)	(6.906)	(7.574)

Table 3 - Regression results for the Economic Sentiment Index (ESI) impact on the PSI-20 returns

	PSI-20 All companies			PSI-20 non-financial companies			PSI-20 financial companies		
Forecast Horizon	1 Month	3 Months	6 Months	1 Month	3 Months	6 Months	1 Month	3 Months	6 Months
ESI	-2.714*	-4.083***	-5.385***	-2.293**	-3.000***	-4.374***	-5.367***	-8.191***	-7.617***
	(1.543)	(1.400)	(1.030)	(1.021)	(1.141)	(1.142)	(1.745)	(2.597)	(2.485)
IP	0.0273	-0.0266	-0.0741	0.0453	-0.0257	-0.0102	-0.0211	-0.0307	-0.168
	(0.126)	(0.121)	(0.0956)	(0.107)	(0.125)	(0.145)	(0.233)	(0.199)	(0.255)
CPI	-0.268	-1.806	-0.720	-0.332	-1.937	-0.191	-0.409	-0.759	-2.844
	(1.352)	(1.239)	(1.460)	(1.107)	(1.285)	(1.073)	(2.566)	(2.142)	(2.624)
UR	0.502	-0.729	-1.780	0.241	0.262	-1.797	-1.631	4.162	-2.704
	(2.691)	(2.204)	(2.535)	(2.825)	(2.523)	(2.020)	(6.115)	(5.757)	(6.054)
CONS	4.478**	4.141**	3.384**	2.633	2.286	2.319*	11.68***	13.48***	8.198
	(2.094)	(1.832)	(1.724)	(1.755)	(1.941)	(1.340)	(4.241)	(3.215)	(5.139)
BC	-2.798	-1.763	-2.365	-3.234	-2.344	-1.896	-2.846	0.777	-3.110

	(2.632)	(2.065)	(1.889)	(2.067)	(1.934)	(1.995)	(3.638)	(3.094)	(3.046)
L.IP	0.0307	0.0654	0.0257	-0.0105	0.0971	0.0816	0.0421	0.0375	-0.160
	(0.0980)	(0.112)	(0.139)	(0.0992)	(0.0842)	(0.132)	(0.221)	(0.223)	(0.231)
L.CPI	0.413	2.394**	1.717	0.232	2.091**	0.730	1.702	3.098	4.882*
	(1.256)	(1.190)	(1.357)	(1.118)	(0.965)	(1.182)	(2.697)	(2.238)	(2.637)
L.UR	-0.725	0.616	1.595	-0.486	-0.436	1.481	1.358	-4.072	2.418
	(2.606)	(2.173)	(2.472)	(2.676)	(2.494)	(1.922)	(6.098)	(5.540)	(5.923)
L.CONS	-3.808**	-2.975*	-1.842	-2.103	-1.509	-1.287	-10.04***	-10.61***	-5.875
	(1.830)	(1.757)	(1.611)	(1.586)	(1.640)	(1.171)	(3.704)	(2.977)	(4.208)
Constant	2.311	-0.0318	-0.0964	3.466	1.996	2.809	-0.969	-8.078	-3.072
	(4.293)	(3.419)	(3.439)	(4.116)	(3.809)	(3.945)	(8.720)	(7.701)	(9.533)

This Table reports the results of the predictive regressions that estimate the future PSI-20 Stock Market Index returns for horizons of 1, 3 and 6 months. The ESI is the Economic Sentiment Index. Macroeconomic control variables: IP refers to the industrial production (%); CPI refers to the Consumer Prices Index; UR refers to the unemployment rate; CONS refers to the private consume; BC refers to the business cycle. L.IP, L.CPI, L.UR and L.CONS refer to the prior variables lagged one month. *, ** and *** stand for statistical significance at 10%, 5%, and 1%, respectively.

Tables 4 and 5 present the results for the US Investor Sentiment proxies. Table 4 reports the impact of the Investor Intelligence Sentiment Index on the Portuguese stock market returns. The results show that the Investor Intelligence Sentiment Index has some predictive power for returns for time frames of 6 months. Considering this time frame, an increase in the standard deviation level is associated, on average, with a 1.254, 1.081, and 2.808 percent decrease in the PSI-20, non-financial and financial companies returns, respectively. Since this indicator is usually viewed in the literature as an institutional measure of institutional sentiment, we can assume that the Portuguese stock market is also prone to institutional sentiment.

The impact of this indicator becomes evident only after six months, consistent with the findings of Verma and Soydemir (2006), who report that the influence of American investor sentiment on foreign markets emerges after approximately three months. They attribute this delay to the lower efficiency of foreign markets in processing and disseminating information generated in the United States. Moreover, their research indicates that the intensity of sentiment's impact on foreign markets varies, potentially due to factors such as the extent of trade relations with the US and the institutional structures of each country. The statistical significance of this indicator suggests the presence of contagion between the US and Portuguese markets, contradicting the findings of Fernandes et al. (2013).

Table 5 reports the influence of the Baker&Wurgler Sentiment Index on the Portuguese future stock market returns. Baker&Wurgler Sentiment Index is an indirect measure that includes the first principal component of six underlying proxies: market turnover, number and average first-day returns on IPOs, the share of equity issues, dividend premium and volatility premium. We find some predictive power of this sentiment measure, albeit weak, in the Portuguese stock market returns, for 3 months horizons. The model estimation incorporates the effect of the Portuguese macroeconomic conditions. Without these control variables, the predictive power of the Baker&Wurgler Sentiment Index is much stronger and observable for time horizons of 1, 2, and 6 months (untabulated results). On the contrary of the prior sentiment measures where financial companies were the most affected by sentiment, for the Baker&Wurgler Sentiment Index, we find weaker evidence of influence on the stock returns of financial companies.

Overall, we conclude that the Investor Intelligence Sentiment Index and the Baker&Wurgler Sentiment Index can be used as complementary proxies to predict future Portuguese stock returns.

Table 4 - Regression results for the Investor Intelligence Sentiment Index (IISI) impact on the PSI-20 returns

	PSI-20 All companies			PSI-20 non-financial companies			PSI-20 financial companies		
Forecast Horizon	1 Month	3 Months	6 Months	1 Month	3 Months	6 Months	1 Month	3 Months	6 Months
IISI	-0.0916	0.225	-1.254***	-0.00646	0.241	-1.081**	-0.434	0.217	-2.808***
	(0.498)	(0.551)	(0.441)	(0.523)	(0.568)	(0.472)	(0.917)	(0.819)	(0.954)
IP	0.0500	0.00782	-0.0370	0.0651	0.000107	0.0195	0.0217	0.0367	-0.124
	(0.125)	(0.135)	(0.130)	(0.129)	(0.131)	(0.101)	(0.213)	(0.215)	(0.218)
CPI	-0.680	-2.445*	-1.586	-0.684	-2.412**	-0.891	-1.206	-2.027	-4.012
	(1.284)	(1.346)	(1.216)	(1.154)	(0.971)	(1.206)	(2.171)	(1.840)	(2.800)
UR	0.847	-0.0733	-1.115	0.534	0.749	-1.255	-0.953	5.465	-1.730
	(2.632)	(2.146)	(2.727)	(2.691)	(1.847)	(2.272)	(5.537)	(6.877)	(4.994)
CONS	2.918	1.444	0.736	1.264	0.249	0.217	8.770**	8.245*	5.266
	(2.046)	(2.170)	(1.814)	(1.992)	(1.876)	(1.349)	(3.924)	(4.221)	(3.401)
BC	-2.868	-1.447	-4.116**	-3.198*	-2.012	-3.400	-3.325	1.101	-6.943**
	(2.586)	(2.281)	(2.010)	(1.870)	(2.361)	(2.449)	(3.361)	(3.305)	(3.182)
L.IP	0.0408	0.0772	0.0507	-0.00242	0.105	0.102	0.0633	0.0625	-0.121
	(0.120)	(0.107)	(0.161)	(0.115)	(0.117)	(0.147)	(0.219)	(0.235)	(0.220)

L.CPI	0.189	2.040	1.294	0.0439	1.832**	0.387	1.253	2.384	4.292
	(1.372)	(1.332)	(1.205)	(1.148)	(0.931)	(1.215)	(2.250)	(1.884)	(2.696)
L.UR	-1.245	-0.290	0.617	-0.928	-1.106	0.684	0.337	-5.874	1.006
	(2.552)	(2.098)	(2.678)	(2.572)	(1.877)	(2.234)	(5.385)	(6.595)	(4.876)
L.CONS	-3.366*	-1.973	-1.273	-1.687	-0.724	-0.867	-9.321***	-8.752**	-5.784*
	(1.940)	(2.055)	(1.664)	(1.888)	(1.862)	(1.238)	(3.473)	(3.792)	(3.095)
Constant	5.687	4.959	6.538*	6.322	5.664*	8.193**	5.693	1.931	6.229
	(3.933)	(4.345)	(3.350)	(3.878)	(3.333)	(3.600)	(9.822)	(7.808)	(6.740)

This Table reports the results of the predictive regressions that estimate the future PSI-20 Stock Market Index returns for horizons of 1, 3 and 6 months. The IISI is the Investor Intelligence Sentiment Index. Macroeconomic control variables: IP refers to the industrial production (%); CPI refers to the Consumer Prices Index; UR refers to the unemployment rate; CONS refers to the private consume; BC refers to the business cycle. L.IP, L.CPI, L.UR and L.CONS refer to the prior variables lagged one month. *, ** and *** stand for statistical significance at 10%, 5%, and 1%, respectively.

Table 5 - Regression results for Baker&Wurgler Sentiment Index (B&WSI) impact on the PSI-20 returns

	PSI-20 All companies			PSI-20 non-financial companies			PSI-20 financial companies		
Forecast Horizon	1 Month	3 Months	6 Months	1 Month	3 Months	6 Months	1 Month	3 Months	6 Months
B&WSI	-2.677	-4.221**	-2.961	-2.677	-4.221**	-2.961	-2.758	-3.615*	-1.860
	(2.266)	(1.696)	(2.457)	(1.942)	(1.901)	(2.687)	(2.325)	(2.058)	(2.030)
IP	0.0375	0.0545	0.0602	0.0375	0.0545	0.0602	0.0518	0.0706	0.0790
	(0.128)	(0.145)	(0.160)	(0.137)	(0.153)	(0.129)	(0.125)	(0.121)	(0.140)
CPI	-3.015*	-2.458*	-1.289	-3.015*	-2.458	-1.289	-2.364	-2.376	-0.922
	(1.745)	(1.415)	(1.650)	(1.713)	(1.687)	(1.399)	(1.576)	(1.675)	(1.778)
UR	4.071	-1.163	2.452	4.071	-1.163	2.452	2.092	-0.0307	1.718
	(4.756)	(3.993)	(3.874)	(4.686)	(3.507)	(2.571)	(4.085)	(2.760)	(3.146)
CONS	-0.0611	-2.969	-4.119*	-0.0611	-2.969	-4.119	-0.438	-2.948	-3.626*
	(2.785)	(3.416)	(2.449)	(2.810)	(3.238)	(2.639)	(2.986)	(2.547)	(2.186)
BC	-4.559*	-2.443	-2.437	-4.559**	-2.443	-2.437	-4.406*	-2.650	-2.223
	(2.428)	(2.640)	(2.407)	(2.289)	(2.566)	(2.601)	(2.527)	(2.990)	(2.131)

L.IP	0.0243	0.161	0.173	0.0243	0.161	0.173	-0.0630	0.169	0.208
	(0.126)	(0.175)	(0.180)	(0.143)	(0.148)	(0.222)	(0.127)	(0.112)	(0.207)
L.CPI	2.851	1.885	0.865	2.851	1.885	0.865	2.143	1.678	0.357
	(2.052)	(1.646)	(1.694)	(1.904)	(1.745)	(1.605)	(1.814)	(1.762)	(1.985)
L.UR	-3.679	1.297	-2.694	-3.679	1.297	-2.694	-1.772	0.116	-2.029
	(4.444)	(3.988)	(3.822)	(4.445)	(3.423)	(2.416)	(4.012)	(2.725)	(3.093)
L.CONS	-0.333	2.436	3.538	-0.333	2.436	3.538	0.160	2.423	2.843
	(2.697)	(3.349)	(2.313)	(2.623)	(3.206)	(2.428)	(2.904)	(2.499)	(2.066)
Constant	-1.930	1.360	4.362	-1.930	1.360	4.362	-0.999	2.409	6.026
	(7.773)	(8.023)	(7.145)	(7.276)	(6.797)	(8.151)	(7.161)	(6.287)	(6.078)
Observations	108	108	108	108	108	108	108	108	108
R-squared	0.179	0.148	0.113	0.179	0.148	0.113	0.169	0.156	0.113

This Table reports the results of the predictive regressions that estimate the future PSI-20 Stock Market Index returns for horizons of 1, 3 and 6 months. The B&WSI is the Baker&Wurgler Sentiment Index. Macroeconomic control variables: IP refers to the industrial production (%); CPI refers to the Consumer Prices Index; UR refers to the unemployment rate; CONS refers to the private consume; BC refers to the business cycle. L.IP, L.CPI, L.UR and L.CONS refer to the prior variables lagged one month. *, ** and *** stand for statistical significance at 10%, 5%, and 1%, respectively.

5. Conclusion

This study examines the impact of investor sentiment on aggregate Portuguese stock returns on financial and non-financial companies over the period from 31 January 2002 to 31 December 2014. We employ local and US sentiment measures to investigate the contagion hypothesis between markets, controlling for the Portuguese macroeconomic environment and business cycles. The period under consideration is particularly significant due to the inclusion of the global financial crisis of 2008, which had a profound effect on investor sentiment worldwide and contributed to widespread contagion across markets. The impact of this crisis on market behavior, particularly in smaller markets like Portugal, has not been thoroughly explored in existing literature. By focusing on this period, this study provides valuable insights into the dynamics of investor sentiment and contagion, offering a better understanding of how these factors affect stock returns in the context of both global and local market sentiment.

Our findings reveal that local sentiment indicators have stronger explanatory power over shorter future periods, reflecting the immediacy with which these measures influence stock prices. However, for the Economic Sentiment Index, the impact intensifies over longer horizons, suggesting that this measure takes longer to be fully incorporated into asset prices.

We also find that US sentiment indicators influence future Portuguese aggregate stock returns. Specifically, the Investor Intelligence Sentiment Index exhibits predictive power for horizons of up to six months, while the Baker & Wurgler Sentiment Index shows predictive power for three-month horizons. These results support the existence of sentiment contagion from the US to the Portuguese market, indicating that US sentiment measures can serve as valuable complementary proxies for forecasting future Portuguese stock returns.

Furthermore, across all direct investor sentiment proxies, we find that financial companies are more sensitive to investor sentiment than non-financial ones. Additionally, while the evidence is somewhat limited, there are indications that the impact of investor sentiment strengthens during economic recessions.

Overall, our results demonstrate that investor sentiment measures hold significant predictive power for Portuguese stock returns, reinforcing the relevance of sentiment dynamics in understanding market behavior.

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