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Investor Sentiment and Stock Returns: Evidence from the Athens Stock Exchange

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Abstract

A plethora of academic research has been under way investigating the effect of individual investor sentiment on stock returns. It seems that the issue is not resolved yet because the empirical findings are not entirely conclusive. Most authors argue that there is a place for sentiment as a determining factor in the stock return generating process while several others find that it is exactly the opposite. This paper aims at contributing to the existing debate by examining the relationship between investor sentiment and stock market returns of firms listed in the Athens Stock Exchange. We employ two investor sentiment proxies, a direct and an indirect. As the direct measurement of sentiment we use the historical investor sentiment indicators compiled by the European Commission, and for the indirect one we resort to the closed-end equity fund discount/premium. Using monthly data for the period January 1995 to April 2014 the regression results indicate that investor sentiment weakly explains returns. Because this type of risk is not diversifiable, for practical purposes somehow it ought to be priced. Thus, it appears that behavioral factors may be considered in empirical asset pricing models for the Greek market.

Keywords: Investor sentiment, Greek stock market, Return predictability

I. Introduction

In neoclassical finance theory there is typically no place for investor sentiment because, it is argued, share valuation reflects only fundamentals and nothing else. From its inception traditional financial theorists have either ignored sentiment as a risk factor or have assumed it

away, on the grounds that in perfectly competitive financial markets irrational trading behavior will be quickly washed away. The tenets on which this conclusion is drawn are: firstly, financial markets are informationally efficient and secondly, market participants are rational.

The requirement of market efficiency, therefore, becomes one of the two foundations of modern financial economics and its presence guarantees that in equilibrium asset prices embody all available information regarding the fundamental value of the underlying security. In the absence of market frictions, then, the price of marketable securities is equal to their intrinsic value, which is defined as the sum of present value of all expected cash flows. Thus, in an efficient market security prices instantaneously reflect all relevant information and this makes prediction of future prices based on past and present information futile, because they just follow a random walk.¹

The second foundation of modern financial theory is the assertion that individual investors behave rationally, which implies that in their decision making calculus they take into consideration and rely on all available relevant information they have access to. Rationality in financial markets is based on the hypothesis of rational expectations found in economic theory, which states that the predictions of economic agents regarding the future value of an asset are not systematically biased, that is, errors are not correlated.²

Introducing in the model the additional factors of investors pursuing their own self-interest and the forces of arbitrage, classical financial theory formulates its final argument that irrational participants will be quickly expelled from the market and with them the opportunities of making

¹ This pattern of security prices movement is postulated by the Efficient Market Hypothesis (EMH), which initially was formalized by Samuelson (1965) and popularized by Fama (1970, 1976).

² Statistically, this is equivalent to saying that the individual predictions will be normally distributed around their expected value. This way of modeling expectations was originally proposed by Muth (1961) and was further developed by Lucas (1972) and Sargent & Wallace (1975) as a reaction to inherent flaws of theories based on adaptive expectations.

risk-free profits. The issue, however, is that in the real world investors are constrained on their arbitrage activities due to the fact that financial markets are not frictionless. This is so because in order to earn risk-free profit professional arbitrageurs must use substantial funds, which means that this activity automatically is exposed to risk. Moreover, because of the presence of transaction cost, information gathering cost, and financing cost arbitrageurs become very skeptical and to a large extent are discouraged from exploiting market mispricing. Therefore, arbitrage does not necessarily operate toward eliminating market anomalies (Shleifer and Vishny, 1997).

The persistent presence of security mispricing and unexploited arbitrage opportunities, which are manifested in financial puzzles such as the closed-end fund discount, January Anomaly, the weekend effect, and IPO underpricing as well as the periodic occurrence of financial crises has led a group of theorists to search for alternative explanations for these market anomalies. One approach is resorting to non-economic factors, such as investor behavior, that bypass the strict rationality assumption and the presence of arbitrage of the conventional finance paradigm. More specifically, this practice has been advocated by proponents of behavioral finance, who posit that some market participants may exhibit irrational characteristics and through their conduct could affect market outcome, asset prices, and possibly the conduct of other investors. In this framework, investor sentiment becomes a key factor that can explain the presence of market distortions, such as limited arbitrage, which make asset prices diverge from equilibrium.

Proponents of behavioral finance have advocated that in real markets arbitrageurs are also constrained by the presence of “noise” traders, whose unconventional behavior increases risk

exposure for all participants, and therefore they (arbitrageurs) are not willing to expose themselves to excessive non-diversifiable risks. These noise traders are usually small individual investors with minimum or without any investment training and hence their behavior is not necessarily rational, because in essence their decisions are made on rumors and not on fundamentals. A further complication arises due to the fact that noise trading is strongly correlated and creates what has been coined as herd behavior³. Because noise traders' expectations about asset returns are sensitive to fluctuations in the same sentiment they have the tendency to overreact or underreact in tandem, their trades are not randomly distributed across assets and thus confuse arbitrageurs with their irrational conduct (De Long *et al.*, 1990, 1991).

As opposed to the traditional view that stock return co-movements can result either by changes in expected cash flows or the discount rate, the noise trader model postulates that synchronous investment activities of unpredictable noise traders would also produce correlated returns. Consequently, to the extent that sentiment gives rise to herd behavior of noise traders, this sentiment becomes an additional explanatory variable in the return generating process of tradable financial assets. In the case of stock prices, the implication of this reasoning is that, besides the usual risk factors and macroeconomic variables, the investment activities of both rational sophisticated arbitrageurs and irrational naive noise traders will determine market outcome⁴.

³ John Maynard Keynes in his masterpiece the *General Theory of Employment, Interest and Money* used the phrase “animal spirits” to describe the instincts, propensities and emotions that systematically influence and guide human behavior, and which can be manifested in terms of investor sentiment.

⁴ The integration of fundamentals and investor sentiment in the valuation process is termed by Charles Lee (2003) *fusion investing*. Robert Shiller (1984) argues that current security market prices transcend their fundamental component by also including a term which captures the demand by noise traders, who act solely on sentiment. Thus, fusion investing implies that investors besides engaging in fundamental analysis should also consider investor sentiment in terms of fads and fashions.

However, with regard to investor sentiment researchers do not agree on a commonly accepted definition. In the relevant literature we find a long list of such definitions, ranging from clouded statements about investors' perceptions to unique psychological biases, which are model specific. The picture becomes even more opaque when considering the different ways this term has been employed by academic researchers, professional practitioners, and the media (Barberis *et al.*, 1998; Daniel *et al.*, 2002; Welch and Qiu, 2004; Cliff and Brown, 2004; Baker and Wurgler, 2007; Shefrin, 2008). Specifically, some scholars view investor sentiment as the tendency to trade on rumors rather than market information while the investment community may use it less formally to indicate periods of euphoria or phobia.

For the purposes of this paper, investor sentiment is defined as the propensity of market participants to speculate, and this attitude can be related to the psychological state of mind of investors. Thus, it is argued that during market upswings it is euphoria that pushes irrational investors to be lax in their investment strategies, whereas during corrections they base their investment decisions on a wider spectrum of considerations and more careful analyses (Schwarz, 2002). In the same spirit, Dellavigna and Pollet (2009) assert that investors become less attentive in good times, which leads to mispricing of stocks. In addition, Brown and Cliff (2004) describe sentiment as the expectation of market participants relative to a norm, according to which the average investor is a zero sentiment person whereas a bullish (bearish) investor expects higher (lower) returns than this norm⁵.

⁵ The former Federal Reserve System chairman Alan Greenspan initiated the term "irrational exuberance" to describe the excessive euphoria in the stock market during the 1990s, and explicitly warn investors of the high risks associated with the bubble in dotcom stocks. Also, Robert Shiller (2002) blames the presence of sentiment as "irrational exuberance" driving the prices of U.S. stocks well above their fundamental values.

As emerging markets are dominated relatively more by individual investors and lack availability of quality information and professional financial analysts' services, the performances of these markets are more likely to be influenced by the sentiment of general investors. Short selling usually is either not allowed or it is very shallow in many emerging stock markets and this is for all practical purposes the case of the Greek market as well.⁶ Hence, as expected, the absence of the mechanism of short selling makes it difficult for smart investors to respond quickly to any new information in order to align mispriced stocks. Despite the high possibility of presence of sentiment in the Greek capital market, there are only a couple of published papers dealing with the effect of sentiment. Thus, this paper investigates the performance of the Greek stock market primarily from behavioral perspective by introducing sentiment factors in the empirical asset pricing models. Based on the above discussion, we believe that the impact of sentiment is an important research issue for the Greek market and hence the paper contributes to the understanding of the operation of this market.

We formalize our investigation on the significance of sentiment in the Greek market by forming the following hypotheses:

Hypothesis 1: The Greek stock market with its periphery attributes is expected to be relatively more prone to investor sentiment influence, in line with other less developed markets.

Hypothesis 2: Of the two complete stock market activity cycles that were recorded over the last twenty five years, we postulate that the former is characterized by stronger sentiment influence

⁶ Short-selling was officially introduced in Greece with the establishment of the Derivatives Market, which started operations in August 1999. However, short-selling activity was never significant and remained shallow ever since, due to small number of stocks available for repos contracts. A short-selling ban on all stocks was reintroduced in August 2011, in order to protect investors from the fallout of the country's debt crisis.

than the latter. This belief stems from the observable fact that during the first cycle the number of immature and unsophisticated market participants was much larger than in the second cycle. In other words, because so many “investors” were forcefully stripped off their wealth when the market collapsed in 1999 they wouldn’t dare repeat the same mistake twice.

Hypothesis 3: For both cycles, the upswing phase is expected to exhibit stronger sentiment influence than the downswing.

The rest of the paper proceeds as follows. Section II presents an overview of the relevant literature on sentiment as determinant of stock returns. In section III we discuss the main characteristics of the Greek stock market, the evolutionary historical developments that have shaped it through the past quarter of a century, and its relative performance over the last two major activity cycles of “boom and bust”. Section IV describes in detail the sources of data used in our analyses and the rationale of using the information contained therein. We also discuss the research methodology used in the study. In section V we present the analysis of the results of our empirical investigation. In section VI we conclude the paper.

II. Literature Review

The long debate among finance theorists and researchers on whether sentiment influences stock prices is still to a large extent not resolved. Black (1986) introduces the concept of noise trading and explains how irrational investors guided by sentiment distort market outcomes. Trueman (1988) extends Black’s point further and explains why an investor would rationally opt to trade on noise. De Long *et al.* (1990) develop a model where noise traders acting in concert can influence equilibrium stock prices because arbitrageurs are incapable of eliminating such

disequilibria, which implies that sentiment is priced. Schleifer and Summers (1990) challenge the efficient market paradigm by showing that the assumption of limited arbitrage in financial markets is more plausible than the one of perfect arbitrage. Shefrin and Statman (1994) extend the CAPM by allowing noise trading to interact with rational information trading and show that noise traders act as a second driver, which destabilizes financial markets and pushes stock prices away from their equilibrium value.

On the other hand, some researchers argue in favor of the EMH, in the sense that investor sentiment does not qualify as a risk factor. Elton *et al.* (1998) provide evidence against the proposition that investor sentiment is priced in the U.S. stock market. Doukas and Milonas (2004) conduct an out of sample analysis in the Greek capital market, which they consider more likely to be prone to investor sentiment, and do not find supporting evidence for the role of sentiment in explaining the returns of closed-end funds. In line with Elton *et al.* they claim that their findings do not support the hypothesis that investor sentiment represents an independent and systematic asset pricing risk. Partly in line with these findings, Brown and Cliff (1999) find weak relationship between sentiment and stock returns, although they report existence of strong relationship between sentiment and returns of small stocks. Likewise, Leonard and Shull (1996) investigate the investor sentiment effect on NYSE stocks over the two periods from July 1965 to April 1980 and again from that date to December 1994. Their findings suggest a dichotomy over the significance of investor sentiment as a risk factor. Whereas investor sentiment is priced in the first sub-period, it loses its explanatory power during the second sub-period.

Overall, research in developed economies reveals the existence of a significant relationship between stock returns and the sentiment of the market (Bhaskaran, 1996; Barberis *et al.*, 1998; Brown and Cliff, 2004; Baker and Wurgler, 2006, Kumar and Lee, 2006; and several others). Specifically, Bhaskaran (1996) examines the relation between closed-end fund discounts and small firm returns and discovers that discounts forecast future small firm returns and also provide independent information about the conditional expected returns of small firms. In addition, he finds that discounts forecast only the small firm factor return out of the five factors suggested by Fama and French (1993). Kumar and Lee (2006) show that the trading activities of retail investors are highly correlated and explain return co-movements for stocks with high retail concentration that are difficult to arbitrage, which is consistent with the predictions of the noise trading model. Beaumont *et al.* (2008) find that sentiment has a significant and asymmetric effect on stock returns volatility. Finter *et al.* (2010) report that an index of market sentiment explains the spread between the returns of sentiment sensitive stocks and sentiment insulated stocks. Additionally, they find that stocks that are difficult to arbitrage and evaluate are more sensitive to market sentiment. Baker *et al.* (2011) consider both local and global sentiment factors to investigate the presence of sentiment in six major markets. They report that high sentiment causes low future returns for relatively difficult to arbitrage and evaluate stocks. Antoniou *et al.* (2012) find that higher momentum of returns occurs in higher sentiment periods and such momentum is absent during pessimistic periods. Finally, Baker and Wurgler (2006) point out that in case of young firms, extreme growth firms, small firms, and non-dividend-paying firms the chance of subjective evaluation increases, which leads to susceptibility to market sentiment. Thus, if the market itself is young, there should be even higher probability of the presence of sentiment.

Research on a number of emerging markets indicates that sentiment plays a role in explaining stock returns. To begin with, Aitken (1998) finds that as soon as institutional investors start investing in emerging economies' markets stock returns there experience a sharp increase in autocorrelation. He concludes that the presence of institutional investors' sentiment in emerging markets works as a risk factor in the determination of asset prices, resulting in overshooting. Kling and Gao (2008) show that sentiment influences stock returns in the Chinese stock market. More precisely, they find that although the mood of investors follows a positive feedback in the short-run, stock price and investor sentiment do not have a long-run relationship. Institutional investors are optimistic (pessimistic) when previous market returns are positive (negative). Also, institutional investors' sentiment is not found to predict future stock returns. Canbas and Kandir (2009) investigate the relation between investor sentiment and sock returns on the Istanbul Stock Exchange, and their results indicate that past stock portfolio returns influence investor sentiment, while investor sentiment fails to forecast future stock returns.

Zouaoui *et al.* (2010) use panel data of 15 European and U.S. stock markets and find that sentiment has more effect on stock returns in those countries where investors are prone to herd behavior and institutional investment is relatively low. Grigaliuniene and Cibulskiene (2010) examine the effect of sentiment in Scandinavian markets and report negative relationship between sentiment and future stock returns. Liu *et al.* (2011) consider the direct and indirect effects of sentiment factors on Taiwan stock market returns. Their results indicate that extreme sentiment indicator plays a critical role in determining changes in market returns. Anusakumar *et al.* (2012) report that local as well as global sentiment influence stock returns of a sample of 13

Asian stock markets. Their findings indicate the presence of sentiment in these markets and their result is robust with respect to firm size, trading volume, sample period and other proxies. Zhuang and Song (2012) examine the relationship between investor sentiment and stock returns and volatility in the Chinese stock market. They report that investor sentiment has a strong impact on stock returns in the Chinese stock market. Liston *et al.* (2012) investigate Dow Jones Islamic Equity indices to find that bullish shifts in sentiment in current period lower conditional future volatility. Rehman (2013) gives empirical evidence that stock returns of Karachi Stock Exchange, a market which primarily consists of retail investors, are also influenced by investor sentiments. Chowdhury *et al.* (2014) examine the effect of sentiment on returns in the Bangladesh stock market and find that high sentiment leads to high contemporaneous returns followed by downward correction in the next month and this is mainly observed for small size portfolios. Thus, they conclude that sentiment should be considered as a source of systematic risk.

Research on the Greek market reveals that it is rather susceptible to investor sentiment, which is not surprising given that this market does not exactly possess the attributes of a mature capital market. Having said that, it is expected that stock prices in the Athens Stock Exchange (ASE) would not follow a random walk and this implies that the market is not informationally efficient. Dockery and Kavussanos (1995) performed unit root tests over the period 1998 to 1994 using panel data for a sample of 73 companies listed on the ASE and conclude that the Greek stock market is inefficient and, therefore, share prices tend to move systematically over time. Niarchos and Alexakis (1998) investigate the speed of price adjustment between common and preferred shares and find that the Greek market exhibits characteristics of inefficiency, because the price

movements of preferred shares tend to follow the price change of common shares. Thus, contrary to the prediction of the EMH, it is possible to forecast the price movement of preferred shares based on the information conveyed by price changes of common shares. Patra and Poshakwale (2006) examine the link between selected macroeconomic variables and stock returns in the Greek market during the 1990s and find a persistent relationship between inflation, money supply, trading volume and stock prices. They conclude that the Greek stock market is not efficient because publically available information regarding macroeconomic variables and trading volumes can be potentially used to predict future stock prices. Athanasiadis (2010) tests the weak-form of EMH in the Greek market by using daily closing prices over the period 2000 to 2008 of stocks of two major stock indices, the GI (general index) and the FTSE-20 (large cap). He reports that whereas shares of the GI do not follow a random walk process, which implies rejection of the efficient market hypothesis in its weak form, in the case of FTSE-20 shares the test is inconclusive. In the latter case half of the stocks appear to follow a random walk pattern but the other half does not do that. Alexakis (2011) investigates the stock price movement between large and small banks in the Athens Stock Exchange, before and during the financial crisis of 2008-2009 and finds that they exhibit totally different price behavior. That is, big banks during the financial crisis showed stock price dynamics due to high institutional ownership, which were affected by correlated negative sentiment or mimicking minimizing loss strategies irrespective of the quality of the banks' assets. On the antipode of these findings, Doukas and Milonas (2004) do not find support for the hypothesis that investor sentiment represents an independent and systematic asset pricing risk in the Greek capital market.

III. The Greek Stock Market in Historical Perspective

The Greek economy entered the 1990s burdened with serious macroeconomic imbalances and significant structural rigidities, mainly as a result of the economic policies implemented during the previous decades. The 1980s was marked by considerable slowdown in economic activity as indicated by the modest growth in GDP, which averaged just 1.5% annually for the entire period. This development is in sharp contrast with the preceding two decades, during which the average GDP growth was 7% and 5% in the 1960s and 1970s, respectively. Inflation on the contrary rose continuously and by the end of 1989 it reached approximately twenty percent and this had an immediate impact on nominal interest rates, which hovered around 25 percent. Most economic indicators demonstrated a significant deterioration of the economic situation in Greece. The large government sector and its huge pervasiveness in all aspects of economic activity were accountable for this gloomy situation. Public sector enterprises losses, which in the early 90s produced over 60% of output in the industrial and services sector (including financial services), and excessive government consumption expenditures translated into persistently high deficits in the national budget, which eventually led to an unsustainable public debt.

The sample period extends from January 1995 until April 2014, covering a period of almost two decades. We selected the mid-nineties as the starting point because it marks the beginning of a long bullish market, which is mainly attributed to a number of major transformations of the Greek economy. These structural changes were the outcome of a strict convergence plan aiming at fulfilling the Maastricht criteria for joining the European Monetary Union and adopting the Euro as the twelfth member state. Being part of the Eurozone provided the country with a stable

macroeconomic environment unprecedented hitherto and this laid down the foundations for long-term economic growth.

On the institutional front, during the 1990s the Athens Stock Exchange witnessed a long wave of modernization characterized by structural changes, innovation, and expansion. These qualitative changes infused confidence in the investor community that the local stock market was finally transforming from an emerging market into a serious and trusted venue to place one's savings, equivalent to advanced economies. As a result we observe a sharp increase in the number of financially healthy full-service brokerage firms. Additionally, the Parallel Market was established in 1990, thus providing an alternative permanent source of funds for small and medium firms. Also, the Automated Electronic Trading System was adopted, which expedited the trading orders execution thus ending the 116 years-old tradition of trading with the outmoded outcry method.

The stock market after a prolong period of hibernation, having overcome a number of institutional and functional inertia foresaw both successfully and timely the ensuing benefits stemming from the positive changes taking place in the economy. Consequently, over the second half of the 1990s the Athens Stock Exchange experienced the greatest upswing phase of its growth ever, not so much with regard to the increase in the level of its index but in some other qualitative developments, such as:

- By the end of 1999 the number of active accounts of private investors reached 1.5 million, which is the largest number in history.
- The volume of average daily turnover exceeded €650 million.

- Market capitalization increased to record high of 150 percent of annual GDP.
- The number of foreign institutional investors not only increased manifold but at the same time they became the most active market participants.
- During the year 1999 alone the amount of funds raised by firms in the primary market reached almost €13 billion. And over the period of 1997 to 2000 approximately €32 billion were raised in the capital market.

Furthermore, right from the start of the year 1997 trading volume gained significant momentum and as a result stock prices began trending upwards. Both the Government and the positive international economic climate of that time contributed towards this dynamism. The Government's contribution resulted from its realization that capital markets could function as a conduit in the privatization process, and the latter's contribution because by 1997 world stock market activity was already experiencing one of the strongest and prolonged bull euphoria. It was this time that the former FED chairman Alan Greenspan coined as the period of "irrational exuberance". The Greek stock exchange had experienced similar bull market periods in the past, especially in 1972 and 1990, but this time there was a material qualitative difference. Now stock investing became a cliché for everyone and all of a sudden it topped everything else in the evening news. This time the stock euphoria like a giant vacuum absorbed hundreds of thousands of ordinary households, with no prior investing experience whatsoever, throughout the entire country from large metropolitan cities to the most remote mountain village.

As a result of this outright irrational exuberance the General Index climaxed on 17 September, 1999 when it reached the all-time high of 6,355 points. During this period the number of listed

companies in the ASE increased to 279 and the stock market capitalization by the end of 1999 reached almost €200 billion, in comparison to just a little over €7 billion in the beginning of the decade. At the same time, trading volume also increased many-fold rising to approximately €175 billion in 1999 compared to a meager €5 billion in 1990. Eventually, the market ran out of fuel, the pressure on stock prices subsided and by the year 2000 the situation was completely out of control, mainly because the majority of emerging and a few of the advanced matured markets were moving deeper into the correction phase of the investing cycle. However, this time the bear market was short-lived and soon stock activity revived due to the fact that all of the required institutional and regulatory changes had been completed, and the electronic order execution systems were upgraded. All these positive developments coupled with Greece's post-joining the Eurozone monetary stability contributed to upgrading the Greek stock market to the category of advanced matured markets in May 2001.

The Greek stock market hit its bottom around March 2003 to rebound again very aggressively and keep on rising until the eruption of the great financial crisis of 2008, which followed the collapse of world markets that were initiated with the annihilation of Lehman Brothers in the USA. The rest is history; the Greek state became insolvent being unable to roll over its borrowing at maturity, the yield on government bonds went through the roof, the rating agencies downgraded the country to "junk" status and the so called troika (IMF, ECB and EU) came to "rescue" by providing the largest loan in human history to a sovereign state, however to no avail. The rescue efforts failed because the bailout terms stated in the memorandum were so horrendous and aligned with unheard of austerity measures that forced the Greek economy to the worst depression ever recorded in modern economic history. Thus, after six whole years of

continued austerity and structural reforms the economy is still suffering from deficiency of effective demand, due to the fact that the GDP has shrunk by one third over this time period. Consequently, as long as the Greek economy struggles to come to grips with a public debt to GDP ratio exceeding 170 percent and worsening through time, there is no chance that its stock market will revive and the likelihood that the Composite Index of the Athens Stock Exchange will hover around 1,000 points is more than certain. In light of the developments discussed previously, it is not surprising that stock prices in the Athens Stock Exchange are characterized by sharp volatility, as it is generally true for all stock markets worldwide, but in the case of the Greek market the variability is much more intense and every time the bubble bursts has resulted in complete wiping out entire households' fortunes.

As indicated in Figure 1, from 1990 until the beginning of 1997 activity in the Greek stock market was rather anemic, during which period the General Index of ASE was struggling to penetrate sustainably the 1,000 points resistance ceiling. However, since that year the stock market started attracting investors' interest and the representative index really exploded as a result, culminating in mid-September of 1999 when the general index reached the all record height of 6,335 points. That is, in less than two years market activity increased by more than 500 percent. It was precisely during this euphoria period that everyone in Greece got involved in one way or another with stock investing, they started neglecting most other productive activities and sold real estate properties, farm-lands and equipment and other real assets in order to get liquidity to burn out in the stock market inferno.

The insanity of the average Greek citizen obsessed with stock investments is illustrated vividly in Figure 2, in which we present the market-capitalization-to-GDP ratio. The main observation in that graph is that whereas in the early nineties the market capitalization was always below 20 percent of GDP (in current prices) all of a sudden at the height of the big bubble of 1999 it climbed to almost 1.5 times the GDP of that year. Following the collapse of the market this ratio retreated to about 50 percent and after that it climbed to a little over 80 percent just before the start of the great recession of 2008, to shrink permanently to less than 20 percent during the last few years.

When the bubble busted with ear-drum destroying sound the most violent wealth redistribution in Greek economic history took place from the unprotected innocent and ignorant “investors” to the so called smart money makers. Foreign hedge funds abandoned the cash producing cow having left just a skeleton from what previously used to be a tireless money making machine. Thus, it took a little over three years for the market to lose almost everything it had gained, and by the beginning of 2003 it retreated to about the same level as in the early nineties, which is a little less than the 1,500 points psychological threshold.

History has a tendency to repeat itself and the stock market is no exception to this rule. The difference is that this time the big noise-making crowd was completely absent and only the more sophisticate informed rational participants started considering stock investing as an attractive alternative to place their excess liquidity. This is why it took the market now four and a half years to reach its new peak at 5,335 points in October 2007 from the previous trough of March 2003, and that was exactly 1,000 points short of the all-time highest level. As was mentioned

previously, world developments at the end of 2007 were so dramatically pronounced that led the global economy into the most severe recession since the times of the Great Depression of the 1930s, but Greece in particular was hit in the hardest way in comparison to the other peripheral economies within the Eurozone. As a result, the Greek stock market today after almost seven years of correction still is unable of finding its way out, being stuck with the representative index at the 1,000 points level.

The narrative of the Greek stock market evolution over the past quarter of a century vividly suggests that this venue provides an excellent laboratory for testing the small investors' sentiment hypothesis proposed by behavioral finance scholars. This belief stems from the fact that the market environment in Greece is more likely to be prone to investor sentiment reaction in relation to other mature capital markets. Our approach is in line with the one adopted by Doukas and Mylonas in their study, in which they cite the following reasons for conducting an out-of-sample test of the sentiment hypothesis in the Greek stock market. Firstly, the Greek capital market experienced two whole investment cycles during our examination period. The unprecedented boom and bust, especially during the first cycle, leads us to expect that investor sentiment should be more pronounced in this kind of stock market environment. Secondly, the Greek capital market falls by far behind the mature and sophisticated markets of the USA and most developed West European capital markets. Therefore, we hypothesize that human emotions should have a greater impact on investment decisions, which implies that "noise" traders play a crucial role in determining stock prices in this type of financial setting. Thirdly, to the extent that investing by word of mouth and rumors rather than relying on fundamentals is primarily a characteristic trait of small investors we expect sentiment to be more pronounced in the Greek

market, in which inexperienced and amateur participants account for a large fraction of total market activity.

IV. Data and Methodology

A. Data

For the computational needs of our analyses we focus on market aggregates rather than on individual stock data. Although it is highly probable that sentiment will permeate across all stocks to the market level, we cannot rule out the possibility that the number of stocks positively affected by bullish sentiment is roughly the same as those that are negatively affected by bearish sentiment and thus they negate one another. In any case, our reliance on market aggregates is primarily imposed by pragmatic considerations stemming from the fact that most of the measures we examine are available for the entire market and not on a disaggregated level. Our empirical investigation is conducted using monthly data and most of our indexes span over the time period from January 1995 through April 2014, resulting in a total of 232 observations. However, because some variables are not available for the full period part of the analyses is performed on shorter subintervals, as indicated in the respective tables. Descriptive statistics for the variables used in the study are presented in Table I. Additionally, in Table II we show contemporaneous pairwise correlations for these variables. Discussion of these variables and their sources is presented in the next section.

a. Direct Sentiment Measures

To carry out our empirical investigation we require various measures of investor sentiment. Fortunately, in our case, the Directorate General for Economic and Financial Affairs of the

European Commission conducts regularly harmonized surveys for different sectors of the economies in the European Union (EU) member states. These surveys are addressed to representatives of the industry (manufacturing), the services, retail trade, and construction sectors, as well as to consumers and they are published in their present format on a monthly basis since 1985. With these data composite indicators are constructed to track cyclical movements in a specific sector and in the economy as a whole.

We use two of these economic indicators as proxies to gauge investor sentiment for the entire period of the analyses. The first is the Economic Sentiment Indicator (ESI), which is constructed as a composite index from the surveys on the five above mentioned sectors.⁷ We believe that this overall sentiment measure is more appropriate to use as a proxy for capturing the investment sentiment of the Greek market. Additionally, we experiment with a narrower version of market sentiment, i.e., Consumer Confidence Indicator (CCI), in order to test whether the model would identify it as a separate risk factor. It is noted that the CCI is included in the construction of the ESI with twenty percent weight and, therefore, these two measures are highly correlated, as indicated in Table 2. A couple of comments on the qualitative characteristics of these sentiment measures are warranted. Firstly, the ESI shows considerably less variability than the CCI. The coefficient of variation of the former is only one fourth of the latter. Secondly, the range of the ESI is much narrower than the CCI's. Thirdly, consumer's confidence in Greece is generally always disappointingly low in comparison to the confidence for the economy as a whole. This issue becomes even more pronounced when the comparison is made with regards to the entire European Union. Specifically, the CCI in the EU for the period under investigation averaged -

⁷ The sectoral weights used to construct these composite indicators are as follows: industry 40%, services 30%, consumer 20%, construction 5%, and retail trade 5%.

12.2 and ranged between 1.6 and -32.2, whereas in Greece the average was -40.3 and the range was between -5.8 and -83.8. Lastly, the respective figures for the ESI show an average of 100.0 with range between 67.2 and 116.8 for the EU, whereas in Greece the average was 99.2 and the index ranged from 74.4 to 118.7.⁸

b. Indirect Sentiment Measures

In our models we use the Mutual Fund Discount (MFDIS) as the indirect measure of investor sentiment. Although in the relevant literature findings on the appropriateness of this measure as an indicator of individual sentiment are not conclusive (see, for example, Lee *et al.* (1991)), we nevertheless decided to employ it mainly because it is the only one that we could reliably access.

The overwhelming majority of the Greek closed-end funds have traditionally been subsidiaries of domestic banks, which hold a majority of share capital and also appoint their management teams. These funds are required by Greek law to publish their net asset value at the end of each month. The monthly data on closed-end funds used in our investigation were provided by the Association of Greek Institutional Investors. Table 1 shows that the deviations of prices from their NAVs are quite substantial, ranging from a maximum premium of 71 percent to a maximum discount of 45 percent. However, over the entire period under investigation on the average these funds experienced a rather large discount of 16.5 percent and quite high standard deviation of about 20 percent.

Following Lee *et al.* (1991) and Doukas and Milonas (2004), we constructed a value-weighted index of discount (VWD) for each month as follows:

⁸ These comments are drawn from the raw data, which are available upon request.

$$VWD_t = \sum_{i=1}^{n_t} \text{weight}_i \times \text{Discount}_{it} \quad (1)$$

where:

$$\text{weight}_i = \frac{NAV_{it}}{\sum_{i=1}^{n_t} NAV_{it}}$$

$$\text{Discount}_{it} = \frac{(NAV_{it} - \text{Price}_{it})}{(NAV_{it})}$$

NAV_{it} = Net asset value of each individual MF i at time t

Price_{it} = Market price of each individual MF i at time t

n_t = the number of funds with the available NAV_{it} and Price_{it}

c. Economy and Market Variables

In addition to sentiment measures we collected data on some key macroeconomic and stock market variables. Among the variables employed in the former category we use the Index on Industrial Production (IPI) as an indicator of economic activity, the Consumer Price Index (CPI) as a measure of inflation, and the yield on ten-year government bonds as a proxy for the risk-free nominal interest rate. Data concerning the IPI and the CPI were collected from publications of the Hellenic Statistical Authority (EL.STAT.), whereas information on sovereign debt rates was gathered from publications of the Bank of Greece.

Market returns are calculated based on the major indexes used to gauge stock market activity by the Athens Stock Exchange. Firstly, the ATHEX Composite Share Price Index (Composite) includes the shares of the 60 largest listed companies in terms of market capitalization. Secondly, the FTSE/ATHEX 20, which was introduced in September 1997, includes the 20 largest blue chip companies in the market. Lastly, the FTSE/ATHEX Mid-cap Index (introduced in December 1999), and the FTSE/ATHEX Small-cap Index (introduced in May 2001) gauge

trading activity in the medium and small segments category, respectively. It is noted that all these market indices are value weighted.

B. Methodology

There are two types of sentiment measures; direct and indirect. Investor surveys provide the direct measure of sentiment of the market. On the other hand, several indirect sentiment proxies have been used in the extant literature.

Fortunately, for the Greek market confidence index and sentiment index are available. We use these two sentiment measures along with mutual fund discount rates to investigate the effect of sentiment on stocks listed in Athens Stock Exchange. Usually, sentiment proxies are highly correlated. Consequently, researchers employ tools such as Principal Component Analysis (PCA) in order to construct a single sentiment measure from various sentiment factors. We also find high correlation among the three sentiment proxies used in the study. Table 2 indicates that the economic sentiment (ESI) and the consumer confidence (CCI) indexes have correlation of 0.88, which is very high, implying that we have to construct a unified sentiment index. Even the mutual fund discount rate (MFDIS) has correlation of 0.44 with the ESI.

Because the correlation between the ESI and the CCI is extremely high we cannot use both of them in the same regression model. Thus, we also employ (PCA) to make a Unified Sentiment Indicator (USI) proxy that can be safely used instead of the above-mentioned three sentiment variables. The PCA shows that the first principal component can account for 49% of the variation in these three sentiment variables. Moreover, only the first component has an eigenvalue greater than one. Therefore, we can pick only the first component as a proxy for our sentiment. Finally, the statistical package E-Views generates a data series that can be used as a

sentiment proxy, which also has a unit variance. Monthly macroeconomic data, such as interest rates, industrial production growth, and inflation are also used to isolate the effect of market risk.

We run the following regression model:

$$R_t = \alpha_0 + \alpha_1(\textit{Sentiment Proxy})_t + \alpha_2\textit{INF}_t + \alpha_3\textit{INT}_t + \alpha_4\textit{IP}_t + \varepsilon_t, \quad (2)$$

where: *INF*, *INT* and *IP* indicate monthly inflation, interest rates and industrial production growth, respectively.

We use several forms of returns. R_t could be Athens Composite Index, FTSE-20, FTSE-Mid-cap or FTSE-Small-cap.

V. Analysis of Results

Table III presents the regression results for the whole period. There are four dependent variables: excess returns from all share index, excess returns from FTSE-20, excess returns from FTSE Mid-cap and excess returns from FTSE Small-cap index. The estimated coefficients of the three sentiment indicators – Mutual Fund Discount (MFD), Economic Sentiment Indicator (ESI), and Consumer Confidence Indicator (CCI) – are reported in this table. Coefficients of the two macroeconomic risk factors – Inflation and Industrial Growth – are not shown, because they are used as control variables. Three different combinations of sentiment proxies for every dependent variable have been employed. The fourth combination (where all sentiment indicators could be used) would result in possible occurrence of near multicollinearity, and thus this model is excluded from consideration.

For the Composite Index (that is, excess return on Composite Index), the MFD rate and the ESI significantly affect returns. However, the R^2 s of the regressions are very close to zero, signifying that a very large portion of returns is not explained by these sentiment proxies. The fourth

regression model uses a Unified Sentiment Index (USI), which is constructed from all three sentiment proxies. This USI is found to be significantly related to market returns. Next, similar regressions are also run for Large-cap, Mid-cap and Small-cap firm returns.

In the case of Large-caps, the coefficients for MFD rates and ESI are significant at the 5% level. As the coefficient for CCI is significant at 10% level, we can say that it has comparatively weak influence on the returns of large firms. On the other hand, the relationship between large firm returns and the USI is found to be significant at the 5% level.

For Medium and Small firms, both ESI and CCI indexes exert significant influence. For all the regressions discussed above, the MFD and the ESI have positive coefficients, whereas the CCI has negative coefficients. It is noted that this happens because of the manner these indices are constructed. Higher values of MFD and ESI indicate more favorable market sentiment and enthusiasm, which drives prices up and ultimately resulting in higher returns. The CCI series, on the other hand, is always *negative* and its movement toward zero is considered to be a *positive* shift in sentiment. Because the raw data have been converted into percentage changes, a positive shift in sentiment corresponds to a smaller change in percentage terms. Thus, our results show a negative relationship between the CSI and stock returns.

The overall conclusion we draw from Table III is that the USI appears to be the most important factor across all types of sentiment indices considered in the study. The estimated coefficients of this comprehensive sentiment proxy are not only larger than the coefficients of the rest sentiment indicators but they also have the highest *t* values. This finding is especially true for the Mid-caps

and Small-caps cases where the coefficients besides being the largest, they are also characterized by greater explanatory power according to the respective R^2 values.

Because over the entire period of investigation the effect of sentiment on excess returns, albeit weak, is found significant we examine two sub-periods (1/1997 – 12/2002 and 1/2003 - 4/2012), in order to test its consistency on stock prices. We consider these two periods in line with the historical movements of stock prices. As seen in Figure 1, during the first period, the General Index ascended very rapidly and afterwards it monotonously slumped at an even faster rate. The same cyclical pattern characterizes the second period, the major difference this time being that both the upward and downward phases are relatively more prolonged and do not show that much variability. Our aim is to investigate the existence of a shift in the attitude of stock market behavior in these two sub-periods, as far as the relationship between sentiment and stock return is concerned.

In Table IV we present the results for the first complete market cycle, from 1/1997 through 12/2002. We examine the effect of sentiment on excess returns for the Composite and the Large-cap cases only because the available observations for the other two market indices (Mid-cap and Small-cap) are not sufficient to warrant reliable conclusions. The general finding conveyed by this table is that, contrary to our expectations, sentiment does not play any role over this period. The coefficients of all sentiment indicators are very low and insignificant, with the exception perhaps of the MFD. Moreover, the R^2 s are very close to zero indicating that variations in excess returns are not explained by investors' mood. This paradox could be attributed to the extreme severity of both the upswing and downswing phases of this market cycle during which euphoria and phobia apparently wash out one another, thus negating the sentiment effect. Or, perhaps, the

number of stocks positively affected by bullish sentiment is roughly the same as those that are negatively affected by bearish sentiment and thus they cancel each other.

Table V shows the results for the second market cycle, from 1/2003 through 6/2012. The availability of data over this period allows us to examine sentiment's influence on excess returns for *all* the market indices. As opposed to the first cycle, sentiment over this period exerts a strong influence on market excess returns. The coefficients of every sentiment proxy are high and significant for each of the market indicators, with the exception of the Composite Index. This is especially true with regard to the Unified Sentiment Indicator, for which coefficients are the highest and by far the most statistically significant. Moreover, the R^2 values have improved considerably in relation to the previous period.

Next we embark on investigating the effect of sentiment over the upswing and downswing phases of the two distinct market cycles. The regression results of market excess returns on USI are reported in Table VIII. With regard to the second market cycle the required data are available and therefore it becomes feasible to carry out full investigation. These results are analytically shown in Table VI and Table VII, respectively, for the “boom” and “bust” of the latter market cycle. However, detailed investigation of the individual sentiment proxies and their effect could not be made for the up and down phases of the first market cycle (period 01/1997 – 12/2000 and again period 01/2001 – 03/2003) due to lack of sufficient data.

Table VI presents the results for the sub-period from 1/2003 through 6/2007. The most striking observation here is that many of the coefficients of intercept terms are significant. This indicates that the return of Composite Index and large firms are explained to a great extent by itself or some other undisclosed factors. Once again, among all sentiment indicators the Unified

Sentiment Index is the most influential factor. Returns for both large firms and medium firms are significantly influenced by sentiment. Because the intercept terms for large firms are significant, apparently returns of these firms increased during this period on their own without any particular relationship to sentiment. Interestingly, small firms show no sensitivity at all to sentiment factors during this period.

Table VII presents the regression results for the period from July 2007 through April 2014. The findings here are somewhat different from those reported in Table VI. The most striking difference between 1/2003-6/2007 and 7/2007-4/2014 is the change of sign for the intercept terms. Intercepts indicate that index returns are not explained by sentiment factors. However, the intercept sign has always been positive in the former period whereas it turns negative in the latter period. This phenomenon can be explained by the fact that during the first (second) period stock prices almost always rose (dropped). Sentiment factors only weakly explain excess returns. Among these factors the Unified Sentiment Index, as previously, has the ability to explain returns. In this period, sentiment factors, albeit weakly, can explain the return of small firms. Overall, except for the signs of intercept terms, because the impact of sentiment on returns during 1/2003-6/2007 and 7/2007-4/2014 is similar, we can also conclude that market reaction to sentiment remains almost unchanged regardless of the state of the investment cycle.

Table VIII shows how sentiment could possibly be related to market returns (Composite Index Returns) in two long-run-up-and-down-market periods. The second column exhibits whether a particular time period corresponds to an upward or a downward market trend. Because, as already has been shown, the overall sentiment measure performs the best among all proxies we only consider the unified sentiment variable for this investigation (USI). Our results indicate that

sentiment exerts significant impact on stock returns only in the second long-run up market (04/2003 – 12/2007). Therefore, the relation between returns and sentiment in long-run trend (up or down) is weak.

VI. Conclusion

This paper investigates the influence of market sentiment on the Greek stock market returns. The results suggest that for the entire period under investigation market sentiment exerts a significant albeit weak effect on stock returns. Among the various size portfolios the effect of sentiment is more pronounced in the case of mid-caps. For all the different periods that we examine their regression coefficients have the greatest values. Furthermore, the results do not indicate any material difference when the whole period is divided into two sub-periods as suggested by the long-term trend of the market. On the contrary, examination of sentiment's influence during the upswings and downswings of the two market cycles conveys that its effect is most pronounced during the period that preceded the market meltdown in the aftermath of the financial crisis of 2007. As a consequence, the Greek stock market completely collapsed and even today, more than six years later, it still struggles to find its way to recovery. This development is not surprising at all, given that the Greek Economy was hit the hardest of all the peripheral Eurozone countries because of its extreme sovereign debt burden. Finally, our results point to the direction that a unified sentiment variable probably captures this stock market's sentiment better than any other sentiment proxy considered in isolation.

As a peripheral market, the Greek stock market would be expected to exhibit vulnerability to investor sentiment. However, our results fail to strongly support this suspicion, which is not surprising since Doukas and Milonas (2004) also do not find support for the hypothesis that

investor sentiment represents a systematic asset pricing risk in the Greek capital market. Therefore, in the absence of strong sentiment influence, future studies may look into other behavior-related trading strategies such as momentum and contrarian to investigate how investor behavior may affect this market.

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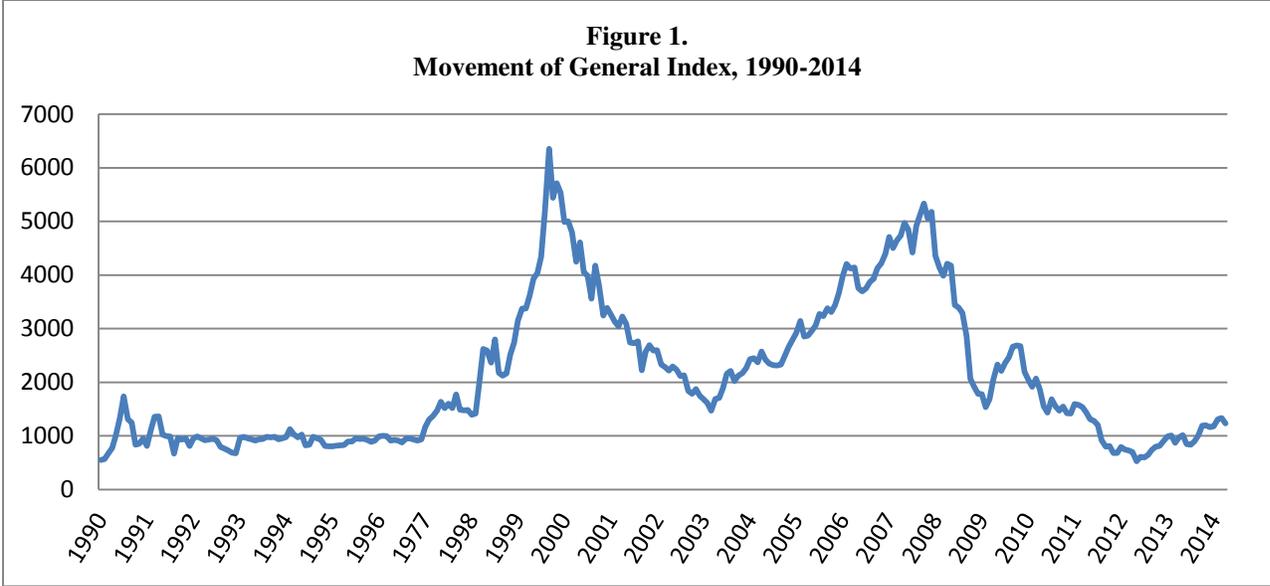
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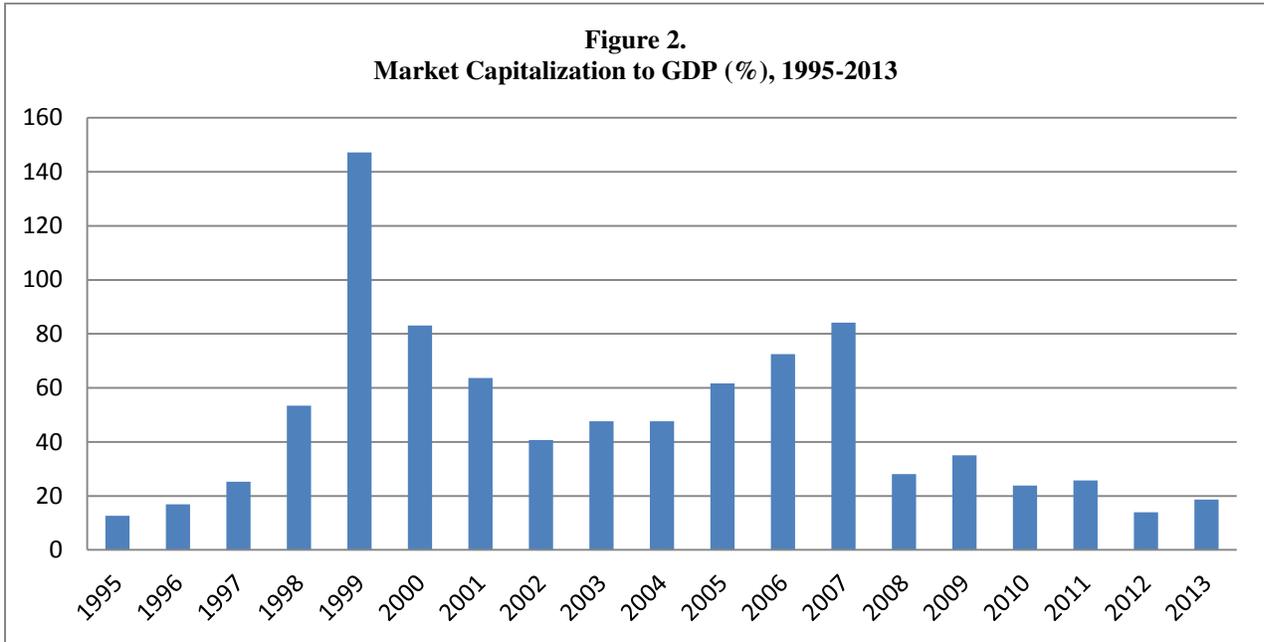
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Source: ATHEX Fact Book, various annual publications, published by Athens Exchange S.A.



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Table I
Summary Statistics

	Mean	Std. Dev.	CV	Maximum	Minimum	Skewness	Kurtosis	N
R _{CI}	0.1848	9.3013	50.3294	34.5946	-32.6730	-0.2326	1.5218	232
R _{FT20}	-0.4841	10.776	-22.2605	40.9006	-34.9378	-0.1476	1.6048	200
R _{FTMID}	-1.2190	10.4712	-8.5810	27.5898	-33.6893	-0.3048	0.7786	176
R _{FTSMALL}	-1.3431	11.4337	-8.5130	47.7926	-35.5302	0.2156	3.2996	132
ESI	99.2138	10.9292	0.1102	118.7000	74.4000	0.7067	0.5914	232
CCI	-40.2582	17.9445	-0.4457	-5.8000	-83.8000	0.8597	0.0317	232
MFDIS	-16.4520	20.0479	-1.2186	71.0377	-45.3442	1.6506	4.4126	208

Table II
Contemporaneous Correlations

	CI	FTSE20	FTSE-Mid	FTSE-Small	ESI	CCI	MFDIS
CI	1.00						
FTSE20	0.96	1.00					
FTSE-Mid	0.84	0.80	1.00				
FTSE-Small	0.58	0.55	0.66	1.00			
ESI	0.07	0.08	-0.05	0.06	1.00		
CCI	0.06	0.07	-0.02	0.06	0.88	1.00	
MFDIS	0.16	0.16	0.05	0.17	0.44	0.36	1.00

Table III
Regression Results (Whole Period)

	Intercept	MFD	ESI	CCI	USI	R²	Obs.
Composite	0.79 (0.73)	0.08 (2.00)**	-	-	-	0.02	204
Composite	-0.49 (-0.59)	-	0.90 (2.20)**	-	-	0.03	204
Composite	-0.47 (-0.55)	-	-	-0.05 (-0.92)	-	0.00	204
Composite	-0.55 (-0.66)	-	-	-	1.60 (2.32)**	0.03	204
FTSE-20	0.37 (0.36)	0.08 (2.08)**	-	-	-	0.03	194
FTSE-20	-0.88 (-1.11)	-	0.93 (2.39)**	-	-	0.04	194
FTSE-20	-0.79 (-0.99)	-	-	-0.10 (-1.76)*	-	0.03	194
FTSE-20	-0.93 (-1.19)	-	-	-	1.90 (2.94)**	0.06	194
FTSE-Mid	4.24 (0.81)	0.17 (0.92)	-	-	-	0.13	155
FTSE-Mid	0.84 (0.26)	-	3.58 (2.30)**	-	-	0.15	155
FTSE-Mid	1.20 (0.36)	-	-	-0.55 (-1.93)**	-	0.14	155
FTSE-Mid	1.27 (0.39)	-	-	-	7.49 (2.60)**	0.16	155
FTSE-Small	0.45 (0.30)	1.00 (1.81)*	-	-	-	0.07	130
FTSE-Small	-1.39 (-1.36)	-	1.05 (2.17)**	-	-	0.08	130
FTSE-Small	-1.30 (-1.26)	-	-	-0.17 (-2.00)**	-	0.08	130
FTSE-Small	-1.32 (-1.32)	-	-	-	2.42 (2.80)**	0.11	130

Note: ** and * indicate significance at 5% and 10%, respectively.

Table IV
Regression Results (Sub-Period 01/1997-12/2002)

Depend. Var.	Intercept	MFD	ESI	CCI	USI	R²	Obs.
Composite	0.68 (0.50)	0.10 (1.51)	-	-	-	0.04	72
Composite	0.12 (0.09)	-	0.60 (0.94)	-	-	0.02	72
Composite	0.13 (0.10)	-	-	-0.02 (-0.34)	-	0.00	72
Composite	-0.07 (-0.05)	-	-	-	0.95 (1.02)	0.02	72
FTSE-20	-0.49 (-0.32)	0.12 (1.65)	-	-	-	0.05	63
FTSE-20	-1.05 (-0.70)	-	0.71 (0.63)	-	-	0.02	63
FTSE-20	-1.07 (-0.70)	-	-	-0.02 (-0.21)	-	0.01	63
FTSE-20	-1.24 (-0.81)	-	-	-	0.83 (0.81)	0.02	63

Table V
Regression Results (Sub-Period 01/2003 – 06/2012)

	Intercept	MFD	ESI	CCI	USI	R²	Obs.
Composite	0.39 (0.27)	0.09 (1.44)	-	-	-	0.03	114
Composite	-1.20 (-0.98)	-	0.97 (1.62)	-	-	0.03	114
Composite	-1.24 (-1.00)	-	-	-0.09 (-0.09)	-	0.01	114
Composite	-1.17 (-0.95)	-	-	-	1.97 (1.85)*	0.03	114
FTSE-20	0.48 (0.34)	0.10 (1.97)**	-	-	-	0.04	114
FTSE-20	-1.26 (-1.26)	-	1.40 (2.87)**	-	-	0.08	114
FTSE-20	-1.19 (-1.18)	-	-	-0.23 (-2.75)**	-	0.08	114
FTSE-20	-1.18 (-1.20)	-	-	-	3.17 (3.72)**	0.12	114
FTSE-Mid	4.21 (1.25)	0.16 (1.30)	-	-	-	0.03	114
FTSE-Mid	1.65 (0.71)	-	2.87 (2.52)**	-	-	0.07	114
FTSE-Mid	1.77 (0.76)	-	-	-0.47 (-2.40)**	-	0.06	114
FTSE-Mid	1.77 (0.77)	-	-	-	6.23 (3.10)**	0.09	114
FTSE-Small	0.52 (0.34)	0.08 (1.51)	-	-	-	0.04	114
FTSE-Small	-0.90 (0.83)	-	1.25 (2.37)**	-	-	0.07	114
FTSE-Small	-0.86 (-0.78)	-	-	-0.15 (-1.69)*	-	0.05	114
FTSE-Small	-0.85 (-0.78)	-	-	-	2.52 (2.70)**	0.08	114

Note: ** and * indicate significance at 5% and 10%, respectively.

Table VI
Regression Results (Sub-Period 01/2003 – 06/2007)

Depend. Var.	Intercept	MFD	ESI	CCI	USI	R²	Obs.
Composite	2.73 (1.82) [*]	0.04 (0.36)	-	-	-	0.15	53
Composite	2.33 (3.14) ^{**}	-	0.93 (2.12) ^{**}	-	-	0.22	53
Composite	2.29 (3.01) ^{**}	-	-	-0.02 (-0.15)	-	0.18	53
Composite	1.86 (2.60) ^{**}	-	-	-	1.95 (2.34) ^{**}	0.22	53
FTSE-20	2.99 (1.85) [*]	0.04 (0.37)	-	-	-	0.16	53
FTSE-20	2.54 (3.15) ^{**}	-	0.83 (1.73)	-	-	0.21	53
FTSE-20	2.49 (3.04) ^{**}	-	-	-0.08 (-1.09)	-	0.18	53
FTSE-20	2.10 (2.65) ^{**}	-	-	-	1.80 (1.99) ^{**}	0.20	53
FTSE-Mid	11.45 (1.20)	0.23 (0.34)	-	-	-	0.05	53
FTSE-Mid	8.12 (1.75) [*]	-	6.17 (2.16) ^{**}	-	-	0.13	53
FTSE-Mid	9.45 (2.03) ^{**}	-	-	-0.90 (-2.13) ^{**}	-	0.13	53
FTSE-Mid	6.50 (1.46)	-	-	-	14.96 (2.88) ^{**}	0.18	53
FTSE-Small	1.80 (0.52)	0.06 (0.24)	-	-	-	0.13	53
FTSE-Small	2.45 (1.39)	-	0.89 (0.81)	-	-	0.14	53
FTSE-Small	2.49 (1.40)	-	-	0.04 (0.23)	-	0.13	53
FTSE-Small	1.82 (1.03)	-	-	-	1.30 (0.61)	0.10	53

Note: ** and * indicate significance at 5% and 10%, respectively.

Table VII
Regression Results (Sub-Period 07/2007 – 04/2014)

Depend. Var.	Intercept	MFDIS	ESI	CCI	USI	R ²	Obs.
Composite	-2.51 (-0.85)	0.02 (0.22)	-	-	-	0.02	77
Composite	-2.92 (-1.63)	-	1.35 (1.72) *	-	-	0.06	77
Composite	-2.84 (-1.55)	-	-	-0.13 (-0.85)	-	0.03	77
Composite	-2.34 (-1.30)	-	-	-	1.85 (1.28)	0.02	77
FTSE20	-2.48 (-0.98)	0.02 (0.35)	-	-	-	0.00	77
FTSE20	-3.18 (-2.09) **	-	1.53 (2.27) **	-	-	0.07	77
FTSE20	-2.80 (-1.84) *	-	-	-0.32 (-2.44) **	-	0.08	77
FTSE20	-2.54 (-1.73) *	-	-	-	3.24 (2.75) **	0.09	77
FTSE-Mid	-4.73 (-0.51)	-0.01 (-0.04)	-	-	-	0.21	77
FTSE-Mid	-3.68 (-0.66)	-	4.79 (1.98) *	-	-	0.25	77
FTSE-Mid	-3.57 (-0.62)	-	-	-0.56 (-1.13)	-	0.22	77
FTSE-Mid	1.44 (-0.23)	-	-	-	6.17 (1.21)	0.02	77
FTSE-Small	-2.50 (-1.29)	0.04 (0.74)	-	-	-	0.03	57
FTSE-Small	-3.44 (-2.49) **	-	1.10 (1.84) *	-	-	0.08	57
FTSE-Small	-3.04 (-2.24) **	-	-	-0.25 (-2.55) **	-	0.13	57
FTSE-Small	-2.95 (-2.34) **	-	-	-	2.46 (2.64) **	0.13	57

Note: ** and * indicate significance at 5% and 10%, respectively.

Table VIII
Relationship between Sentiment and Stock Returns in Boom and Bust

Period	Movement	Intercept (t-stat.)	USI	R ²	Obs.
01/1997 - 12/2000	Up	1.06 (0.56)	1.05 (0.85)	0.04	37
01/2001 - 03/2003	Down	-4.07 (-2.69) *	-0.07(-0.05)	0.17	27
04/2003 - 12/2007	Up	2.18 (2.98) **	1.60 (1.96) *	0.15	60
01/2008 - 06/2012	Down	-5.27 (-2.08) **	2.08(1.13)	0.08	54

Note: ** and * indicate significance at 5% and 10%, respectively. Composite Index returns and overall sentiment are the dependent and independent variables, respectively.