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Investor Sentiments and Stock Returns

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Table of Contents

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Supervisor: Ilan Cooper

1 Introduction

The assumption of rationality is a major building block in economics. Investors are depicted as flawless and they seek to maximize their utility. However, this strict assumption has proven to be challenging as all investors are independent and act in their own best interest. For this reason it is not plausible to make an assumption and generalize it over the entire population (Shiller, 2003). Kahneman and Tversky (1986) argue that the actual behavior of investors deviates significantly from what is used in standard theory. There are numerous reasons for this deviating behavior and among them is the current mood of investors. Research has found that certain mood variables have a statistically significant impact on stock markets.

One of these researches is the paper of Edmans, Garcia and Norli (2007), *Sport sentiments and stock returns*. Their paper investigates the stock market reaction to sudden changes in investor mood. They use football results as a proxy for mood, where they claim that there is a significant decline in national indices when the national team of that country loses a football match. Similar researches before 2007 have also found other variables affecting investors' mood.

This thesis will be a replication of the investigation of Edmans et al. (2007) in order to tell if their result is relevant ten years later. The thesis is highly motivated from the fact that the topic of behavioral finance is receiving a lot of attention in the explanation of financial markets. According to Wright and Bower (1992) people who are in good mood are more optimistic in their choices and judgement than those in bad moods. Findings like these indicate possible behavioral biases amongst investors and could pose as a trading opportunity.

Hence, we have formulated the following research question:

- *Are markets efficient with regards to football sentiments?*

To check whether the stock markets are efficient, will work with the following hypothesis where the assumption of rational actors is embedded in the null:

H_0: Stock markets are not affected by the outcome of football matches.

H_1: Stock markets are affected by the outcome of football matches.

2 Literature Review

Throughout the last decades, researchers have been interested in moods impact on investors' decision making. Standard economic theory assumes that all investors are rational and make decisions purely based on their calculations. On the other side, many researches want to investigate whether this is correct or not. Hirshleifer (2001) believes that mood and emotions affect people's risk taking. Another research finds that sales of State of Ohio lottery tickets were found to increase in the days following a football victory by Ohio State University (Arkes, Herren & Isen, 1988).

Findings showing a relationship between mood and stock returns

Hirshleifer and Shumway (2003) found that sunshine is highly significantly correlated with daily stock returns. The paper examines the relationship between morning sunshine in the city of a country's leading stock exchange and daily market index returns across 26 countries from 1982 to 1997. "Individuals who are in good moods make more optimistic choices" (Hirshleifer & Shumway, 2003). *Sports sentiment and stock returns* by Edmans, García and Norli (2007) investigate the stock market reaction to sudden change in investor's mood. Motivated by psychological evidence of a strong link between football results and mood, they used football as their primary mood variable. Edmans et al. (2007) documented a strong negative stock market effect of international football results. "In monthly terms, the excess returns associated with a football loss exceed 7%." (Edmans et al., 2007). The data was collected from 39 different countries from January 1973 through December 2004.

Quite like Edmans et al. 2007, Ashton, Gerrard and Hudson (2003) reports a strong association between the performance of the England football team and the daily change in FTSE 100 index.

Even though these research papers show that there exists relationship between mood and investors' decision making, there are other papers that disprove it. One reason for the different findings is that the data is collected from different countries and different periods of time. Another reason for the different findings is the approach of their investigation. Some studies use raw data while other rearranges their data in specific ways.

Findings showing no relationship between mood and stock returns

Lee and Chiu (2016), disprove the impact of mood on investor's decision making in their paper *Sport Sentiments and Stock Returns: Example of FIFA World Cups.* They consider that stock markets are efficient and use not only closing prices, but also opening prices to estimate excess stock return. Lee and Chiu (2016) use both data from before and after the financial crisis in 2008. This paper concludes that: "investors are rational in dealing with sport sentiments (FIFA World Cup) and the stock trading decision" in contrast to many other papers, Lee & Chiu chose to sample data for all participants in the FIFA World Cups.

Boyle and Walter (2001) investigate moods impact on the stock market in New Zealand by looking at the single dominant sport; Rugby, in the period January 1950 to November 1999. The conclusion of their studies is straight forward: *"we find no evidence of any relationship between sporting team success and stock market return behavior, regardless of the time period analyzed, the frequency of the data we use, or the classification of sporting success and failure. If any market reaction to sports contests exists, it must therefore be transitory at best."*

The last paper we want to highlight is Kaustia and Rantapuska's *Does mood affect trading behavior?.* Like Ashton et al. (2003), Kaustia and Rantapuska only use one country to test the relationship between mood and trading decisions. More precisely do Kaustia and Rantapuska investigate the Finnish Central Securities Depositary (FCSD) with hours of daylight as their main mood variable. The bottom in this paper is that *"Sunniness has the right sign on the direction of trade, but it is statistically insignificant."*

We see that literature shows volatile results regarding relationship between mood and investors' decision making. Different results on these studies might indicate some manipulations from some of the researchers. We know that researchers have the incentive to show some coherence to make their articles more interesting. In addition, it seems like most of the positive findings are the papers from before the financial crisis in 2008. Because of our critical view on the different approaches in previous researches on this topic, we will use our own approach, which we will discuss later. In our study, we will use newer data, from after the financial crisis in 2008. This is because we believe that investors may have changed their behavior

after the 2008, and we want to investigate how the market responds to sport sentiment today.

3 Theory

In this chapter we will introduce the underlying theories that concern our hypothesis. We are seeking to determine whether or not markets are efficient with regards to football sentiments. Efficient markets have been a frequent topic for investigation since it was concluded by scholars that Maurice Kendall's (1953) findings of random price movements indicated an efficient market and not an irrational one.

Efficient Markets Hypothesis

The efficient markets hypothesis is a fundament in much of modern investment theory and practice. According to Fama (1970), a market is said to be efficient when prices always fully reflect all available information. Underlying this hypothesis is the assumption that market participants are rational players who always trade in their own self-interest and make decisions based on complex stochastic optimization problems (Lo, 2005). Fama (1970) concluded in his article *Efficient Capital Markets: A Review of Empirical Work* that market efficiency indeed was present, and the efficient markets hypothesis has in fact showed strong resilience towards empirical evidence (Lo, 2005). However, after several decades of research on the efficient markets hypothesis there has not been developed an agreement about whether markets, especially financial markets, are efficient.

Behavioral finance

In later years and more recent time the assumptions of rationality and their implications for efficient markets have been challenged. The focus in academic discussion has shifted away from economic analyses of time series, towards establishing models of human psychology (Shiller, 2003). Phycologists and experimental researchers have found evidence of violation of the efficient markets hypothesis in the form of behavioral biases (Lo, 2005).

According to Shiller (2003) the usage of the assumption of rationality cannot be anything other than absurd. He claims that for these models to work, it must be the case that rational actors must offset the foolishness or biases of the irrational ones. The efficient markets theory says that when an irrational investor buys a stock, smart money sells, and vice versa. This will counter the effect irrational investors create in market prices. However, research has found that smart money

not necessarily is in the position of power to drive back markets prices. For example, De Long, Shleifer, Summers and Waldman (1990) found that smart money never would choose to offset the irrational investors since they are concerned with the risk created by these investors.

Drawing back upon the behavioral biases, the prospect theory of Kahneman and Tversky (1979) illustrates this. Their theory suggests that individuals are far more upset by losses than they are satisfied by equivalent gains. Actually, individuals are so upset by any losses that they are willing to take greater amount of risks with the aim of avoiding any loss at all. If these bad decisions leading to losses have its roots in mood change among investors, there will be a possible domino effect creating trading opportunities.

4 Empirical Methodology

In this section we explain how we are going to perform our empirical tests and elaborate on the statistical models we will apply. We are working with two main types of data, results from football matches and stock returns. The football results are qualitative data which means that dummy variables will be used in order to run our desired regressions. Data from the different indices are quantitative, but these data are often prone to time-varying volatility. Incorporating the dummy variables and correcting for the non-constant volatility represents the main tasks in this thesis. Thus, we are conducting a longitudinal study.

Football data

Our null hypothesis is that there is no significant relationship between football sentiments and stock returns. Embedded within this hypothesis is the fact that investors are rational, markets are efficient and that outcomes in football matches does not affect stock markets. The alternative hypothesis is that wins leads to positive market reactions while losses lead to negative market reactions, claiming that there in fact is a relationship between football results and stock markets.

We will use the model proposed by Edmans et al. (2007). They estimate the impact of wins and losses on stock returns while controlling for the Monday effect and other confounding effects by running the regression:

$$R_{it} = \gamma_{0i} + \gamma_{1i}R_{it-1} + \gamma_{2i}R_{mt-1} + \gamma_{3i}R_{mt} + \gamma_{4i}R_{mt+1} + \gamma_{5i}D_t + \gamma_{6i}Q_t + \varepsilon_{it}$$

Where R_{it} is the daily return on a countries index in local currency. We use local currency to remove the effect of fluctuations in exchange rates. R_{mt} is the continuously compounded daily U.S. dollar return on Datastream's world market portfolio on day t. Since some local markets may be lagging the world index while other may be leading the index, the model also includes R_{mt-1} and R_{mt+1}. We include these variables to control for the fact that international stock markets are integrated, and therefore correlates across countries. We have to control for this correlation to estimate the clean win and loss effect. R_{it-1} is included to account for any first order serial correlation. $D_t = (D_{1t}, D_{2t}, D_{3t}, D_{4t})$ are dummy variables for Monday through Thursday, and $Q_t = (Q_{1t}, Q_{2t}, Q_{3t}, Q_{4t}, Q_{5t})$ are

dummy variables for days which the previously 1 through 5 days are non-weekend holydays.

The most interesting variable in the above regression is the residuals, ε_{it}. We will estimate the effect of football results using the equation (Edmans et al., 2007):

$$\hat{\varepsilon}_{it} = \beta_0 + \beta_W W_{it} + \beta_L L_{it} + u_{it}$$

Where $W_{it} = (W_{1it}, W_{2it} \dots W_{6it})$ are dummy variables for wins in our 6 different subgroups and $L_{it} = (L_{1it}, L_{2it} \dots L_{6it})$ are dummy variables for loss in the same subgroups. The subgroups we use is: close qualifying game, close group game, close elimination game, not close qualifying game, not close group game and not close elimination game. The reason why we want do distinguish between these subgroups is to locate a potential effect.

Indices data

There is one concern regarding the above statistical approach, namely the constant volatility assumption. By this we mean that stock markets have time varying volatility. French, Schwert and Stambaugh (1987) find that stock indices returns have time-varying volatility. An example from our dataset will be the European championship in 2016 where 'Brexit' occurred at the same time as the football event, creating highly volatile periods. If this is not corrected for, our standard errors would be biased downward.

To do so, we will model the stock return volatility using a GARCH model, first developed by Engle (1982). We are using the residuals from our first regression to estimate the following GARCH (1,1) process:

$$\sigma_{it}^2 = \alpha_{0i} + \alpha_{1i} u_{it-1}^2 + \alpha_{2i} \sigma_{it-1}^2$$

Where σ_{it}^2 is the index return volatility for country *i* on day *t*. Further we use the estimated σ_{it}^2 to create a new time series of normalized stock index returns:

$$R_{it}^0 = a_i + b_i \left(\frac{1}{\sigma_{it}^2} \right) R_{it}$$

Where a_i and $b_i$are chosen so that the mean of R_{it}^0 equals zero and the standard deviation equals one. This approach will normalize all index returns, which means we have our desired homoscedasticity.

5 Data

In our study, we use the home page of FIFA to collect match results and FIFA rankings. The FIFA ranking is updated every month and we have therefore collected the top 30 football teams every month from January 2008 and throughout 2016. We found that there are 11 nations that have remained in the top 30 on the FIFA ranking throughout our sample period. In our study, we assume that these 11 countries are the countries that care the most for football. This assumption is made based both on the fact that these countries has the best football teams in the world, and the fact that in countries such as Italy, Spain, and Portugal, the best-selling newspapers are dedicated exclusively to sports, particularly football (Edmans et al., 2007).The data from match results includes games from the World Cup, European Championship and Copa America, as well as all qualifying games.

We divide the matches in to three groups; “the qualifying games”, “the group games” and “the elimination games”. We have also decided to distinguish between “a close game” and not. The close games are games where two equally good teams meet. Whether the teams are equally good or not, we have chosen to define according to the FIFA rank at the specific time. Teams that lie within a ten-interval on the FIFA ranking are defined as close in this study.

To get information regarding the domestic indices for the 11 nations we want to investigate, we simply use Bloomberg/DataStream to collect the closing price each day in the sample period.

6 Thesis Progression

In the coming weeks we must first find all relevant data and finalize each chapter after further talks with supervisor. The football results are easily available through official sites like FIFA and our indices returns will be downloaded from Datastream. It is yet to be determined which indices to use from each country and we need guidance on this part. When we are in the position of having all data, these must be rearranged in order to run our desired regressions in statistical software. In addition, we will focus on improving the content in this preliminary report for the final master thesis.

7 References

Arkes, H. R., Herren, L. T., & Isen, A. M. (1988). The role of potential loss in the influence of affect on risk-taking behavior. *Organizational behavior and human decision processes*, 42(2), 181-193.

Ashton, J. K., Gerrard, B., & Hudson, R. (2003). Economic impact of national sporting success: evidence from the London stock exchange. *Applied Economics Letters*, 10(12), 783-785.

Bollerslev, T. (1986). Generalized autoregressive conditional heteroskedasticity. *Journal of econometrics*, *31*(3), 307-327.

Boyle, G., & Walter, B. (2003). Reflected glory and failure: International sporting success and the stock market. *Applied Financial Economics*, 13(3), 225-235.

De Long, J. B., Shleifer, A., Summers, L. H., & Waldman, R. J. (1990). Positive feedback investment strategies and destabilizing rational speculation. *the Journal of Finance*, *45*(2), 379-395.

Engle, R. F. (1982). Autoregressive conditional heteroscedasticity with estimates of the variance of United Kingdom inflation. *Econometrica: Journal of the Econometric Society*, 987-1007.

Fama, E. F. (1970). Efficient capital markets: A review of theory and empirical work. *The journal of Finance*, *25*(2), 383-417.

French, K. R., Schwert, G. W., & Stambaugh, R. F. (1987). Expected stock returns and volatility. *Journal of financial Economics*, *19*(1), 3-29.

Hirshleifer, D. (2001). Investor psychology and asset pricing. *The Journal of Finance*, 56(4), 1533-1597.

Hirshleifer, D., & Shumway, T. (2003). Good day sunshine: Stock returns and the weather. *The Journal of Finance*, 58(3), 1009-1032.

Kahneman, D., & Tversky, A. (1979). Prospect theory: An analysis of decision under risk. *Econometrica: Journal of the econometric society*, 263-291.

Kahneman, D., & Tversky, A. (1986). Rational choice and the framing of decisions. *The Journal of Business*, S251-S278.

Kaustia, M., & Rantapuska, E. (2016). Does mood affect trading behavior?. *Journal of Financial Markets*, 29, 1-26.

Kendall, M. G. (1953). The Analysis of Economic Time-Series – Part 1: Prices. *Journal of the Royal Statistical Society. Series A (General)*, *116*(1), 11-34.

Lee, J. S., & Chiu, C. W. (2016). Sport Sentiments and Stock Returns: Example of FIFA World Cups. *Applied Economics and Finance*, *4*(2), 44-56.

Lo, A. W. (2005). Reconciling efficient markets with behavioral finance: the adaptive markets hypothesis. *Journal of Investment Consulting*, *7*(2), 21-44.

Shiller, R. J. (2003). From efficient markets theory to behavioral finance. *The Journal of Economic Perspectives*, *17*(1), 83-104.

Wright, W. F., & Bower, G. H. (1992). Mood effects on subjective probability assessment. *Organizational behavior and human decision processes*, 52(2), 276-291.