

The Impact of Crises and Recessions on Excess Equity Returns

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Abstract

This study examines excess return on equities and the effect of financial crises and recessions on excess equity returns. Excess equity returns are observed in three northern European countries: The Netherlands, Germany, and Belgium and three southern European countries: Italy, Spain, and Greece. Excess returns on equity in the United States are also included in the study.

The Capital Asset Pricing Model and the Arbitrage Pricing Theory are often used to price equities. The statistical analysis uses a modification of the Arbitrage Pricing Theory in order to explain excess return on equity in the countries that are involved in the study.

The results show that both the presence of a recession and the probability of an upcoming recession have a significantly negative influence on the level of excess returns on equity. However, the other variables that are used as explanatory variables in this model have an ambiguous impact on the level of excess equity returns.

Contents

1. Introduction.....	3
2. Literature Review	5
2.1 Capital Asset Pricing Model.....	5
2.1.1 Explanation of the Capital Asset Pricing Model	5
2.1.2 Performance of the Capital Asset Pricing Model	9
2.2 Arbitrage Pricing Theory.....	10
2.2.1 Explanation of the Arbitrage Pricing Theory	10
2.3 Other Multiple Factor Models.....	11
2.3.1 Fundamental Factor Models	11
2.3.1 Macroeconomic factor models	12
2.4 Capital Asset Pricing Model versus Arbitrage Pricing Theory	14
2.5 Hypotheses.....	14
3. Data	17
3.1 Quantitative Data	17
3.2 Qualitative Data.....	18
4. Methodology	21
5. Results	23
6. Conclusion and Discussion	31
Bibliography.....	33
Appendix A: Recession Years.....	35
Appendix B: Stock Returns and Treasury Bill Rates.....	37
Appendix C: Excess Equity Returns.....	41
Appendix D: Regression Analyses.....	43
Appendix E: Do-File STATA.....	46

1. Introduction

In this study, excess equity returns in The Netherlands, Belgium, Germany, Spain, Italy, Greece, and the United States will be studied. The purpose of this thesis is to study the determinants of excess returns on equities and to examine what is the effect of financial crises and recessions on the level of these excess equity returns. Excess equity return is defined as the return on equity minus the interest rate on risk-free assets (Ross, 1976). The results of this study will add to the existing asset pricing literature by analyzing determinants of excess equity returns. In addition, the results can be of value to investors by offering information on investment allocation.

The countries investigated in this study are three northern European countries, three southern European countries, and the United States. U.S. equity returns are an often-used benchmark in the literature (Schwert, 1989; Shiller & Beltratti, 1992; Babalos et al, 2016). The northern and southern European countries are studied, because there is an important difference between those types of countries. These countries are different in terms of macroeconomic circumstances. In particular, the behavior of investors following the recent financial crisis has been different in northern and southern European countries. The equity markets of southern European countries suffered more losses than northern European countries (Moravcsik, 2012). Governments of southern European countries have also reacted systematically different on the financial crisis and the follow-up (Hall, 2012).

This study adds to the literature by studying the effects of the financial crisis on excess equity returns, helping to explain investor's behavior. Moreover, it attempts to explain whether it is still worthwhile to invest in risky equity rather than investing in 'risk-free' government bonds. It investigates whether there is a difference in the effects of the financial crisis on the level of excess equity returns in different countries and how this potential difference could be explained. This study contributes to the asset pricing literature by not only focusing on the impact of financial crises and other macroeconomic forces on the level of excess equity returns, but it also incorporates some aspects of behavioral finance by using subjective data that measures the probability of an upcoming recession to explain the level of excess equity return.

Hence, the following research question: *'What determines the level of excess return on equity and what is the impact of financial crises and recessions on the level of excess equity returns?'*

In order to answer this question, some relevant asset pricing literature will be discussed in chapter 2. There will be a special focus on the similarities and differences of two well-known models: the Capital Asset Pricing Model and the Arbitrage Pricing Theory. Based on the theory, it will be investigated which

asset pricing model suits the answering of the research question. Section 3 discusses the data, and chapter 4 describes the methodology of the analysis. The results will be presented in chapter 5. Finally, section 6 concludes.

2. Literature Review

Economists have long tried to explain returns in risky and risk-free assets (Sharpe, 1964). Many economists made effort to develop equilibrium models that explain and predict prices and returns of capital assets. One of the best-known models is the Capital Asset Pricing Model (CAPM), which explains equity returns by the sensitivity of an asset to market risk that cannot be diversified away (Sharpe, 1964; Fabozzi et al, 2012). This kind of risk is also called the systematic risk. The CAPM is popular, both in industry and academia because the model is simple and powerful. Arbitrage Pricing Theory (APT) type models are also discussed. These models are multifactor models that price assets by relating them to factors other than only systematic risk (Ross, 1976; Fabozzi et al, 2012). There are also many more factor models that try to explain and predict asset prices and returns, but these models will not be discussed in depth, because they are not relevant for answering the research question.

2.1 Capital Asset Pricing Model

The development of the CAPM is attributed to Sharpe (1964), Lintner (1965), and Mossin (1966). However, others say that Treynor actually gave the start for this model in his manuscripts, which have never been published in an academic journal. In 1990, Sharpe received a Nobel Prize in Economics for his asset pricing theory. Below, this model will be shortly explained. Afterwards, the validity of the model and the critics on the model will be discussed.

2.1.1 Explanation of the Capital Asset Pricing Model

The CAPM holds that the expected return on a specific equity is a linear function of its market risk and a market risk premium. It is an asset pricing model that is derived from a set of six important assumptions (Fabozzi et al, 2012) and is based on the 'mean-variance model' of Markowitz (1952). Although not all these assumptions are realistic, they do matter from a mathematical point of view. The six assumptions are the following:

1. *Investors make investment decisions that are based on the expected returns and the variances of the returns, as described in the Markowitz' method of portfolio diversification.* The Markowitz model (1952), which is also called a 'mean-variance model', can be explained as follows: investors select a particular portfolio at time $t-1$ and this investment will give them a random return at time t . One of the most important assumptions is that investors are risk-

averse and do only care about two things: the mean return of their investment and the variance of this asset return. Therefore, investors choose 'mean-variance-efficient' portfolios, which means that these portfolios minimize the variance of the portfolio return, given the level of return. In other words, a given portfolio will obtain a maximum return, given the variance of the portfolio returns. The Markowitz model provides the most efficient asset weights in a portfolio (Fama & French, 2004).

2. *Investors are rational and risk-averse.* This assumption indicates the risk-return relationship, which implies that when investors take a higher level of portfolio risk, they have to be compensated for the risk by earning a higher rate of (expected) return. The consequence is that when investors have to choose between two alternatives with a different level of risk, but the same expected return, they will always rationally choose the investment with the lowest risk level.
3. *All investors in the economy invest for the same period of time.* Investors make decisions on their investments over one time-period. This is unrealistic, but necessary from a mathematical point of view.
4. *Investors have the same expectations of the expected returns and variances for all assets.* This assumption is also referred to as the 'homogeneous expectations assumption', because it is assumed that investors have exactly the same expectations about the information that is needed to derive efficient portfolios, like returns on assets, variances, and covariances. This assumption is also unrealistic, because expectations are personal and subjective, and therefore they differ among investors (Levy & Levy, 1996).
5. *There is always a risk-free asset available and investors can borrow and lend unlimited amounts at this risk-free rate.* In the model, this risk-free rate is used as a benchmark return which is seen as the opportunity cost of money. In practice, this assumption is also unrealistic: there is observed an interest rate spread, which is the difference between borrowing and lending interest rates (Kwark, 2002).
6. *Capital markets are perfectly competitive and frictionless.* A complete competitiveness of the capital market means that the number of buyers and sellers is large enough, so that no one has any influence on the price of assets. Therefore, investors are all price takers. A frictionless capital market means that there are no barriers in trading assets, so buyers do not pay more than sellers receive. In practice, there is no market in which there are no frictions.

CAPM uses these six assumptions and involves the capital market line and the security market line. The capital market line is the line that shows all the possible portfolio combinations of risk and return that can be selected. The start of the capital market line is the point where the level of risk is equal to

zero, and the return is equal to the risk-free rate. The capital market line represents the optimal choice of portfolios by investors. The slope of the capital market line is:

$$\text{Slope Capital Market Line: } \frac{E(r_m) - r_f}{\sigma(r_m)}.$$

Here, $E(r_m)$ is the expected return on the market portfolio, r_f is the risk-free rate of return, and $\sigma(r_m)$ is the standard deviation of the market portfolio return. The capital market line can then be used to write the relationship between the level of risk and return on a portfolio which can be chosen by an investor:

$$E(r_p) = r_f + \left[\frac{E(r_m) - r_f}{\sigma(r_m)} \right] \sigma(r_p). \quad (1)$$

Here, $E(r_p)$ is the expected return on the portfolio of the investor, and $\sigma(r_p)$ is the standard deviation of the portfolio return of the investor.

The equation that represents the expected return on the portfolio can easily be rewritten to the standard formula:

$$E(r_p) = \alpha + \beta \cdot \sigma(r_p). \quad (2)$$

In this equation, β is the slope of the capital market line and α is the intercept. This α should be equal to the risk-free rate, because the capital market line starts at the point where the risk level on the portfolio is zero and the portfolio return is equal to the risk-free rate.

From the above equations, the security market line can be derived. Suppose that investors do not fully invest their portfolio value into the market, but that they also invest part of their money in any specific asset. Here, w_j is the proportion of security j in a portfolio that consists of the market portfolio m and security j . This portfolio has the following expected return and standard deviation:

$$E(r_p) = wE(r_j) + (1 - w)E(r_m) \quad (3)$$

$$\sigma(r_p) = [w^2\sigma(r_j) + 2w(1 - w)cov(r_j, r_m) + (1 - w)^2\sigma(r_m)]^{1/2} \quad (4)$$

Here, $\sigma(r_j)$ is the standard deviation of security j , and $cov(r_j, r_m)$ is the covariance between the return on security j and the market portfolio.

Sharpe (1964) showed that by these equations, one can measure the trade-off between risk and return, as investors want to find:

$$\frac{\partial E(r_p)/\partial w}{\partial \sigma(r_p)/\partial w} = \frac{\partial E}{\partial \sigma}$$

Intuitively, these derivatives measure the trade-off between returns and risk levels. When indeed taking the derivative with respect to w , the equations become:

$$\frac{\partial E(r_p)}{\partial w} = E r_j - E r_m$$

$$\frac{\partial \sigma(r_p)}{\partial w} = \frac{2w\sigma^2(r_j) + 2(1-w)\text{cov}(r_j, r_m) - 2w\text{cov}(r_j, r_m) - 2(1-w)\sigma^2(r_m)}{2\sigma(r_p)}$$

When w is equal to zero, so when the proportion in security j gets zero weight in the portfolio, this can be simplified to:

$$\frac{\partial \sigma(r_p)}{\partial w} = \frac{\text{cov}(r_j, r_m) - \sigma^2(r_m)}{\sigma(r_m)}$$

The slope of the security market line at the point where w is equal to zero is:

$$\frac{\partial E}{\partial \sigma} = \frac{\sigma(r_m)[E(r_j) - E(r_m)]}{\text{cov}(r_j, r_m) - \sigma^2(r_m)}$$

The slope of the security market line at the point where w is equal to zero can be made equal to the slope of the capital market line at the point where w is equal to zero, which gives the following equation:

$$\frac{E(r_m) - r_f}{\sigma(r_m)} = \frac{\sigma(r_m)[E(r_j) - E(r_m)]}{\text{cov}(r_j, r_m) - \sigma^2(r_m)}$$

The last equation can then be rewritten as follows:

$$E(r_j) = r_f + \beta_j [E(r_m) - r_f] \quad (5)$$

In this equation, β_j measures the covariation of security j with the market. The formula for this beta is:

$$\beta_j = \frac{\text{cov}(r_j, r_m)}{\sigma^2(r_m)} = \frac{\text{corr}(r_j, r_m)\sigma(r_j)}{\sigma(r_m)}$$

The term $E(r_m) - r_f$ is called the market risk premium, which is the premium that is required by investors for taking risk by investing in risky assets instead of investing in risk-free assets. The market risk premium is then the return in excess of the risk-free return.

Finally, in a CAPM setting, the excess return is defined by $r_j - r_f$ in the following equation.

$$r_j - r_f = \alpha_j + \beta_j (r_m - r_f) + \varepsilon_i \quad (6)$$

The random return on an asset, r_j , is here decomposed into a constant term (α_j) and two components of which one is correlated with the market (β_j), and the other is unrelated to the market (ϵ_j). This equation can be rearranged to the following regression equation:

$$E(r_j) - r_f = \alpha_j + \beta_j[E(r_m) - r_f] \quad (7)$$

This formula is not based on any financial theory describing specific variables that determine the returns on an asset and therefore the formula is always true, and can be used in any case (Fabozzi et al, 2012). Because the constant term α_j is regarded as the unexplained expected return by the market, it can have any value. However, the CAPM states that because investors have homogeneous expectations, and because all other assumptions listed above hold, α_j must be zero in equilibrium (Fabozzi et al, 2012).

2.1.2 Performance of the Capital Asset Pricing Model

The CAPM (Sharpe, 1964; Lintner, 1965; Mossin, 1966) is still widely used in academic papers (Da et al, 2012; Barberis et al, 2015), and highly influential. However, although the model is clear, there is a lot of criticism on this model, both from an empirical side as from a theoretical perspective. Theoretically grounded criticism focusses mostly on the assumptions necessary for the model. The first assumption of the CAPM is that investors make up their portfolio by using the mean-variance criterion of Markowitz (1952). Therefore, the CAPM is also vulnerable to the same criticism as the mean-variance model of Markowitz. The most important point of criticism of the Markowitz model is that it assumes that investors only consider a one-period investment (Khouja, 1999). Furthermore, other assumptions of the CAPM are criticized, such as the assumption that all investors have the same expectations and the assumption of one-period optimizing. There is also empirical criticism. Black et al (1972) show that assets with a lower beta did actually earn a higher return than assets with a higher beta. This is not in line with CAPM, which claims that assets with a higher beta would earn a higher return than assets with a lower beta.

One could ask why, despite many theoretical and empirical pitfalls, CAPM is still used. The answer is that the model is not too difficult to interpret, and consistent empirical evidence showed that CAPM still has a large explanatory power (Fabozzi et al, 2012).

2.2 Arbitrage Pricing Theory

An alternative explanation of asset prices and returns is the Arbitrage Pricing Theory (APT). This model was proposed by Ross (1976). APT is an alternative to the already existing CAPM, introduced by Sharpe (1964), Lintner (1965), and Mossin (1966), which is described above. Ross (1976) observed that CAPM was subject to criticism based on theoretical grounds as well as on empirical conclusions. He provided an alternative model, not hinging on mean-variance theory.

2.2.1 Explanation of the Arbitrage Pricing Theory

In contrast to CAPM, which stated that expected returns on assets are linearly related to only one single source of risk, the market risk or systematic risk, APT assumes that expected returns on assets are linearly related to more than one risk factor. These risk factors are all systematic factors, which means that these factors are related to the entire economy, and not specifically to one part of the economy or specific sectors (Fabozzi et al, 2012). The degree of exposure to these factor risks varies across firms. Because APT says that the expected returns on assets are linearly related to a number of systematic factors (K factors), and the exposure to these systematic factors are defined as factor betas, the following equation comes about:

$$E[r_i] = r_f + \gamma_1\beta_{i1} + \dots + \gamma_k\beta_{ik} \quad (8)$$

Here, β_{ik} is the risk exposure on factor k, and γ_k is the risk premium for that specific factor, for all factors that are involved in the model. The expected equity returns of APT are thus the same as CAPM in one specific case when k is equal to one, so when there is one explaining systemic factor in the model, and when this factor is the market portfolio factor. However, many empirical studies use many macroeconomic variables to explain equity returns.

The assumptions of the APT are different from the assumptions of the CAPM. The CAPM is based on the 'mean-variance theory' of Markowitz (1952) and therefore states that the portfolio choice of investors is only determined by the means and variances of portfolio returns. When using CAPM, the statistical distribution of returns on assets is restricted, as asset returns have to be normally distributed, and the form of the utility function used for the model must be quadratic. Quadratic utility functions imply that the absolute risk aversion increases, which predicts unrealistic behavior of investors, because a quadratic utility function does only represent investor's preferences over restricted levels of wealth (Fabozzi et al, 2012). APT is less restrictive. The only restriction that APT imposes on the form of utility functions is non-satiation, which means that more is preferred to less (Perloff, 2014).

Another difference of CAPM and APT concerns the behavior of investors which is assumed to be homogenous in CAPM and heterogeneous APT models. Under CAPM, every investor is assumed to use the same Markowitz criteria in order to build a portfolio, and as a result, all investors will hold the same market portfolio according to the theory. The only differences between investors do depend on their level of risk-aversion, and will be revealed in the individual investors' allocation over the risk-free asset and the risky assets. In contrast, APT states that it is possible for only a few investors to take advantage of arbitrage possibilities. Investors can make abnormally high returns when certain assets are mispriced and give higher returns than what is represented in their beta risk, just because they make use of arbitrage possibilities.

In a competitive market, however, it is assumed that there are no arbitrage opportunities, because these would immediately be exploited by investors. This implies that assets should only be rewarded by their exposure to risks according to the asset's betas, and therefore in equilibrium APT holds. Generally, an asset exhibits higher expected returns when the systematic risk of the asset is also higher. The model specification of APT is written as follows:

$$r_{it} - r_{ft} = \alpha_i + \beta_{i1}f_{1t} + \dots + \beta_{ik}f_{kt} + \varepsilon_{it} \quad (9)$$

Here, f_1 up to f_k are the systematic factors that have impact on the asset returns, while ε_{it} is the asset-specific risk or the error term.

APT does not specify what macroeconomic forces the factors that are involved in the equation have to be, and it does not say anything about the number of factors, whereas CAPM claims that there is only one factor that explains asset returns, which is the market risk. Economic factors that are often used in APT in order to explain stock returns are variables like Investor Confidence, Interest Rates, Inflation, Real Business Activity, especially the change in industrial production, and a Market Index, which is equal to CAPM's beta (Connor, 1995). The consequence of APT is that when the market is in equilibrium, and all explanatory variables are found, there should not be observed any deviations from the APT price relation (Fabozzi et al, 2012).

2.3 Other Multiple Factor Models

2.3.1 Fundamental Factor Models

Other studies identify different specific factors regarding relationships between risk and return, but generally hypothesize linear relationships between different kinds of risk and return. One well-known multiple factor model is the Fama-French three-factor model (1993), which states that firm-specific book-to-market values and size factors have a systematic impact on asset returns, as earlier empirical

evidence showed that the market capitalization of assets influences the level of excess return on equity (Fama & French, 1992). However, for this study, the Fama-French three-factor model is irrelevant, because it focuses on explaining the returns of equity for specific companies, while the focus of this study is on explaining country-level excess returns on equities. Models like the Fama-French three-factor model are examples of fundamental factor models. These fundamental factor models use features of both the company and the industry wherein the company operates as well as market data in order to predict and explain equity returns. Variables that are used in fundamental factor models are firm-specific characteristics like book-price ratios and price-earnings ratios. The models provide a risk index and according reward for taking risk by investing in one specific company.

2.3.1 Macroeconomic factor models

Macroeconomic factor models use other variables than fundamental factor models. Serving as inputs for such models are, for example, historical stock returns and other macroeconomic variables which are quite good observable. One successful macroeconomic model was for example the macroeconomic factor model that was invented by Burmeister, Roll, and Ross (2003). These authors found five sources of risk that did have a significant impact on stock returns. The risks they found and the way in which these factors were measured will be discussed below:

- *Confidence Risk*: the unexpected change in the willingness of investors to invest in relatively risky projects, which is actually a measure of investor's in the performance of the economy. The way in which this is measured in Burmeister et al (2003), is by calculating the difference between the return rate on long-term corporate bonds, which are perceived as relatively risky, and the return rate on long-term government bonds, which are assumed to be riskless. When the excess return on risky bonds with respect to the riskless bonds was higher than the long-term average difference, the confidence risk measure is positive. Because most stocks are positively exposed to this confidence risk, it is stated that stocks will rise in price when confidence risk is positive.
- *Time Horizon Risk*: the unexpected change in the desire of investors with respect to the time they want to be paid out. Burmeister et al (2003) measure this by calculating the difference between the return rate on long-term government bonds and short term treasury bills. When this risk is positive, investors require a lower compensation for investments with a long period before payout. The stock price of stocks that are exposed to this risk will rise, because the yield of these stocks can go down and investors want to participate in risky projects.

- *Inflation Risk*: covers the unexpected parts of both the short-term as well as the long-term inflation rates. The inflation risk is measured here as the difference between expectations about inflation and the actual inflation. Almost all stocks are negatively exposed to inflation, and therefore when the inflation rate is positive, stock returns will be lower, and when the inflation rate is lower than expected, stock returns will be higher than expected.
- *Business Cycle Risk*: unexpected changes in the real measured activity in a country. This is measured in Burmeister et al (2003) as the difference between business activity expectations at the end of a month and the same expectations at the beginning of a month. When GDP growth is higher than expected, then Business Cycle Risk is measured positive. Therefore, firms that are positively exposed to GDP growth, have higher stock returns than firms that are insensitive to the business cycle.
- *Market Timing Risk*: part of the index return that is not explained by the other four macroeconomic forces. Actually, when the beta of Confidence Risk, Time Horizon Risk, Inflation Risk, and Business Cycle Risk are zero, so they are unexposed to these risk, the stock returns are equal to the beta of the factor Market Timing Risk. Only when the other macroeconomic factors have a beta of zero, the beta of the factor Market Timing Risk is equal to the beta that is used in the Capital Asset Pricing Model (Burmeister et al, 2003).

Burmeister et al (2003) found significant results in a sample of S&P 500 firms when using these five macroeconomic factors to explain stock returns. They found a positive contribution to the excess return on stocks within the S&P 500 over the 30-days treasury bill rate for the factors Confidence Risk, Business Cycle Risk, and Market Timing Risk. For Time Horizon Risk and Inflation Risk, they found a negative contribution to the excess return on equity on stocks in the S&P 500. The general equation for any asset in the S&P 500 in their study was:

$$E(r_i) - TB = 2.59 \beta_{i1} - 0.66 \beta_{i2} - 4.32 \beta_{i3} + 1.49 \beta_{i4} + 3.61 \beta_{i5}$$

Here, TB is the 30-day Treasury Bill Rate, so the equation calculates the excess return on equity with respect to the short term risk-free rate on the S&P stock market. The coefficients are the prices of risks, which are positive for the first factor (Confidence Risk), the fourth factor (Business Cycle Risk), and the fifth factor (Market Timing Risk), and they were negative for the second factor (Time Horizon Risk) and the third factor (Inflation Risk). The beta measures the exposure of such a risk for one specific stock or stock market index.

2.4 Capital Asset Pricing Model versus Arbitrage Pricing Theory

Although APT and CAPM both describe the relationship between stock returns and the exposure to risk, these models are not the same. What APT and CAPM do have in common is that they state that in well-diversified portfolios, firm-specific risks can be cancelled out by spreading risks, which is called the principle of diversification. However, what makes APT different from CAPM is that APT states that even large and well-diversified portfolios are still not completely risk-free, because these portfolios suffer from macroeconomic risks. There are common economic forces that influence all stock returns in a portfolio or an index and cannot be eliminated by a good diversification technique. In APT, these common economic forces are called systemic risks (Burmeister et al, 2003). The CAPM on the other hand assumes that the systemic risk of an asset does only depend on the sensitivity to the market, and this systemic risk is measured in one beta.

2.5 Hypotheses

The literature review above implies some hypotheses. As Burmeister et al (2003) showed that some macroeconomic factors explained stock returns in the U.S. for the S&P 500, the expectation is that for the countries involved in this study, this will also be the case. Therefore, the hypotheses are derived from factors mentioned by Burmeister et al (2003), and they are supplemented by other hypotheses regarding additional (new) macroeconomic factors. Therefore the following five hypotheses are formulated:

1. *Excess return on equity is positively related to the confidence of investors.* When investors are confident about the economy in general, and when they have positive expectations about the future, it is more likely that they will invest in risky equity. Hence, stock prices will rise, and return on equity will also increase. On the other hand, when confidence in the performance of the economy is low, investors are less willing to invest in equity, because they perceive it as a more risky and less profitable investment. Therefore, stock prices will decline, which also causes stock returns to go down. Investors will invest their money in 'riskless' treasury bills, of which the interest rate will hence decline. However, this decline will be lower than the decline in equity return, because the variance of interest rates is much lower than the variance of stock returns. Therefore, the excess return on equity is positively related to investor confidence.
2. *Excess return on equity is negatively related to risk-free interest rates.* When risk-free interest rates are increasing, the opportunity costs for investing money in risky projects do also increase. Therefore, investors would be less willing to invest in risky projects. The demand for

equity will go down, which decreases stock prices, and therefore the return on equity will be lower. Excess return on equity will therefore also decrease, because return on equity goes down, while the risk-free interest rate increased. On the other hand, when risk-free interest rates are low, the opportunity costs for investing in risky projects become lower, as well as the possible alternatives to invest become less attractive. Therefore, when the interest rate is low, investors will invest more in equity, and therefore stock prices will go up. Because of increasing stock prices, the return on equity goes up. As a result of both a lower interest rate as well as higher stock returns, the excess return on equity will increase when interest rates go down.

3. *Excess return on equity is negatively related to inflation.* When a country suffers from inflation, the risk of investing in equity increases. Therefore, the demand for risky assets declines, and thus return on equity will go down. The other way around, when inflation is low, the risk of investing becomes lower, and thus investors require a lower return on equity. Consequently, the demand for equity becomes higher, which rises stock prices. Because of the higher stock prices, the return on equity is higher.
4. *Excess equity return is positively related to the real GDP level.* When the real GDP of a country grows, the profit of companies will be higher, and thus stock returns will increase. On the other hand, when the real GDP of a country grows very slow or even declines, the profits of companies will also suffer from this. Therefore, when real GDP growth is low, stock prices go down, and thus return on equity declines. So, excess return on equity is positively related to the development of the business cycle.
5. *Financial crises and recessions affect the level of excess equity.* However, the impact of financial crises and recession on excess equity return can be both positive as well as negative. This will be explained below.
 - On the one hand, during a crisis or recession, investors will perceive investing in equity as if it were more risky, and therefore they demand a higher risk premium. Therefore, during times of financial distress, excess return on equity will be higher. Because investors in equity are risk-averse and they are convinced that their investment is riskier than on average, they want to be rewarded for taking this additional risk in the form of a higher risk premium or excess return above the risk-free rate
 - On the other hand, investors could also consider investing in equity a too risky activity, and therefore stop investing will only remain invested in 'risk-free' securities, such as government bonds and treasury bills. This means that during times of financial distress, excess return on equity will be lower than when financial distress is absent. When investors start selling their equity holdings, this decreases stock prices, and thereby decreases equity returns. Because equity holders will change investments and start to

invest in riskless securities, such as government bonds and treasury bills, the risk-free rate will also decline. However, this decline in the risk-free rate will be less severe than the decline in equity returns, because the variance in the risk-free rate is much lower than the variance of equity returns, because stock prices are determined by the law of supply and demand, and the risk-free rate is set by different institutions (Fabozzi et al, 2012).

The first four hypotheses are derived from the work of Burmeister et al (2003), because these authors have shown that the first four factors had a significant impact on equity returns of the S&P 500. It is hypothesized that these relationships do also hold for other countries that are of interest in the study.

The fifth hypothesis combines two very relevant aspects and approaches of economics. The first approach finds its origins in classical economic theory, which holds that when an asset is perceived as more risky, the investor should be rewarded for taking an additional risk by a risk premium, and therefore the return on the asset should be higher. The second approach originates in the behavioral financial literature. This approach assumes that investors are generally risk-averse and therefore build their investment strategy on the basis of risk by determining how high the level of risk is that they want to take, because their behavior suffers from bounded rationality (Kuhnen & Knutson, 2005). In the first instance, the behavioral approach disregards the trade-off between risk and return, but the behavioral approach is more interested in investors' willingness to take risk and how they decide on their investment strategy.

3. Data

The countries featured in this research are three northern European countries: The Netherlands, Germany, and Belgium. In addition to these northern European countries, three southern European countries are studied: Spain, Italy, and Greece. Because the study of Burmeister et al (2003) uses the United States as research subject, the United States is used as a benchmark. It is presumed that there is a fundamental difference between the three northern European countries and the three southern European countries, because the southern European countries suffered more from the past financial crises than the northern European countries (Hall, 2012). In the southern countries, global financial crises do also last a longer time (Moravcsik, 2012). For example, during the recent financial crisis of 2008, the real GDP level declined stronger in the southern European countries than in the northern European countries. Another observed difference is the impact of the financial crisis on the labor market. In the southern European countries, the unemployment increased stronger than in northern European countries as a consequence of the financial crisis. So, although these six countries are members of the same monetary union, they are different in many aspects (Moravcsik, 2012). Therefore, one could expect a difference in regard to the impact of financial crises and recessions on the level of excess return on equity in these countries.

Both quantitative as well as qualitative data is used in this study. Quantitative data is used in the form of stock prices, stock returns, risk-free interest rates, inflation rates, and real GDP values. This data can be used in order to calculate the level of excess equity returns and to measure whether a country suffers from a recession or not. Qualitative data, regarding the opinions and views of respondents, is also used. With data such as these, one can study the impact of financial distress on the behavior of investors and consumers.

3.1 Quantitative Data

The first quantitative data that is used in this study are the equity indices. The following equity indices are involved in this study:

- United States: S&P 500 (Standard & Poor's 500 Index)
- Netherlands: AEX (Amsterdam Exchange Index)
- Germany: DAX (Deutscher Aktienindex)
- Belgium: Bel20 (Euronext Brussel)
- Greece: ATHEX (ATHEX Composite Price Index)

- Italy: FTSE MIB (Financial Times Stock Exchange Milano Indice di Borsa)
- Spain: IBEX-35 (Iberia Index Bolsa de Madrid)

The historical data of these equity indices is extracted from Datastream (2016). For the one country there was longer historical information available than for the other country, and therefore the amount of observations differs for each country.

Secondly, the 1-year treasury bill interest rate for all countries is extracted from Datastream (2016). Again, the history of available data was longer for the one country than for the other country. However, for all countries the same treasury bill rate for the treasury bills with the maturity of one year is used, with the purpose of ensuring comparability.

Thirdly, data on the inflation rate of every single country is extracted from Datastream (2016). The Consumer Price Index that is gathered by the national bureaus of statistics in each country is used as a benchmark for inflation in a country.

Additionally, the real GDP values are extracted from Datastream (2016). These real GDP values are published by the national bureaus of statistics of each country and by the World Bank. The growth of real GDP is relevant for this research, so GDP growth rates are calculated from real GDP levels.

In order to determine whether a country is in a recession or not, a dummy variable is calculated, defined as 1 if the GDP growth rate negative for two consecutive quarters, 0 otherwise. This is the method that is used by the U.S. National Bureau of Economic Research, and therefore this method is also used for the other countries. Table 6 in Appendix A shows all years for which there is measured a recession by using this calculation method.

3.2 Qualitative Data

First, the Main Economic Indicators that represent the economic sentiment in the country of interest are extracted. These indicators are published by the Organization for Economic Co-operation and Development (OECD) and are available on Datastream (2016). The information that is used for these publications of the OECD was gathered from several national statistical institutes, as well as from other institutions and agencies, both governmental organizations and private organizations. But also banks and other research institutes did contribute to the Main Economic Indicators which are published by the OECD. The data is collected by opinion surveys among consumers and investors. For all the European countries involved in this study, this kind of data is available and therefore these datasets are suitable. The OECD collects data on different topics. First, some national consumer confidence indicators are collected, which particularly focus on the country that is subject in the survey. Topics

that are discussed in these surveys are, for example, people's expectations about the economic growth, the unemployment rate, the inflation rate, and employee's expectations about their income. The answers are not presented in a uniform format. Sometimes people can rate the expected future economic situation while choosing among five answer alternatives, which are: a lot better, slightly better, the same, a little worse, and a lot worse. Other questions, like what people expect about the inflation rate and the interest rate can be answered by a simple number or a range of numbers. The exact questions and indicators differ per country, and also the way in which the confidence indicator number is calculated differs per country and is also dependent on what kind of questions are asked. Secondly, EU harmonized consumer confidence indicators are collected by the OECD in order to make up the Main Economic Indicators. Topics of interest included in these surveys are: the expected change in financial situation of households over the next 12 months, the expected change in the general economic situation over the next 12 months, the expected change in the unemployment rate over the next 12 months, and the expected change in savings of households over the next 12 months. All these questions have to be answered by choosing among five alternative answers, which are as follows: a lot better, a little better, the same, a little worse, and a lot worse. The calculated confidence indicator calculated out of these answers shows a balance of positive results over negative results. Typically, there is given double weight to extreme outcomes, as answers like 'a lot better' and 'a lot worse' get weight 1, and answers like 'a little better' and 'a little worse' are given half weight. The answer option 'the same' gets zero weight. Apart from these two big indicators, people are asked to give their expectation about the development of consumer prices. The exact question that is asked then is: 'By comparison with the past 12 months, how do you expect that consumer prices will develop in the next 12 months?'. The answer alternatives are as follows: 'They will: 'increase more rapidly', 'increase at the same rate', 'increase at a slower rate', 'stay about the same', 'fall', or respondents can answer 'don't know''. Finally, one question is asked about the overall economic situation. The exact question that is asked is: 'How do you expect the general economic situation in this country to develop over the next 12 months?' The possible answers are as follows: 'They will: 'get a lot better', 'get a little better', 'stay the same', 'get a little worse', 'get a lot worse', and respondents can also answer 'don't know''. From all these questions, one final index is assembled centered around 0, indicating the aggregate economic sentiment in a country.

For the U.S., there is found an economic sentiment index database, which is published on Datastream (2016) too. The University of Michigan publishes their Consumer Sentiment Index every month. This data is extracted by asking fifty important questions in telephone interviews. These questions that are asked to consumers are quite the same as the questions that are used to perform the OECD's monthly Main Economic Indicators. Some questions are for example: 'Would you say that you (and your family

living here) are better off or worse off financially than you were a year ago?', 'Do you think that a year from now you (and your family living here) will be better off financially, or worse off, or just about the same as now?'. But also questions about the subjective welfare of the country are asked in the form of questions like: 'Turning to business conditions in the country as a whole: do you think that during the next twelve months, we'll have good times financially, or bad times, or what?' After these general economic questions, there are also asked questions about the price development in the United States and what respondents expect about the price developments in the next periods. Because the questions that are asked in order to make up the Main Economic Indicators of the OECD are more or less similar with the questions that are used by the Consumer Sentiment Index of the University of Michigan, the data and numbers are comparable to each other.

Finally, a smoothed recession probability variable for all countries is collected. This variable is collected and built by the Federal Reserve Bank of St. Louis in the United States and also published on Datastream (2016). This variable is constructed, based on various metrics, for example: the index of production in industries, the personal income as well as the household incomes, and trade sales. By collecting the data on these variables, the Federal Reserve tries to predict the probability of an upcoming recession. Therefore, this variable is also a suitable measurement for the economic sentiment in a country.

4. Methodology

In this section, the way in which the data will be analyzed is discussed.

First, for all equity indices, the yearly return is calculated. This is done by calculating all daily returns by the following formula: $stock\ return\ day_t = \ln(p_{t+1}) - \ln(p_t)$, where p_t is the equity index price at day t, and p_{t+1} is the equity index price at day t+1. Then, all daily returns calculated by this formula are summed up to calculate the return for year t, so: $stock\ return\ year_t = \sum_{t=0}^{t=n} stock\ return\ day_t$.

Secondly, the excess return on equity is calculated by the following formula: $Excess\ equity\ return_{jt} = [stock\ return_{jt}] - [risk - free\ rate_{jt}]$. Here, the *risk-free rate_{jt}* is the 1-year treasury bill rate in country j in year t, which is often regarded as the risk-free rate.

In the statistical analysis, the first step is estimating the specification of Burmeister et al (2003). Therefore, the dependent variable in the regression will be the excess return on equity, and the independent variables are the economic sentiment of the country, the level of the risk-free interest rates, the inflation rate, and the growth rate of real GDP. This regression will then provide the following formula, like formula 9:

$$R_{jt} - TB_{jt} = \alpha_1 + \beta_{11}f_{11} + \beta_{21}f_{21} + \beta_{31}f_{31} + \beta_{41}f_{41}$$

In this equation, R_{jt} is the return on the specific index and TB_{jt} stands for the 1-year treasury bill rate in a country. α_1 is the constant term which represents the excess return on equity in case when all other variables get value zero. Factor 1 is the economic sentiment of the country, factor 2 is the level of the risk-free interest rate in the specific country, factor 3 is the country's inflation rate, and factor 4 is the growth rate of real GDP in this equation. Therefore, the regression equation can be interpreted as:

$$Excess\ Return\ on\ Equity = Constant + \beta_{11} \cdot Economic\ Sentiment + \beta_{21} \cdot Risk - free\ Rate + \beta_{31} \cdot Inflation\ Rate + \beta_{41} \cdot Economic\ Growth$$

Here, the betas measure the sensitivity of excess equity returns to the corresponding risk variable.

It will be analyzed whether the variables in this regression equation are significant explanatory variables of excess return on equity for all countries that are involved in the study. The results of this analysis will be published in chapter 5. If the coefficient corresponding to the variable is significantly different from zero, it will be labelled with one or more asterisks *: *=0.05 significance level, **=0.01 significance level, ***=0.001 significance level. However, the significance of the coefficients belonging

to the variables can also be observed in the t-values which are displayed within brackets underneath the coefficients. Finally, adjusted r-squared values will be reported. The r-squared value is a statistical value which shows how much of the variation in the dependent variable is explained by the independent variables that are used in the model. An adjusted r-squared value actually shows the same, but is corrected for the amount of explanatory variables used in the model, and sample size. For example, when the adjusted r-squared has a value of 0.40, this means that 40% of the variability of the dependent variable around its mean is explained by the explaining factors that are used in the model (Hill et al, 2008).

Afterwards, additional variables are included order to identify whether these variables make a significant contribution to the model. The fifth hypothesis regards the impacts of recessions and crises on excess equity returns. Hence, two additional variables are included in the specification: the probability of recession and the dummy variable indicating the presence of a recession.

The new regression equation will then be the following:

$$R_I - TB = \alpha_I + \beta_{1I}f_{1I} + \beta_{2I}f_{2I} + \beta_{3I}f_{3I} + \beta_{4I}f_{4I} + \beta_{5I}f_{5I} + \beta_{6I}f_{6I}$$

This model specification can be simplified to:

$$\begin{aligned} \text{Excess Return on Equity} = & \text{Constant} + \beta_{1I} \cdot \text{Economic Sentiment} + \beta_{2I} \cdot \text{Risk} - \text{free Rate} + \\ & \beta_{3I} \cdot \text{Inflation Rate} + \beta_{4I} \cdot \text{Economic Growth} + \beta_{5I} \cdot \text{Recession Year} + \beta_{6I} \cdot \\ & \text{Recession Probability} \end{aligned}$$

Here, factor 1 up to 4 are the same factors as before. Factor 5 is a dummy variable indicating the existence of a recession, and factor 6 is the probability of an upcoming recession as it is measured by the Federal Reserve Bank of St. Louis in the United States.

All models are estimated using OLS Regression Analysis.

The model estimations will then be analyzed in order to identify the contribution of the explanatory variables and the predictive power of the model.

5. Results

In this section, the results of the analysis are presented. In Appendix B, figures that represent the return on equity as well as the risk-free rate are given. Table 7 in Appendix C shows the excess return on equity for each country for each year and table 8 in Appendix C shows the average excess equity return for each country for each year.

Table 1: Excess Equity Return explained by economic sentiment, risk-free rate, inflation rate, and economic growth

Excess Return on Equity								
Country	United States	Netherlands	Belgium	Germany	Spain	Italy	Greece	
Variable								
Constant	0.0731 (1.27)	0.712 (1.87)	0.219 (1.75)	0.312 (1.98)	0.146 (1.44)	0.251 (1.18)	-0.193 (-0.62)	
Economic Sentiment	0.236 (0.97)	8.614 (1.10)	-1.179 (-1.11)	1.780 (1.11)	0.355 (0.24)	-0.104 (-0.06)	-1.153 (-0.22)	
Risk-free Rate	0.208 (0.19)	-4.158 (-0.52)	-0.887 (-0.43)	-1.690 (-0.40)	2.121 (0.88)	-0.913 (-0.12)	-0.376 (-0.57)	
Inflation Rate	-1.492 (-0.98)	-7.538 (-0.44)	-13.38 ** (-2.94)	-10.00 (-0.90)	-7.864 (-1.33)	-13.60 (-1.38)	-7.145 (-0.74)	
Economic Growth	-0.630 (-0.53)	-46.09 (-1.26)	5.269 (0.86)	-5.487 (-0.84)	-0.431 (-0.07)	1.537 (0.21)	4.135 (0.29)	
Adjusted R-Squared	0.052	0.138	0.260	0.025	-0.014	0.031	-0.359	

Table 1 shows the regression results for all countries, for the model that follows the methodology of Burmeister et al (2003). The first row shows the coefficient of the corresponding variable, while the second row with the value within two brackets shows the corresponding t-statistic. When a coefficient is significantly differing from zero, the coefficient is denoted with one or more asterisks.

The estimated equation is the following:

$$\text{Excess Return on Equity Country}_i = \text{Constant}_i + \beta_{ES\ i} \cdot \text{Economic Sentiment} + \beta_{RF\ i} \cdot \text{Risk-free Rate} + \beta_{INF\ i} \cdot \text{Inflation Rate} + \beta_{EG\ i} \cdot \text{Economic Growth}$$

In this regression, there is only one significant coefficient for one country, namely the coefficient corresponding to the variable inflation rate for Belgium. This coefficient is significantly negative, which verifies the hypothesis that held when there is observed inflation in a country, investors will regard investing in equity as more risky, and therefore invest less, which cause stock prices to decline and therefore stock returns decline too. However, for the other countries, no variable assumes statistical significance. Moreover, the adjusted r-squared values are very low, which means that almost no fraction of the variance of excess return on equity around its mean is explained by the variables in the model.

Because the explanatory power of the previous model is low, additional variables will be added to the existing model in order to investigate whether these extra variables have any explanatory power.

Table 2: Excess Equity Return explained by economic sentiment, risk-free rate, inflation rate, economic growth, and presence of recession

		Excess Return on Equity						
Country	United States	Netherlands	Belgium	Germany	Spain	Italy	Greece	
Constant	0.0942 (1.99)	0.565 (1.42)	0.280 (2.09)	0.287 (1.73)	0.256 (1.90)	0.279 (1.33)	-0.255 (-0.58)	
Economic Sentiment	0.0780 (0.39)	5.393 (0.66)	-0.977 (-0.92)	1.873 (1.14)	0.678 (0.45)	-0.176 (-0.10)	-1.115 (-0.19)	
Risk-free Rate	0.415 (0.46)	-1.622 (-0.20)	-1.256 (-0.61)	-1.624 (-0.38)	1.073 (0.42)	0.218 (0.03)	-0.363 (-0.48)	
Inflation Rate	-0.941 (-1.033)	-2.987 (-0.17)	-11.23 * (-2.31)	-11.58 (-1.00)	-5.299 (-0.85)	-12.12 (-1.24)	-8.344 (-0.69)	
Economic Growth	-1.033 (-1.06)	-34.27 (-0.92)	1.733 (0.26)	-4.330 (-0.62)	-4.680 (-0.67)	-1.085 (-0.14)	5.691 (0.32)	
Recession Year	-0.289 *** (-4.92)	-0.276 (-1.09)	-0.177 (-1.18)	0.0987 (0.58)	-0.239 (-1.23)	-0.179 (-1.17)	0.190 (0.24)	
Adjusted R-Squared	0.366	0.171	0.274	-0.020	0.008	0.057	-0.777	

Table 2 shows the subsequent regression analysis with one additional variable included: the dummy variable 'recession year', which adopts the value of 1 if a country suffered from a recession in year t, and 0 otherwise.

The regression equation that follows out of the analysis is the following:

$$\text{Excess Return on Equity Country}_i = \text{Constant}_i + \beta_{ES\ i} \cdot \text{Economic Sentiment} + \beta_{RF\ i} \cdot \text{Risk-free Rate} + \beta_{INF\ i} \cdot \text{Inflation Rate} + \beta_{EG\ i} \cdot \text{Economic Growth} + \beta_{RY\ i} \cdot \text{Recession Year}$$

For Belgium, the coefficient belonging to the variable inflation rate is again negative and significantly different from zero. Additionally, for the United States, the variable recession year is negative and statistically significant. This means that in the United States the excess return on equity was lower during years in which there was observed a recession. However, the adjusted r-squared value is still not very high, which means that there is a lot of unexplained variance in excess equity returns.

Table 3: Excess Equity Return explained by economic sentiment, risk-free rate, inflation rate, economic growth, and probability of recession

		Excess Return on Equity						
Country	United States	Netherlands	Belgium	Germany	Spain	Italy	Greece	
Constant	0.210 ** (3.39)	0.335 * (3.58)	0.304 * (2.75)	0.258 (1.81)	0.158 (1.67)	0.193 (1.10)	-0.156 (-0.45)	
Economic Sentiment	-0.133 (-0.54)	-0.979 (-0.49)	-0.479 (-0.51)	2.046 (1.42)	-1.297 (-0.81)	1.708 (1.04)	-1.915 (-0.32)	
Risk-free Rate	2.041 (1.90)	8.460 * (3.85)	-0.522 (-0.30)	0.0425 (0.01)	1.339 (0.59)	-2.022 (-0.32)	-0.411 (-0.56)	
Inflation Rate	-2.355 (-1.64)	-15.50 * (-3.99)	-9.066 * (-2.18)	-0.668 (-0.06)	-8.920 (-1.61)	-3.726 (-0.42)	-4.089 (-0.35)	
Economic Growth	-4.754 ** (-2.97)	-7.771 (-0.86)	-2.341 (-0.40)	-10.43 (-1.66)	4.659 (0.75)	-9.371 (-1.28)	6.830 (0.41)	
Recession Probability	-0.783 *** (-4.09)	-0.956 *** (-9.78)	-0.728 ** (-2.92)	-0.738 * (-2.18)	-0.630 * (-2.10)	-0.851 * (-2.68)	-0.504 (-0.58)	
Adjusted R-Squared	0.299	0.957	0.463	0.221	0.117	0.344	-0.627	

Table 3 shows the same regression analysis as the first one, but now another variable is added that is hypothesized to explain excess return on equity. This is the variable ‘recession probability’, which measures the probability of a future recession.

The following regression equation is estimated:

$$\text{Excess Return on Equity Country}_i = \text{Constant}_i + \beta_{ES\ i} \cdot \text{Economic Sentiment} + \beta_{RF\ i} \cdot \text{Risk-free Rate} + \beta_{INF\ i} \cdot \text{Inflation Rate} + \beta_{EG\ i} \cdot \text{Economic Growth} + \beta_{RY\ i} \cdot \text{Recession Probability}$$

In this regression, there are several explanatory variables whose coefficients show statistical significance. For the United States, the coefficients of the variables economic growth as well as the variable recession probability are significantly negative. The negative relationship between economic growth and excess returns on equity is not predicted in the hypotheses, because it was expected that when the real GDP of a country grows, expected company profits and expected stock returns would go up, which would cause a higher demand for risky equity, and thus higher stock returns. For the United States, The Netherlands, Germany, Belgium, Spain, and Italy there is observed a negative relationship between the variable recession probability and excess equity returns, which can be easily explained. When there is a higher probability of an upcoming recession, investing in equity will become riskier, and therefore investors will sell (part of) their equity holdings. This will cause stock prices to decline and therefore equity returns will decline. Investors will put their money in risk-free assets, so the risk-free interest rate will also go down. However, the decline of the risk-free interest rate will be less severe than the decline in equity returns, because the variance of the risk-free interest rate is much lower than the variance of equity prices and returns. Finally, for The Netherlands and for Belgium, a significantly negative relationship is observed between the variable inflation rate and the level of excess equity returns. This confirms the hypothesis, and is also quite intuitive, because investing in equity becomes riskier when there is inflation. Furthermore, for The Netherlands a positive relationship between the level of the risk-free interest rate and the level of excess equity returns is discovered. This contradicts the hypothesis, which stated that a higher risk-free interest rate would imply that opportunity costs of investing money in risky projects would become higher, and that as a result of this there would be less equity investments and lower equity returns. However, this positive relationship has possible explanations. For example, investors could regard a high risk-free interest rate as a signal of a good performance of the economy and therefore become less risk-averse. Then they will start to invest in equity which will increase stock prices and equity returns.

The adjusted r-squared value of this model is higher than the previous models, which means that this regression model does explain more of the variation around the mean excess return on equity than the previous models.

Table 4: Excess Equity Return explained by economic sentiment, risk-free rate, inflation rate, economic growth, presence of recession, and probability of recession

		Excess Return on Equity						
Country	United States	United	Netherlands	Belgium	Germany	Spain	Italy	Greece
Constant	0.192	***	0.323 *	0.283 *	0.214	0.134	0.219	-0.412
	(3.68)		(3.19)	(2.42)	(1.45)	(0.89)	(1.25)	(-0.90)
Economic Sentiment	-0.202		-1.202	-0.476	2.221	-1.533	1.567	-2.897
	(-0.97)		(-0.56)	(-0.50)	(1.54)	(-0.77)	(0.96)	(-0.47)
Risk-free Rate	1.798		8.451 *	-0.243	0.305	1.502	-1.070	-0.395
	(2.00)		(3.61)	(-0.13)	(0.08)	(0.61)	(-0.17)	(-0.52)
Inflation Rate	-1.818		-14.40 *	-9.576 *	-2.406	-9.610	-3.006	-5.427
	(-1.50)		(-3.27)	(-2.22)	(-0.22)	(-1.47)	(-0.34)	(-0.44)
Economic Growth	-3.848 **		-7.069	-1.587	-8.979	6.130	-10.96	18.86
	(-2.83)		(-0.73)	(-0.26)	(-1.41)	(0.65)	(-1.49)	(0.87)
Recession Year	-0.238 ***		-0.0489	0.104	0.161	0.0545	-0.143	0.962
	(-4.32)		(-0.72)	(0.61)	(1.08)	(0.21)	(-1.12)	(0.90)
Recession Probability	-0.585 **		-0.922 **	-0.854 *	-0.804 *	-0.691	-0.811 *	-1.282
	(-3.50)		(-8.04)	(-2.61)	(-2.35)	(-1.63)	(2.57)	(-1.03)
Adjusted R-Squared	0.506		0.951	0.444	0.230	0.077	0.357	-0.742

The next regression analysis is presented in table 4. This analysis includes all variables in order to see which variables make a contribution to the explanation of excess returns on equity.

The following model is estimated:

$$\text{Excess Return on Equity Country}_i = \text{Constant}_i + \beta_{ES\ i} \cdot \text{Economic Sentiment} + \beta_{RF\ i} \cdot \text{Risk-free Rate} + \beta_{INF\ i} \cdot \text{Inflation Rate} + \beta_{EG\ i} \cdot \text{Economic Growth} + \beta_{RY\ i} \cdot \text{Recession Year} + \beta_{RY\ i} \cdot \text{Recession Probability}$$

In this regression, the variable recession year is significantly negatively related to the level of excess return on equity for the United States, and the variable recession probability is also significantly negatively related to the level of excess equity returns for the United States, The Netherlands, Belgium, Germany, and Italy. This means, when there is a recession, or when the probability of an upcoming recession increases, investors perceive investing in equity as a too risky activity and therefore stop investing in equity. This will lead to lower stock prices, and therefore lower returns on stocks. Furthermore, for The Netherlands there is a significant positive coefficient for the variable risk-free rate, which means that if the risk-free rate increases, excess equity returns also increase. For The Netherlands, a significantly negative relationship is observed between the level of the inflation rate and the level of excess equity returns. This is intuitive: when there is a lot of inflation, investing in equity is perceived as more risky, and therefore stock returns decrease as a result of a lower amount of investments. Finally, the coefficient of economic growth for the United States is significantly negative, which means that when the growth of real GDP goes up, excess returns on equity decrease, which is contrary to the hypothesis.

The adjusted r-squared values for most of the countries are high, which means that a large share of the total variation of the excess return on equity is explained by the model. Only in the case of Spain, the adjusted r-squared is very low, and for Greece the value is negative, which means that the model cannot explain the variation well or the model does not fit the data well for these countries.

In order to identify which variables actually have a linear relationship with excess return on equity, several regressions are performed with excess return on equity as the dependent variable and all other variables one by one as the independent and explanatory variable. These regression analyses can be found in table 9 up to 14 in Appendix D. It can be concluded from these regression analyses that the variables risk-free rate and economic growth never make a significant contribution to the explanation of the level of excess equity returns for any of the countries. Therefore, a final regression analysis is performed which omitted these two variables. This regression analysis is presented in table 5.

Table 5: Excess Equity Return explained by economic sentiment, inflation rate, presence of recession, and probability of recession

		Excess Return on Equity					
Country	United States	Netherlands	Belgium	Germany	Spain	Italy	Greece
Variable							
Constant	0.0934 * (2.24)	0.327 (2.52)	0.256 ** (3.32)	0.203 (1.47)	0.201 (1.92)	0.261 (2.06)	-0.192 (-0.59)
Economic Sentiment	-0.0999 (-0.54)	-1.767 * (-3.17)	-0.645 (-1.49)	0.640 (0.75)	-0.428 (-0.71)	-0.618 (-0.83)	1.911 (0.60)
Inflation Rate	-0.569 (-0.70)	-14.29 (-1.68)	-10.24 ** (-2.85)	-11.25 (-1.27)	-4.659 (-1.88)	-10.02 (-1.78)	-9.236 (-0.90)
Recession Year	-0.264 *** (-4.47)	-0.0817 (-0.51)	0.129 (0.88)	0.212 (1.46)	-0.0979 (-0.61)	-0.111 (-0.88)	-0.492 (-0.55)
Recession Probability	-0.209 (-1.68)	-0.715 * (-3.06)	-0.848 * (-2.81)	-0.671 (-2.08)	-0.498 (-1.70)	-0.557 (-2.06)	-0.492 (-0.55)
Adjusted R-Squared	0.419	0.715	0.496	0.225	0.130	0.343	-0.428

In the final regression, the following model is estimated:

$$\text{Excess Return on Equity Country}_i = \text{Constant}_i + \beta_{ES\ i} \cdot \text{Economic Sentiment} + \beta_{INF\ i} \cdot \text{Inflation Rate} + \beta_{RY\ i} \cdot \text{Recession Year} + \beta_{RP\ i} \cdot \text{Recession Probability}$$

In this analysis, a significantly negative relationship between the variable recession probability and the level of excess return on equity is observed, which means that if the probability of an upcoming recession is higher, the level of excess equity returns is lower. This can be explained by the theory that when there is a higher probability of the presence of recessions, investing in equity becomes riskier, and therefore investing in equity becomes less attractive. Therefore, the amount of investments in equity will decline, which causes stock prices to decline. Because of this, equity returns will go down, which causes a lower excess return on equity. In The Netherlands, the variable economic sentiment is associated with a negative coefficient, which means that when the economic sentiment has a higher value, excess return on equity is lower. This contradicts the hypothesis that states, the higher the value on the economic sentiment index, the higher investors' confidence in the performance of the economy. Hence they start to buy equity, which increases stock prices and stock returns. An explanation for this observed negative coefficient could be that the economic sentiment is not

measured correctly, and hence does not give valid results. For Belgium, a significantly negative relationship is observed between the inflation rate and the level of excess equity returns. This verifies the hypothesis, as a positive inflation rate makes investing more risky, and therefore the amount of equity investments will go down, which causes stock prices and stock returns to decline.

The adjusted r-squared value of this regression analysis is again relatively high, so a large share of the total variation in excess equity returns is explained by this model. For Spain, the adjusted r-squared value is very low, and for Greece the adjusted r-squared value is even negative, which means that the model does not fit the data well for these countries.

6. Conclusion and Discussion

In this master thesis, the impact of different variables, and especially the impact of recessions and crises on the level of the excess return on equity was examined for three northern European countries, three southern European countries, and the United States. The main objective of the thesis was to gain understanding of the determinants of the level of excess return on equity and especially to study the impact of financial crises and recessions. This is done by using a modification of the model as it is made up by Ross in the Arbitrage Pricing Theory (1976), and this model was also used by Burmeister et al (2003).

The statistical analysis showed that for the countries in which a significant relationship was observed between the presence of recessions and excess return on equity, this relationship was negative. The same goes for the relationship between the probability of upcoming recessions and excess equity returns. In other words, when a recession took place in one of these countries in a specific year, this caused excess returns on equity to be lower than in periods in which there was no recession. Additionally, if the probability of an upcoming recession was higher, excess returns on equity were lower. These findings are in line with the second part of hypothesis 5, confirming behavioral approaches to equity pricing. As investors perceive investing in equity as a too risky activity, they stop investing in equity. That is why stock prices and stock returns go down, and this will lead to lower excess equity returns.

For the other variables in the model there was an ambiguous relationship between the level of excess returns on equity and the independent variables, as in some cases the concerning relationship was positive, while in other countries, this relationship was negative. There could also not be observed a very clear difference between the impact of explanatory variables on excess equity returns in the northern European countries and the southern European countries.

The results of the statistical analysis do not completely correspond to the results that Burmeister et al (2003) found. The reason could be that these authors used different data, and different ways in order to measure and collect the data. For example, the variable economic sentiment used in the analysis of Burmeister et al (2003) is measured in a different way from the OECD Main Economic Indicators used in this study. Also, in Burmeister et al (2003), excess return on equity is measured for every month, and not per year as in this paper. The study of Burmeister et al (2003) is based on much more

observations, and therefore it was easier for these authors to observe unambiguous and significant relationships between different variables.

Suggestions for further research are using other variables to explain the level of excess return on equity in order to see whether they can help to improve the standard model to reach a better fit and more explanatory power. In addition, one could look for data for every month instead of yearly data. When a statistical model is based on more observations, it becomes more reliable, and it is easier to reject or adopt hypotheses.

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Appendix A: Recession Years

In this appendix, the years for which there is measured a recession are displayed in table 6. A recession is defined as two or more successive quarters of decline in real GDP value. A note to the way in which the years of recession is calculated: when the last quarter of the one year has a negative real GDP growth, and is followed by another quarter of real GDP decline in the next year, the second year is labelled as a recession year, and the first year is not.

Table 6: Recession Years: Years with two or more successive quarters of real GDP decline

Country	Years of Recession
United States	1953
	1957
	1960
	1969
	1973
	1974
	1981
	1990
	2007
	2008
The Netherlands	2003
	2008
	2009
	2011
	2012
Belgium	2001
	2008
	2009
	2012
Germany	1991
	1992
	1993
	1996
	2003
	2004
	2008
	2009
	2013
Spain	2008
	2009
	2011
	2012
	2013
Italy	1996
	2001
	2003
	2007

	2008
	2009
	2011
	2012
	2013
	2014
Greece	1996
	1997
	1998
	1999
	2002
	2003
	2004
	2005
	2006
	2008
	2009
	2010
	2011
	2012
	2013
	2014

Appendix B: Stock Returns and Treasury Bill Rates

Figure 1 up to 7 graphically show the stock returns and 1-year treasury bill rates per year for each country. The blue line shows the return on stocks, while the orange line shows the treasury bill rates for each year. As one can see, in each country the variance of the return on stock is much higher than the variance in the treasury bill rate.

Figure 1: Returns United States

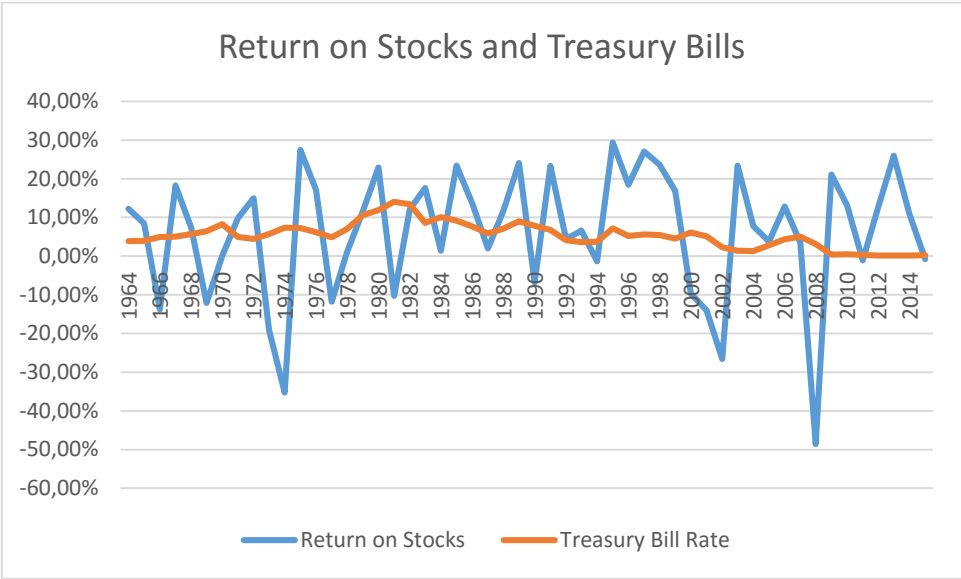


Figure 2: Returns The Netherlands

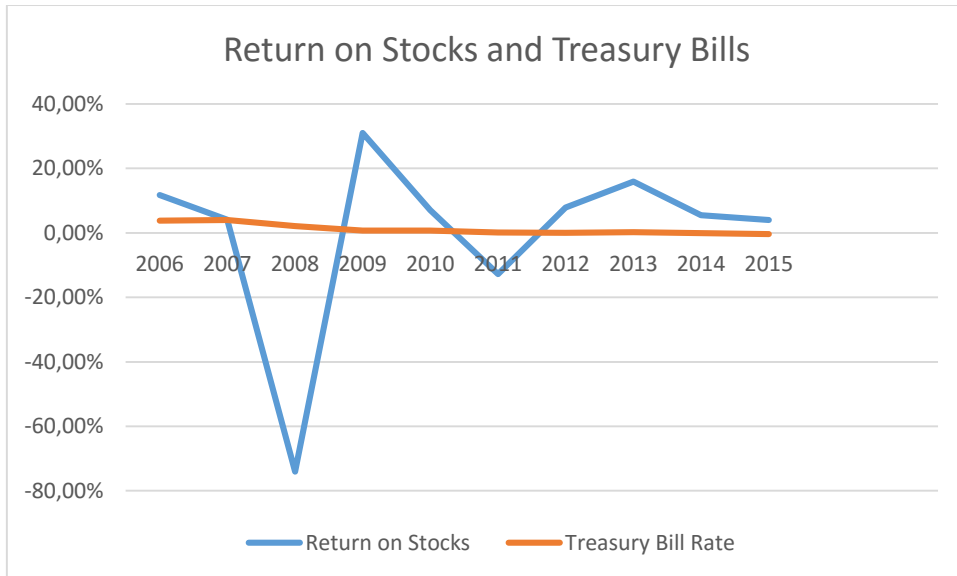


Figure 3: Returns Belgium

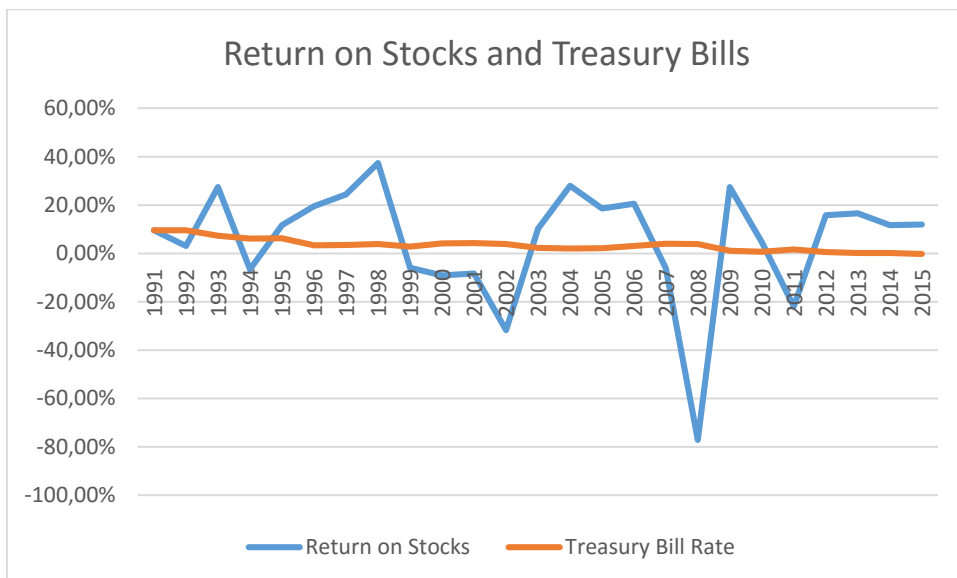


Figure 4: Returns Germany

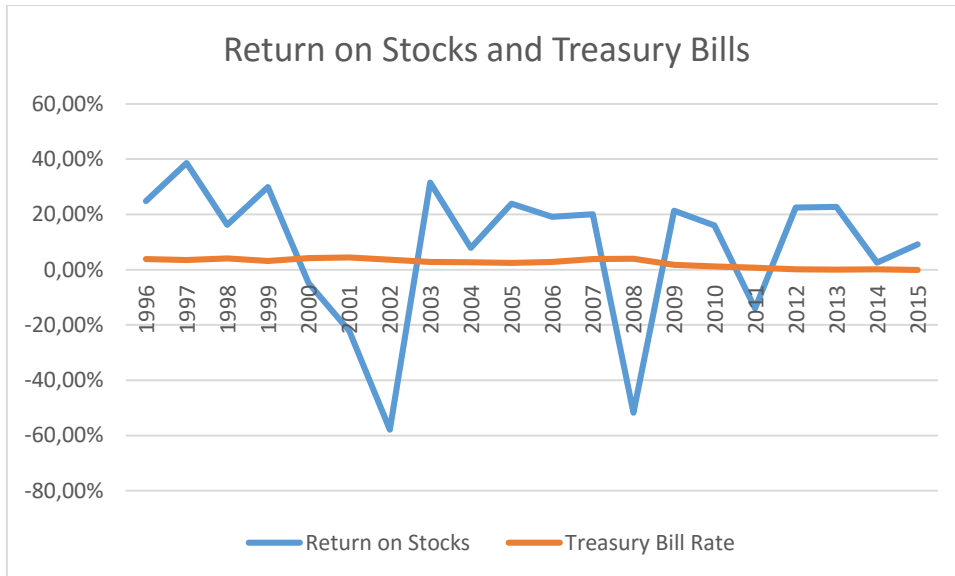


Figure 5: Returns Spain

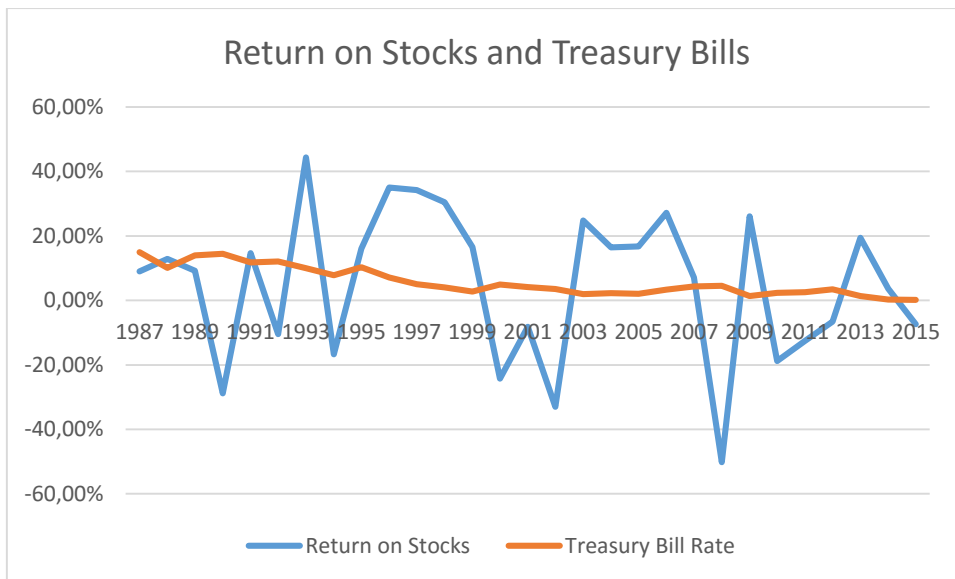


Figure 6: Returns Italy

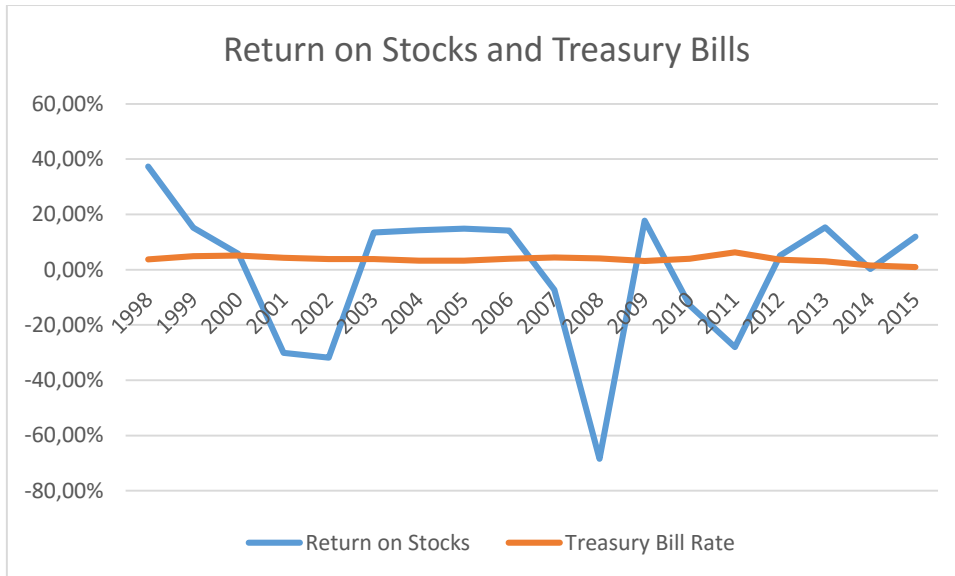
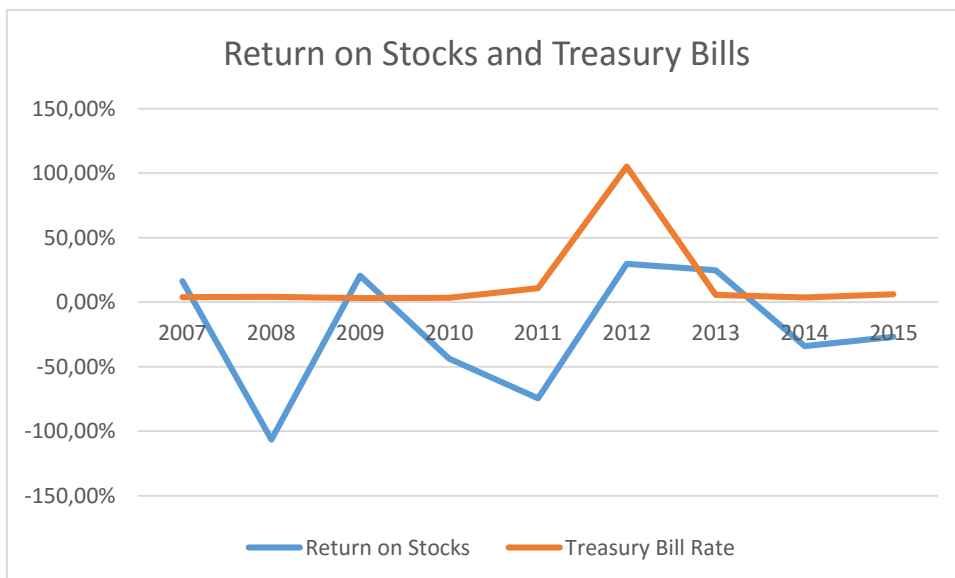


Figure 3: Returns Greece



Appendix C: Excess Equity Returns

Table 7 shows the excess return on equities for each year in each country for the years there is enough data. Also, the average of the excess return on equity of all measured years is given in table 8.

Table 7: Excess return on equity per year per country

	United States	The Netherlands	Belgium	Germany	Spain	Italy	Greece
1964	8.36%						
1965	4.41%						
1966	-18.70%						
1967	13.31%						
1968	1.67%						
1969	-18.48%						
1970	-8.18%						
1971	4.89%						
1972	10.45%						
1973	-24.79%						
1974	-42.65%						
1975	20.15%						
1976	10.89%						
1977	-16.67%						
1978	-5.92%						
1979	1.03%						
1980	11.04%						
1981	-24.30%						
1982	-1.23%						
1983	8.96%						
1984	-8.69%						
1985	14.19%						
1986	6.01%						
1987	-3.85%				-6.05%		
1988	4.59%				2.71%		
1989	15.08%				-4.75%		
1990	-14.59%				-43.29%		
1991	16.61%		0.01%		2.88%		
1992	0.24%		-6.52%		-22.55%		
1993	2.99%		20.12%		34.39%		
1994	-5.00%		-12.61%		-24.54%		
1995	22.15%		5.43%		5.79%		
1996	13.28%		16.13%	20.99%	27.96%		
1997	21.38%		20.90%	35.07%	29.16%		
1998	18.18%		33.52%	12.22%	26.40%	33.53%	
1999	12.35%		-8.78%	26.86%	13.80%	10.26%	
2000	-15.82%		-13.23%	-9.05%	-29.13%	0.61%	
2001	-19.09%		-12.56%	-26.55%	-12.24%	-34.46%	
2002	-28.89%		-35.60%	-61.50%	-36.57%	-35.68%	
2003	21.99%		8.01%	28.69%	22.90%	9.61%	

2004	6.49%		26.02%	5.25%	14.25%	10.97%	
2005	0.98%		16.33%	21.41%	14.72%	11.51%	
2006	8.39%	7.96%	17.45%	16.26%	23.78%	10.19%	
2007	-1.53%	0.01%	-10.14%	16.23%	2.74%	-11.62%	12.52%
2008	-51.76%	-76.16%	-81.03%	-55.67%	-54.71%	-72.50%	-110.58%
2009	20.67%	30.33%	26.42%	19.60%	24.77%	14.58%	17.40%
2010	12.68%	6.31%	4.05%	14.76%	-21.20%	-16.86%	-46.99%
2011	-1.42%	-12.84%	-23.44%	-14.80%	-15.11%	-34.24%	-85.47%
2012	12.46%	7.86%	15.22%	22.39%	-10.04%	1.50%	-75.40%
2013	25.78%	15.71%	16.50%	22.72%	18.03%	12.28%	19.04%
2014	10.66%	5.55%	11.46%	2.43%	3.30%	-1.32%	-37.95%
2015	-0.98%	4.43%	12.08%	9.21%	10.60%	-7.53%	-32.94%

Table 8: Average Excess Return on Equity

Average excess return on equity	
United States	0.96%
The Netherlands	-1.08%
Belgium	1.83%
Germany	5.33%
Spain	-0.69%
Italy	-4.48%
Greece	-37.82%

Appendix D: Regression Analyses

Table 9 up to 14 show regression analyses with the excess return on equity as the dependent variable and the other variables as explanatory variable one by one in order to see whether the variables do have a significant contribution to the explanation of the level of excess returns on equity.

Table 9: Excess Equity Return explained by Economic Sentiment

		Excess Return on Equity						
Country	United States	Netherlands	Belgium	Germany	Spain	Italy	Greece	
Variable								
Constant	0.00185 (0.08)	-0.0202 (-0.22)	0.0167 (0.34)	0.0533 (0.88)	-0.00626 (-0.14)	-0.0473 (-0.76)	-0.294 (-1.29)	
Economic Sentiment	0.365 * (2.17)	-0.756 (-0.88)	-0.431 (-0.76)	0.517 (0.68)	0.243 (0.49)	0.225 (0.30)	0.923 (0.54)	
Adjusted R-Squared	0.068	-0.027	-0.018	-0.029	-0.029	-0.057	-0.097	

Table 10: Excess Equity Return explained by the Risk-Free Rate

		Excess Return on Equity						
Country	United States	Netherlands	Belgium	Germany	Spain	Italy	Greece	
Variable								
Constant	0.0534 (1.21)	0.0331 (0.29)	0.0825 (1.04)	0.172 (1.54)	0.0559 (0.79)	0.247 (1.26)	-0.304 (-1.69)	
Risk-Free Rate	-0.813 (-1.16)	-3.953 (-0.65)	-1.872 (-1.02)	-4.765 (1.25)	-1.093 (-1.11)	-7.748 (-1.56)	-0.456 (-0.90)	
Adjusted R-Squared	0.007	-0.068	0.001	0.029	0.008	0.077	-0.024	

Table 11: Excess Equity Return explained by the Inflation Rate

Excess Return on Equity							
Country	United States	Netherlands	Belgium	Germany	Spain	Italy	Greece
Variable							
Constant	0.0848 * (2.18)	0.274 (1.22)	0.293 ** (3.29)	0.268 (1.89)	0.125 (1.46)	0.225 (1.75)	-0.244 (-1.34)
Inflation Rate	-1.858 * (-2.36)	-17.19 (-1.38)	-13.79 ** (-3.46)	-15.02 (-1.65)	-3.951 (1.76)	-13.82 * (-2.31)	-8.713 (-1.32)
Adjusted R-Squared	0.082	0.090	0.314	0.083	0.070	0.204	0.085

Table 12: Excess Equity Return explained by Economic Growth

Excess Return on Equity							
Country	United States	Netherlands	Belgium	Germany	Spain	Italy	Greece
Variable							
Constant	-0.00091 (-0.02)	0.0363 (0.37)	0.0487 (0.64)	0.0642 (0.88)	0.00400 (0.06)	-0.0447 (-0.71)	-0.262 (-1.32)
Economic Growth	0.342 (0.30)	-4.886 (-1.17)	-1.756 (-0.52)	-0.825 (-0.28)	-0.460 (-0.25)	-0.0454 (-0.01)	4.026 (0.97)
Adjusted R-Squared	-0.018	0.040	-0.031	-0.051	-0.035	-0.062	-0.007

Table 13: Excess Equity Return explained by Recession Year

Excess Return on Equity							
Country	United States	Netherlands	Belgium	Germany	Spain	Italy	Greece
Variable							
Constant	0.0506 * (2.61)	0.0666 (0.58)	0.0465 (0.90)	0.0464 (0.64)	0.00705 (0.15)	0.0394 (0.48)	-0.195 (-0.70)
Recession Year	-0.305 *** (-5.76)	-0.194 (-1.06)	-0.176 (-1.36)	0.0229 (0.17)	-0.0812 (-0.70)	-0.168 (-1.44)	-0.275 (-0.81)
Adjusted R-Squared	0.387	0.013	0.034	-0.054	-0.019	0.060	-0.046

Table 14: Excess Equity Return explained by Recession Probability

Excess Return on Equity							
Country	United States	Netherlands	Belgium	Germany	Spain	Italy	Greece
Variable							
Constant	0.0467 (1.87)	0.0733 (0.88)	0.0674 (1.52)	0.103 (1.79)	0.0261 (0.59)	0.0143 (0.26)	-0.312 (-1.71)
Recession Probability	-0.398 ** (-3.35)	-0.666 (-2.30)	-0.734 ** (-3.12)	-0.644 * (-2.34)	-0.511 * (-2.07)	-0.688 * (-2.72)	-0.474 (-0.78)
Adjusted R-Squared	0.178	0.322	0.267	0.191	0.105	0.273	-0.051

Appendix E: Do-File STATA

In this appendix, the do-file that is used in the program STATA for the statistical analysis is attached.

```
1  **Master Thesis Mirjam Keizer s4230361**
2  import excel "\\CNAS.RU.NL\s4230361\Master Thesis\Data New Concept Version.xlsx",
3  sheet("Data") firstrow
4
5  *REGRESSION 1*
6  *United States*
7  regress USER USES USRF USINFL USGROWTH
8  eststo US
9  *Netherlands*
10 regress NLER NLES NLRF NLINFL NLGROWTH
11 eststo NL
12 *Belgium*
13 regress BEER BEES BERF BEINFL BEGROWTH
14 eststo BE
15 *Germany*
16 regress GERER GERES GERRF GERINFL GERGROWTH
17 eststo GER
18 *Spain*
19 regress SPER SPES SPRF SPINFL SPGROWTH
20 eststo SP
21 *Italy*
22 regress ITER ITES ITRF ITINFL ITGROWTH
23 eststo IT
24 *Greece*
25 regress GRER GRES GRRF GRINFL GRGROWTH
26 eststo GR
27 *Together*
28 esttab US NL BE GER SP IT GR, label title(Regression_1) varwidth(45) mtitles ar2
29
30 *REGRESSION 2*
31 *United States*
32 regress USER USES USRF USINFL USGROWTH USRECYEAR
33 eststo US
34 *Netherlands*
35 regress NLER NLES NLRF NLINFL NLGROWTH NLECYEAR
36 eststo NL
37 *Belgium*
38 regress BEER BEES BERF BEINFL BEGROWTH BERECYEAR
39 eststo BE
40 *Germany*
41 regress GERER GERES GERRF GERINFL GERGROWTH GERRECYEAR
42 eststo GER
43 *Spain*
44 regress SPER SPES SPRF SPINFL SPGROWTH SPRECYEAR
45 eststo SP
```

```

46  *Italy*
47  regress ITER ITES ITRF ITINFL ITGROWTH ITRECYEAR
48  eststo IT
49  *Greece*
50  regress GRER GRES GRRF GRINFL GRGROWTH GRRECYEAR
51  eststo GR
52  *Together*
53  esttab US NL BE GER SP IT GR, label title(Regression_2) varwidth(45) mtitles ar2
54
55  *REGRESSION 3*
56  *United States*
57  regress USER USES USRF USINFL USGROWTH USRECPROB
58  eststo US
59  *Netherlands*
60  regress NLER NLES NLRF NLINFL NLGROWTH NLRECPROB
61  eststo NL
62  *Belgium*
63  regress BEER BEES BERF BEINFL BEGROWTH BERECPROB
64  eststo BE
65  *Germany*
66  regress GERER GERES GERRF GERINFL GERGROWTH GERRECPROB
67  eststo GER
68  *Spain*
69  regress SPER SPES SPRF SPINFL SPGROWTH SPRECPROB
70  eststo SP
71  *Italy*
72  regress ITER ITES ITRF ITINFL ITGROWTH ITRECPROB
73  eststo IT
74  *Greece*
75  regress GRER GRES GRRF GRINFL GRGROWTH GRRECPROB
76  eststo GR
77  *Together*
78  esttab US NL BE GER SP IT GR, label title(Regression_3) varwidth(45) mtitles ar2
79
80  *REGRESSION 4*
81  *United States*
82  regress USER USES USRF USINFL USGROWTH USRECYEAR USRECPROB
83  eststo US
84  *Netherlands*
85  regress NLER NLES NLRF NLINFL NLGROWTH NLRECYEAR NLRECPROB
86  eststo NL
87  *Belgium*
88  regress BEER BEES BERF BEINFL BEGROWTH BERECYEAR BERECPROB
89  eststo BE
90  *Germany*
91  regress GERER GERES GERRF GERINFL GERGROWTH GERRECYEAR GERRECPROB
92  eststo GER
93  *Spain*
94  regress SPER SPES SPRF SPINFL SPGROWTH SPRECYEAR SPRECPROB
95  eststo SP
96  *Italy*
97  regress ITER ITES ITRF ITINFL ITGROWTH ITRECYEAR ITRECPROB

```



```

98  eststo IT
99  *Greece*
100 regress GRER GRES GRRF GRINFL GRGROWTH GRRECYEAR GRRECPCOB
101  eststo GR
102  *Together*
103  esttab US NL BE GER SP IT GR, label title(Regression_4) varwidth(45) mtitles ar2
104
105  *Per Variable*
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107  eststo US
108  regress NLER NLES
109  eststo NL
110  regress BEER BEES
111  eststo BE
112  regress GERER GERES
113  eststo GER
114  regress SPER SPES
115  eststo SP
116  regress ITER ITES
117  eststo IT
118  regress GRER GRES
119  eststo GR
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121
122  regress USER USRF
123  eststo US
124  regress NLER NLRF
125  eststo NL
126  regress BEER BERF
127  eststo BE
128  regress GERER GERRF
129  eststo GER
130  regress SPER SPRF
131  eststo SP
132  regress ITER ITRF
133  eststo IT
134  regress GRER GRRF
135  eststo GR
136  esttab US NL BE GER SP IT GR, label title(Regression_6) varwidth(45) mtitles ar2
137
138  regress USER USINFL
139  eststo US
140  regress NLER NLINFL
141  eststo NL
142  regress BEER BEINFL
143  eststo BE
144  regress GERER GERINFL
145  eststo GER
146  regress SPER SPINFL
147  eststo SP
148  regress ITER ITINFL
149  eststo IT

```

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150 regress GRER GRINFL
151 eststo GR
152 esttab US NL BE GER SP IT GR, label title(Regression_7) varwidth(45) mtitles ar2
153
154 regress USER USGROWTH
155 eststo US
156 regress NLER NLGROWTH
157 eststo NL
158 regress BEER BEGROWTH
159 eststo BE
160 regress GERER GERGROWTH
161 eststo GER
162 regress SPER SPGROWTH
163 eststo SP
164 regress ITER ITGROWTH
165 eststo IT
166 regress GRER GRGROWTH
167 eststo GR
168 esttab US NL BE GER SP IT GR, label title(Regression_8) varwidth(45) mtitles ar2
169
170 regress USER USRECYEAR
171 eststo US
172 regress NLER NLRECYEAR
173 eststo NL
174 regress BEER BERECYEAR
175 eststo BE
176 regress GERER GERRECYEAR
177 eststo GER
178 regress SPER SPRECYEAR
179 eststo SP
180 regress ITER ITRECYEAR
181 eststo IT
182 regress GRER GRRECYEAR
183 eststo GR
184 esttab US NL BE GER SP IT GR, label title(Regression_9) varwidth(45) mtitles ar2
185
186 regress USER USRECPROB
187 eststo US
188 regress NLER NLRECPROB
189 eststo NL
190 regress BEER BERECPROB
191 eststo BE
192 regress GERER GERRECPROB
193 eststo GER
194 regress SPER SPRECPROB
195 eststo SP
196 regress ITER ITRECPROB
197 eststo IT
198 regress GRER GRRECPROB
199 eststo GR
200 esttab US NL BE GER SP IT GR, label title(Regression_10) varwidth(45) mtitles ar2
201

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202 *Final with variables economic sentiment, inflation, recession year, recession probability*
203 regress USER USES USINFL USRECYEAR USRECPROB
204 eststo US
205 regress NLER NLES NLINFL NLRECYEAR NLRECPROB
206 eststo NL
207 regress BEER BEES BEINFL BEREYEAR BERECPROB
208 eststo BE
209 regress GERER GERES GERINFL GERRECYEAR GERRECPROB
210 eststo GER
211 regress SPER SPES SPINFL SPRECYEAR SPRECPROB
212 eststo SP
213 regress ITER ITES ITINFL ITRECYEAR ITRECPROB
214 eststo IT
215 regress GRER GRES GRINFL GRRECYEAR GRRECPROB
216 eststo GR
217 esttab US NL BE GER SP IT GR, label title(Final_Regression) varwidth(45) mtitles ar2
```