Between-country differences
in the Monday Effect:

Evidence from European Equity Markets

ABSTRACT. The goal of this paper is to find evidence if the Monday effect still exists and if there are economic variables, which can explain between-country differences in the Monday effect. The theoretical basis of this study lies in the fact that there are between-country differences in the Monday effect. These international differences in the Monday effect have not been systematically investigated so far. The geographical focus concentrates on 6 European equity markets. The timeframe of this study is January 2000 till December 2011. In contrast to the expected relationship according to the theory, this study can conclude that no significant Monday effect exists, nor do any day-of-the-week effect exist in the major European equity indices.

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INTRODUCTION

THE EVIDENCE OF a growing amount of anomalies in stock markets around the world raises doubt on the widely accepted efficient market hypothesis (EMH). Many different anomalies have been found in the international equity markets. Anomalies or seasonal patterns like the weekend, turn-of-the-month, end-of-December, monthly and the Friday-the-thirteen effect have all been examined in the literature. For example, Agrawal and Tandon (1994) find a daily seasonal in almost 18 countries, but a weekend effect in 9 countries. They also find that many countries have large December pre-holiday and inter-holiday returns and that a significant monthly seasonal exists in 10 countries. The anomalies represented here are only the tip of the iceberg. A more recent study by Jacobsen and Bouman (2002) also document the existence of a strong seasonal effect in stock returns based on the popular market saying 'Sell in May and go away'. Jacobsen and Bouman (2002) found this market saying to be true in 36 of the 37 developed and emerging markets. Another study by Jacobsen (2008) shows strong evidence on a weather seasonality in stock returns (Jacobsen & Marquering, 2008). These anomalies in the stock markets contradict the efficient market hypothesis. This study will purposefully concentrate on one single anomaly in the stock markets, namely the Monday effect.

One of the most puzzling anomaly in finance is the significantly negative Monday stock return. Researchers have studied the anomaly known as the Monday effect or Weekend effect for more than eighty years. "The phenomenon that the Monday stock returns, on average, are less than the returns on any other day of the week and that net returns are negative has been called the Monday effect (or Weekend effect) in the literature" (Cho et al, 2007). The presence of market anomalies like the Monday effect and other anomalies contradicts the efficient market hypothesis. The efficient market hypothesis suggests that at any given time prices fully reflect all available information on a particular stock market (Cho et al, 2007). However, there is a lot of evidence against the efficient market hypothesis in the world of investments. Knowing if and when the Monday effect occurs, could be very profitable for investors. Despite the large amount of research on daily stock returns, no satisfactory explanation has yet been offered to solve the puzzle. Already in the 1920's professional stock traders noticed that the stock returns are significantly lower on Mondays compared to other days of the week. Kelly (1930) and Fields (1931) were one of the first researchers that used empirical data to confirm these anomalies. It turned out that explaining this Monday effect is quite difficult; one would expect such an anomaly not to exist for a long time due to the assumption of efficient markets. Investors would exploit any anomaly until it disappears. Nevertheless, many researchers believe the Monday effect exists. The Monday effect has been extensively researched. It ranges from equity (Chang et al., 1993; Tong, 2000; Basher & Sadorsky, 2006) to bonds (Gibbons & Hess, 1981;

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Johnston et al., 1991; Jordan & Jordan, 1991). The Monday effect is also researched at exchange rates (McFarland et al., 1982; Hsieh, 1988) and commodities (Chiang & Tapley, 1983; Gay & Kim, 1987; Crain & Lee, 1996) and also at precious metals (Ball et al., 1982; Ma,1986).

Extensive research is done in the international equity markets. It is shown that the Monday effect anomaly is a global phenomenon. Wide literature is written about the Monday effect in the US equity markets (French, 1980; Gibbson & Hess, 1981; Keim & Stambaugh, 1984; Lakonishok & Smidt, 1988; Bessembinder & Hertzel, 1993; Siegel, 1998). The Weekend effect is also documented in the Canadian markets (Hindmarch et al., 1984). In the British, Japanese, and Australian equity markets (Jaffe & Westerfield, 1985). In a study by Condoyanni, O'Hanlon, and Ward (1987) significantly negative Monday returns were found. This study included 7 developed markets. There is also evidence of the Monday effect in emerging markets. This Weekend effect has been found in 4 emerging markets by Aggarwal and Rivoli (1989). Tong (2000) provides further evidence of the Monday effect studying 23 Asian, European and North American markets.

All these different researches have one thing in common: they find evidence for the existence of the Monday effect, but the evidence shows that the magnitude and the statistical significance of the effect differs for each research. Based on all prior research it becomes clear that in some countries the Monday effect is present in some periods, while in other countries the effect does not exist in those periods. The problem with the current state of the literature is the fact that it is not explaining these international differences. The expectation rises that a part of this variability could be ascribed to systematic between-country differences. A study by Moshirian, Ng and Wu (2008) came up with factors which have the potential to explain between-country differences in stock price changes to analysts' recommendations. They suggested that factors like the rule of law, market transparency, financial development and investor protection have the potential to explain international differences. Till now, research did not provide an answer to these international differences in the Monday effect. The underlying main question throughout this research is to find out *what determines the international differences in the Monday effect*. To answer this question adequately we need to determine if the Monday effect exists. When it exists, it will be shown where, when and why it occurs the strongest here. This study will be a valuable contribution to the current literature concerning the Monday effect. The goal of this study is to find evidence what causes and determines these international differences in the Monday effect. In contrast to this extensive literature on anomalies in financial assets and securities for developed economies, considerably far less attention has been paid to anomalies in the financial markets of the European countries in general. This paper

contributes an investigation of the Monday effect in European equity markets of the following six countries: United Kingdom, France, Germany, Spain, Italy and the Netherlands.

The paper is organized as follows: the next section is the research framework. This contains an overview of the current literature about the Monday Effect. In this research framework section propositions and hypotheses will be conducted. The third section is the research design. This is the methodology part. In this part it is discussed which research method is used, what the advantages and disadvantages of this particular research method are, and why this method is suited for this research. The fourth section is the empirical results part. This section gives evidence found from the data of the 6 different European equity markets. This will enlighten us about the evidence found in the European equity markets. Finally, a summary and conclusions part, which will be ending with recommendations for future research.

RESEARCH FRAMEWORK

US Evidence

The Monday effect is first identified by Fred C. Kelly in 1930. Kelly (1930) documented the Monday effect in his book Why you win or lose: the Psychology of Speculation. He saw that individual investors in the stock markets have a tendency selling their stocks on Monday's. Kelly (1930) found after a three year statistical study that Monday is the worse day to buy stocks. Kelly stated that on Mondays, individual investors have a tendency for selling their stocks, and that this tendency is related to the Monday decline. After this finding of Kelly, more researchers concentrated on the Monday anomaly. Fields (1931) found that Friday's average closings were higher than the average of Monday closings. Fama (1965), for example, finds that the variance of U.S. stock returns on Monday is greater than that for other days. Furthermore, Merril (1966) described that between 1952 and 1965 the Dow Jones Index rose by 43% on Monday's and more than 50% on the other weekdays. Hirsch (1968) also reports average weekday returns and identified negative average returns for Monday. Yet, extensive attention to this Monday phenomenon arose only after Cross (1973) and French (1980). Cross (1973) conducted a statistical test on the S&P 500 between 1953 and 1970. The results of this test is that on Monday the returns were significantly lower than on the other weekdays. French (1980) examined the behavior of stock returns between 1953 and 1977 and he also found evidence of the Monday effect in the S&P 500 index. French (1980) argues that investors could made an average annual return of 13,4% between 1952 and 1977 by exploiting this Monday effect, while a buy and hold policy would only have yielded a 5,5% annual return. However, within this calculation transactions costs were ignored. If these costs are 0,25% per transaction, the buy and hold policy would have yielded a higher return. This does not mean that knowledge of this Monday effect have no value, instead, investors could increase the expected return of their investments by altering the timing of trades which would have been made anyway (French, 1980). This study by French was an important starting point for further research concerning the Monday effect. Gibbons and Hess (1981) found evidence of the Monday effect between 1962 till 1978 studying the S&P 500 and the CRSP value- and equally weighted indexes of the New York Stock Exchange (NYSE) and the American Stock Exchange (AMEX). Keim and Stambaugh (1984) draw similar conclusions as French and Cross from the S&P index over a 54 year research which started at 1928 till 1982. Their paper also examines both small and large stock indices. Linn and Lockwood (1988) examined a large sample of OTC securities. Basically, these researchers above all find significant negative returns for Mondays, while researching different time periods and different indices in the US equity market. More evidence about the Monday effect is found in the US markets, for example, Lakonishok and Smidt

(1988) studied weekday returns for the Dow Jones Industrial Average (DJIA) index over a period of 89 years. They found negative Monday returns for the total time frame of 1897 till 1986 and also found negative Monday returns for all nine different subsample periods. Siegel (1998) studied the Monday effect over the period 1885 until 1997. He states that: "if Monday returns had been equal to the average return for other weekdays over the same period, the DJIA would be almost twice its level at the end of 1997" (Siegel, 1998). We see that there is an extensive literature concerning the Monday effect and they all document convincing evidence of the weekday effect involving low Monday returns. This first part concentrated on evidence focusing on the US equity markets, but the Monday effect has also been researched and examined in foreign equity markets. The focus will now be on international evidence concerning the Monday effect.

International Evidence

In various studies all over the world it was found that stock markets and stock returns are not completely random and that there are anomalies like the Monday effect. On the previous section, it is shown that the fist evidence of the Monday effect was found in US equity markets, but there is also evidence in international equity markets. Hindmarch, Jentsch, and Drew (1984) were one of the first researchers concentrating on other markets than the United States. They documented a Weekend effect in the Canadian markets. A study by Jaffe & Westerfield (1985) finds similar weekday effects as in the US markets for Japan, Australia, United Kingdom and also Canada. However, they find that stock returns on Saturday (last trading day in Japan) are significantly higher than the other trading days. They also find that the Tuesday stock returns for Japan and Australia are significantly lower than other trading days. The existence of this anomaly in these markets has been confirmed by other studies as well. For example, it has been confirmed that the weekend effect exists in the London Stock Exchange by Theobald & Price (1984). Condoyanni, O'Hanlon, and Ward (1987) find significantly negative Monday or Tuesday returns in a study including 7 developed markets, including the Toronto Exchange which supports earlier findings for the Canadian market. The Monday effect is also found in the Milan Stock Exchange (Barone, 1990) and the Belgium and Switzerland Stock Exchanges (Agrawal & Tandon, 1994). Furthermore, Chang, Pinegar, and Ravichandran (1993) report significantly negative Monday returns in 13 of 23 international markets. In their analysis they find that the mean Monday returns are significantly different from mean return of other trading days. The analysis extends from January 1986 till April 1992.

More evidence of low Monday returns for 9 developed countries was found during 1969 till 1992 by Dubois and Louvert (1996). They report that the anomaly disappears for the most recent periods in the USA, but that the effect is still strong for European countries, Hong-Kong and Toronto.

Tong (2000) provides further evidence of weekday effects studying 23 equity market indices. Aggarwal and Rivoli (1989) examined this anomaly in stock return for four Asian markets; Hong Kong, Singapore, Malaysia and the Philippines. They find a negative Monday effect and a strong negative Tuesday effect. This Tuesday effect in the Asian markets is explained by the time difference between the New York market and the Asian markets. In the Asian region extensive research has been done concerning these anomalies. To name just a few, Ho (1990), Seow and Wong (1998), Choudhry (2000), Kok and Wong (2004), Hui (2005) and Islam and Watanapalachaikul (2005) have all reported the existence of day of the week effects in Asian markets.

The results in these studies conclude that stock returns on Monday are significantly negative, and they are lower than returns on other days of the week. These negative returns are found across international equity markets and for other assets as well. Although numerous studies have attempted to offer explanations of the Monday effect, no satisfactory explanation has yet been offered to solve this puzzle. The focus will be now on studies that have come up with explanations in order to explain the Monday effect. The next section reviews these explanations.

Explaining the Monday Effect

The Monday effect is researched in many studies. Although there are numerous explanations concerning the Monday effect, researchers did not offer a convincing explanation for this effect. Almost every study comes up with different explanations. This section will review these explanations.

Kelly (1930) was one of the first researchers that pointed out this anomaly. Kelly stated that on Mondays, individual investors have a tendency for selling stocks, and this tendency is related to the Monday decline. French (1980) examined the behavior of stock returns between 1953 and 1977 in the S&P 500 index. French (1980) suggested 2 hypotheses for the Monday effect. The first hypothesis is the Calendar Time Hypothesis. This suggests that expected returns should be larger over the weekend because of the 3 calendar days in-between versus the usual 1 calendar day in-between. The second hypothesis is the Trading Time Hypothesis. This suggests that the Monday returns should not be significantly different than the other days of the week. French (1980) shows that these hypotheses do not hold. Lakonishok and Levi (1982) have attempted to offer explanations of this Monday anomaly through the analysis of the settlement procedure. They explain this effect to the delay between trading and settlements in stocks and clearing checks. Their effort was without much success, only 17 percent of the significant low Monday returns can be explained by the settlement period. Eight years later, Lakonishok again attempted to explain this Monday anomaly. This time Lakonishok and Marbely (1990) researched the buying and selling behavior of individual investors.

They found that individual investors trade more on Mondays and that they perform more sell transactions than buy transactions. Moreover, they show that institutional investors trade less on Mondays than on other days of the week. Based on this, they suggest that the Monday effect is driven by individual investors. Abraham and Ikenberry (1994) support the findings of Lakonishok and Marbely (1990). Using US equity data from 1963 to 1991, they found that when Friday returns are negative (proxy for bad news), Monday returns are also negative almost 80% of the time. They suggest that the Monday effect is probably a response of individual investors to bad news on Friday (Abraham and Ikenberry, 1994). So there is a higher selling pressure from individual investors on Mondays if bad news comes on the previous Friday. They refer to this as the information processing hypothesis. They also report that this positive correlation between Friday and Monday is stronger for small and medium size companies than large companies. However, Abraham and Ikenberry (1994) also report that this trading behavior of individual investors appears to be at least one factor contributing to this Monday effect. Chow, Hsiao and Solt (1997) also found a correlation between Friday and Monday returns analyzing the S&P 500 during 1970 to 1973. The positive correlation between Friday and Monday is not limited to US markets. For example, Jaffe and Westerfield (1989) find positive correlations in the US, Australia, Canada, Japan and the UK, but they find only correlations when there was a bad news environment on Friday. When the Friday returns are positive there seems no significant correlation to exist with Monday returns. This was also found by Brusa et al (2003), which contradicts the findings of Lakonishok and Marbely (1990) and Abraham and Ikenberry (1994) who suggest that Monday returns tend to follow previous Friday returns regardless of whether the returns are positive or negative.

Sias and Starks (1995) also disagree with the findings of Lakonishok and Marbely (1990) and Abraham and Ikenberry (1994). They challenge the argument that the Monday effect is driven by individual investors. Sias and Starks (1995) find that stocks which are highly owned by institutional investors have significantly higher day-of-the-week patterns than stocks which are highly owned by individual investors. Based on this, they suggest that the Monday effect is driven by institutional investors.
Wang, Li and Erickson (1997) also challenge the individual investor argument, but from a different angle. They discovered that the Monday effect exists only on the last 2 Mondays of the month, while Mondays during the first half of the month are not significantly different from zero. Sun and Tong (2002) suggest that this Monday effect at the end of the month can be explained by liquidity; "Given that a lot of monthly payments are made near the end of the month, the liquidity needs of individuals intensify at that time". This means that investors are selling their stocks at the end of the month.

Several other studies tried to explain the Monday effect through analyzing the mood of investors on Mondays. Rystrom and Benson (1989) indicate several studies who point out that individuals are more pessimistic on Mondays compared to other days. They suggest that because investors are more pessimistic on Mondays than other days of the week, this means investors are more willing to sell stocks and less willing to buy stocks on Mondays. Jacobs and Levi (1988) and Markese (1989) also suggest that the Monday anomaly can be explained by the pessimistic mood of investors on Mondays. This pessimistic mood of investors is called the blue-Monday hypothesis. Pettengill (1993) did an experimental study concentrating on the blue-Monday hypothesis and he found that participants were taking less risk on their investments on Monday than on Fridays.

More competing explanations concerning the Monday anomaly have been presented. For example, short sellers who are closing their positions on Fridays as it is difficult to monitor over weekends (Chen and Singal, 2003). Comparative advantage of informed traders when markets open after a period of no trading (Foster and Viswanathan, 1990). Overestimation of Fridays closing price and underestimation of Mondays closing price (Keim and Stambaugh, 1984). Keim and Stambaugh (1984) report that neither measurement-error nor specialist-related explanations can explain the Monday effect. On the other hand, Wang and Walker (2000) suggest that institutional investors mainly tend to sell orders on Mondays and that this partly explains the Monday effect. But Flannery and Protopapadakis (1988) suggest that institutional aspects of the stock market cannot explain the Monday effect. Damodaran (1989) reports that the delay of announcement of bad news on Friday can only explain 3,4% of the weekend effect.

Several other researchers report that the Monday effect disappeared or even changed. Mehdian and Perry (2001) found such a change in the Monday effect. They researched 3 large-cap and 2 small-cap US stock indexes between 1964 and 1999. The research concludes that Monday returns are significantly negative till 1987, when the stock markets crashed on the so called Black Monday. Mehdian and Perry (2001) state that for large-cap stocks the Monday effect disappeared after Black Monday, while for small-cap companies the Monday effect persisted after 1987. Kamara (1997) also found a change in the Monday effect. His research concentrated on transaction costs associated with trading. Kamara (1997) argues that the Monday effect disappeared, because of the increasing dominance of institutional investors. He shows that since transaction costs decreased, the Monday effect also started to disappear. According to Chan, Leung and Wang (2003) large investment institutions made use of the Monday anomaly, and therefore the anomaly disappeared. They also report that when institutional ownership grew, the Monday effect disappeared.

The explanations presented are only a tip of the iceberg trying to explain the Monday anomaly. What we see is that all kinds of different explanations have been presented. Given the available evidence, it appears that the Monday effect is an anomaly that cannot be fully explained. No consensus has

been reached between researchers what causes this anomaly, but it appears that there is something special about Mondays. The underlying question throughout this research is to find out *what determines the international differences in the Monday effect.* Based on all the different studies we see that the Monday effect is present in some periods for some markets, while in other markets the Monday effect does not exist in those periods. The evidence also shows that the magnitude and the statistical significance of the Monday effect differs for each research and country. It appears that there are factors which can explain between-country differences in the existence of the Monday effect. A study by Moshirian, Ng and Wu (2008) came up with factors which have the potential to explain between-country differences in stock price changes to analysts' recommendations. They suggested that factors like the rule of law, market transparency, financial development and investor protection have the potential to explain international differences. A study by Singleton and Wingender (2003) suggest that economic factors, such as interest rates, and behavioral factors, such as investor sentiment are associated with negative Monday returns. Both of these studies suggest economic factors which could explain the between-country differences in the Monday effect. A recent study by Keef, Khaled and Zhu (2009) also used an economic factor based on several indices to examine the temporal dynamics of the Monday effect. A research by Singleton and Wingender(2003) indicates that economic or psychological factors may be responsible for the Monday effect. The research points out new directions for researchers to consider when examining the causes of the Monday effect. As they point out: "Further research might profitably focus on the variables suggested here as the search for the source of the Monday effect continues" (Singleton and Wingender, 2003). In their study they performed a content analysis, where they considered variables like US economy, Federal Reserve policy, sentiment, technology, US politics etc. To the best of our knowledge, the causes of between-country differences in the Monday effect has not been systematically investigated. Prior research into the international evidence of the Monday effect did not concentrate on the between-country differences. However, based on the research of Keef et al (2009) and Singleton and Wingender (2003) the expectation rises that there are factors that cause or can explain the between-country differences. This study will focus on variables which have the potential to explain these between-country differences. More specifically, the focus of this study will be on economic factors. Non-economic alternatives are not considered, or better, left for other researchers to determine. This is in line with the research of Keef et al (2009) who also purposefully chooses to concentrate on economic variables. Four economic variables were pointed out by Keef et al (2009). These economic variables are the Gross Domestic Product (GDP) of the countries, the level of corruption within the countries, the economic freedom of these countries and last, a variable for the Information and Communication Technology (ICT). Keef et al (2009) used these four variables in order to conduct a factor for the economic dimension to examine the temporal dynamics of the

Monday effect. However, based on the theoretical framework above the expectation rises that these four economic variables have an explanatory power for between-country differences in the Monday effect, this develops into the following hypothesis below:

HYPOTHESIS(1) – The Monday Effect does exist in the European equity indices.
HYPOTHESIS(2)– The 4 variables can explain the between-country differences in the Monday Effect.

The next section is the research design. This is the methodology part. In this part it is discussed which research method is used, what the advantages and disadvantages of this particular research method are, and why this method is suited for this research.

RESEARCH DESIGN

The research design will firstly focus on the variables which have the potential to explain the between-country differences. The second part of this section will describe the empirical research design of this research.

A country can be different than other countries by a number of dimensions. Potential country characteristics could include for example, aspects related to the economic environment, religious persuasion, cultural practices, social mores etc. (Keef et al, 2009). This study will be focusing on four economic variables mentioned earlier. Starting with the Gross Domestic Product (GDP), the GDP is the market value of all goods and services produced within an economy. The GDP is often considered as an indicator of a country's standard of living. This variable has been extensively used in other macroeconomic studies as well. Within this study it will be used in order to explain between-country differences in the Monday effect. The second economic variable is corruption. Keef et al. (2009) states that: "corruption has the potential to lead to miss-pricing in capital markets through a number of mechanisms. First, the price effects of secretive and corrupt deals do not become public until well after the event. Second, insider trading results in the transfer of wealth from non-insiders to insiders. As a result, corruption makes investors hesitant to invest and thus reduces the liquidity of the stock market". Country-level differences in corruption have the potential to explain differences in the Monday effect. The third economic variable is related to Information and Communication Technology (ICT). As Keef et al. (2009) point out ICT has 2 important roles. First of all, it contributes to the economic development and secondly, in the context of the stock exchange, it contributes to the market efficiency. Access to up-to-date information is crucial here. In this way, ICT has the potential to explain between-country differences in the Monday effect. The last economic variable is the economic freedom within countries. There are several institutes who measure the economic freedom of countries. The level of economic freedom has also the ability to explain between-country differences. Now that we know the different economic variables the challenge becomes in measuring the variables. The timeframe of this study is from 1 January 1st 2000 till 30 December 31st 2011. This paper contributes an investigation of the Monday effect in European equity markets of the following 6 countries: United Kingdom, France, Germany, Spain, Italy and the Netherlands. Annual data will be used for the economic variables. Starting with the first variable, the GDP per capita. We use annual GDP per capita data in euro's. The data are obtained from the website of Eurostat (2012), which is a statistical bureau of the European Union. The second variable is corruption. Keef et al (2009) used the Corruption Perception Index (CPI), which is annually published by Transparency International. The index is reversed scored – the lower (higher) the value of the index, the higher (lower) the level

of perceived corruption. The third economic variable is Information and Communication Technology (ICT). Keef et al. (2009) uses the Network Readiness Index (NRI), which is prepared annually by the World Economic Forum. NRI measures "the degree of preparation of a nation or community to participate in and benefit from ICT developments" (World Economic Forum, 2012). The last variable is the Economic Freedom. In line with the research of Keef et al. (2009), the data is obtained from the Fraser Institute. This institute publishes the Economic Freedom of the World: Annual report. This report measures 5 components: (1) the size of government, (2) legal systems and property rights, (3) access to sound money, (4) freedom to trade with foreigners and (5) regulation of credit, labor and business (Gwartney et al, 2011). Annual data between 2000 and 2011 is obtained for all of these 4 economic variables for the 6 different countries. The hard part of the analysis is that the 4 economic variables are in yearly data, while for the measuring of the Monday effect daily data of the European stock markets is required. However, in order to show the relevance and the potential of these variables to explain the between-country differences in the Monday effect, we will first need to find evidence of the Monday effect, as our theory suggests, in some countries and not in others. Therefore, the focus will be first on the evidence of the Monday effect in the different equity markets and thereafter on the four economic variables that will be used to explain the expected between-country differences. The daily closing prices adjusted for stock splits and dividends for the European stock markets are collected with DataStream for the period beginning in January 2000 through the end of December 2011. This is a common approach in the literature (Lim et al, 2010; Lin and Lim, 2004; Draper and Paudyal, 1997; Chain and Liew, 2010). The countries and their related stock markets are, in alphabetic order: France (CAC40), Germany (DAX), Italy (MIBTEL), Netherlands (AEX), Spain (IBEX35) and United Kingdom (FTSE100). For all equity markets, the daily returns are computed. After the daily returns are calculated, a test needs to be performed to find out if the returns on Monday are significantly different than the other weekdays. The first variable needed to perform the research are the daily returns of the several European indexes. The second variable which is needed are the actual days of the week. Current literature points out that there are several possibilities in researching the Monday effect. First of all, there are researchers (Almonte, 2004) who used the Kruskal-Wallis test. The Kruskal-Wallis, which is a nonparametric test, tests the null hypothesis that the k samples come from the sample population. When the Kruskal-Wallis test leads to significant results, then at least one of the samples is different from the other samples. A limitation of this test is that it does not tell which ones are different. It also doesn't tell how many of the groups are different from each other. Another limitation is the fact that the Kruskal-Wallis test is used for comparing more than two samples that are independent, or not related. It's a strong assumption that daily returns are independent and not related.

A more common approach in the Monday effect literature starts with number coding, so that number 1 represents returns for Monday, number 2 for Tuesday, number 3 for Wednesday, number 4 for Thursday and 5 for Friday. The following formula is presented here:

$$Return_t = \alpha + \beta_2 D_{2t} + \beta_3 D_{3t} + \beta_4 D_{4t} + \beta_5 D_{5t} + \varepsilon_t \qquad (1)$$

Where $Return_t$ is the daily return of the equity market index. D_{it} are the dummy variables which take on value of 1 if it is representing Tuesday, Wednesday, Thursday and Friday and 0 otherwise. Due to the fact that the dummy variable for Mondays is missing, the constant α captures the mean return on Mondays. β_i are coefficients which represent the mean excess daily return on the Monday return. This is also been pointed out by Borges (2009). Finally, ε_t is the error term. The t-tests of the β_i coefficients in formula (1) above inform us if the excess daily returns on Tuesdays, Wednesdays, Thursdays and Fridays are significantly different from Mondays' mean return. Borges (2009) argues that this specification (1) is only appropriate to use, when we hold a prior belief that an effect exists on one of the specific days. Borges (2009) states that: ""if we want to investigate whether a Thursday effect exists, the coefficient β_4 would inform us if Thursdays' returns are statistically different from Mondays' returns, but the model tells us nothing whether Thursdays are different from Tuesdays', Wednesdays' and Fridays' returns". This shortcoming can be overcome be running the model 5 separate times and excluding a different day every time. In the line of this study this is not the optimal formula to perform. An alternative specification of the formula is to include dummy variables for all of the 5 weekdays. However, the intercept α needs to be excluded in order to avoid the dummy variable trap (Borges, 2009):

$$Return_t = \beta_1 D_{1t} + \beta_2 D_{2t} + \beta_3 D_{3t} + \beta_4 D_{4t} + \beta_5 D_{5t} + \varepsilon_t \qquad (2)$$

Where $Return_t$ is again the daily return of the equity market index and D_{it} are the dummy variables. In this case, the β_1 captures the mean daily return for each of the days, but the t-tests for those coefficients only inform if they are significantly different from zero (Borges,2009). Specification (2) will be used when analyzing the descriptive data, but this equation does not give an answer if day-of-the-week returns are significantly different than other days-of-the-week returns. Borges (2009) claims that there is a simpler and better approach, which overcomes all the shortcomings of the previous specifications. This new approach is to estimate five equations separately, each trying to find a specific day of the week effect:

$$Return_t = \alpha + \beta_i D_{it} + \varepsilon_t \qquad (3)$$

Specification (3) above has only one β_i and one D_{it} variable. This means that if we select Monday for the dummy variable, the intercept α measures the mean daily return of non-Mondays. The β_i co-efficient is now the excess return of Mondays, relative to non-Mondays. The t-test indicates if this effect is significant. By doing this 5 separate times other day of the week effects can be measured as well. So if there would be no day-of-the-week effect in the returns the β_i coefficients will not be significantly different than zero. This could be estimated by the use of an OLS regression. Such a regression approach is more appealing, because additional factors that could affect the Monday effect can be added. The advantage of this is that once we have found that the Monday effect does exist, additional factors like GDP per capita (GDP), the Corruption Perception Index(CPI), Network Readiness Index(NRI) and Economic Freedom of the World index (EFW) will be added into our analysis to explain the between-country differences. The next section is the Analysis part.

EMPIRICAL RESULTS

This section is the Analysis part. Within this section the research data will be presented and analyzed. Firstly the data will be explored. We will start with the descriptive statistics of the dataset. In table 1 summary statistics for daily equity returns of the Netherlands are presented. Each country will be analyzed separately, this will give a clear view of the data and the possible between-country differences. Table 1 reports the returns for the entire study period as well as the return for each separate day of the week of the Amsterdam Exchange. The average mean daily return for the entire study period of the Amsterdam Exchange is -0,0119 percent. The standard deviation of the return is 1,59, skewness is 0,13 and kurtosis is 8,93. The skewness and kurtosis are both statistically different at the 1% level. The significant different positive skewness indicates that the tail on the right side is longer than the left side. The significant different positive kurtosis indicates that more of the variance is the result of infrequent extreme observations. Thus, the all days distribution of the Amsterdam Exchange is leptokurtic, meaning that relative to normal distributions, they have both higher peaks and fatter tails. Also the Jarque Berra normality test rejects the normality of returns at the 1% level. The finding that stock returns are not normally distributed is not surprising. In line with a majority of studies and previous findings, daily equity returns are not normally distributed (Chia and Liew, 2010).

TABLE 1. Summary statistics for daily equity returns of the Netherlands

AEX statistics	All Days	Monday	Tuesday	Wednesday	Thursday	Friday
Mean	-0,0119	-0,0279	-0,0070	-0,0669	0,0245	0,0177
t-stats	-0,42	-0,37	-0,12	-1,11	0,38	0,30
SD	1,59	1,88	1,43	1,51	1,60	1,48
Minimum	-9,14	-9,14	-6,95	-7,68	-6,74	-8,48
Maximum	10,55	10,55	7,74	9,09	9,98	8,58
Skewness	0,13**	0,23*	0,07	-0,23*	0,33**	0,07
Kurtosis	8,93**	9,74**	7,06**	7,64**	7,65**	8,88**
Observations	3130	626	626	626	626	626

Notes: The Dutch equity index is the Amsterdam Exchange Index from January 2000 to December 2011. ** and * indicate significance at the 1% and 5% levels, respectively.

When analyzing the returns of each day for the Amsterdam Exchange, the findings indicate that the mean returns of Monday is -0,02795 and the mean return of Friday is 0,0177. The signs of the findings are in line with the literature (Lakonishok and Levi 1982; Rogalski 1984; Keim and Stambaugh 1984). The t-statistics measure if the mean daily returns are significantly different than zero. For all days-of-the-week the returns are not significantly different than zero. We observe the highest daily mean return on Thursday and the lowest daily mean return on Wednesday, but again these returns are not significantly different than zero. Table 1 also reports the standard deviation, minimum and

maximum daily returns, skewness and kurtosis for each day. Monday has the highest standard deviation; Tuesday has the lowest standard deviation. Kurtosis is significant different at the 1% level for all days. The significance of the skewness differs by each day. The minimum daily return was on a Monday with -9,14 percent. The maximum daily return was also on a Monday with 10,55 percent. On the next page summary statistics for the United Kingdom will be analyzed.

In table 2 below summary statistics for daily equity returns of the United Kingdom are presented. Table 2 reports the returns for the entire study period as well as the return for each separate day of the week of the FTSE100. The average mean daily return for the entire study period is 0,0016 percent. The standard deviation of the return is 1,31; skewness is 0,01 and kurtosis is 8,99. The skewness is not significantly different than a normal distribution, this is contrary to the skewness of the Netherlands. The kurtosis is statistically different at the 1% level, which is equivalent to the Netherlands. The significant different positive kurtosis indicates that more of the variance is the result of infrequent extreme observations.

TABLE 2. Summary statistics for daily equity returns of the United Kingdom

FTSE 100 statistics	All Days	Monday	Tuesday	Wednesday	Thursday	Friday
Mean	0,0016	0,0039	0,0195	-0,0765	0,0076	0,0535
t-stats	0,07	0,07	0,39	-1,48	0,15	1,08
SD	1,31	1,45	1,24	1,29	1,29	1,24
Minimum	-8,85	-7,85	-5,72	-7,16	-5,70	-8,85
Maximum	9,84	9,84	5,05	8,05	6,08	8,84
Skewness	0,01	0,35**	0,13	-0,18	-0,21*	-0,16
Kurtosis	8,99**	11,43**	5,18**	7,88**	6,19**	12,14**
Observations	3130	626	626	626	626	626

*Notes: The UK equity index is the Financial Times Stock Exchange Index 100 from January 2000 to December 2011. ** and * indicate significance at the 1% and 5% levels, respectively.*

When analyzing the returns of each day for the FTSE100, the findings indicate that the mean returns of Monday is 0,0039 and the mean return of Friday is 0,0535. The signs of the findings are not consistent with the literature. The t-statistics measure if the mean daily returns are significantly different than zero. For all days-of-the-week the returns are not significantly different than zero. We observe the highest daily return on Friday and the lowest daily return on Wednesday, but again these returns are not significantly different than zero. Table 2 also reports the standard deviation, minimum and maximum daily returns, skewness and kurtosis for each day. Monday have the highest standard deviation with 1,31; Tuesday and Friday have the lowest standard deviation with 1,24. Kurtosis is significant different at the 1% level for all days. The skewness differs by each day. The minimum daily return was on a Friday with -8,85 percent. The maximum daily return was on a Monday with 9,84 percent.

Although it is interesting to analyze the summary statistics for each country individually. It is not much value-adding when all 6 countries are analyzed individually. Summary statistics for the other 4 remaining countries with their related tables are therefore added in the appendix. When analyzing the remaining 4 countries similar results are found as the AEX and FTSE100 indices. There are several similarities between the 6 countries. For all countries, the kurtosis is significant at the 1% level. For all countries, except the UK skewness is significant at the 1% or 5% level. This means that stock markets returns in general are not normally distributed, which is consistent with a majority of studies. Another important similarity found between the 6 countries is that the mean daily returns are not significantly different than zero, which is indicated by their related t-statistic. Several other interesting findings are: mean daily returns for all days are the highest in Germany (0,008), lowest in Italy (-0,0215). The highest standard deviation is in Germany (1,63), lowest in the UK (1,31). The highest mean daily return was on a Thursday in Spain (0,0631), lowest in Italy on a Monday (-0,0988). The maximum daily return was in Spain, with a return of 14,43 percent. The minimum daily return was in the Netherlands and Spain, with a return of -9,14 percent. Comparing the 6 countries on descriptive statistics gives interesting information. Visually analyzing descriptive statistics gives a clearer view of the differences. For example, in figure 1 the 10th and 90th percentiles of daily returns by country are presented:

FIGURE 1. 10th and 90th percentiles of daily returns by country
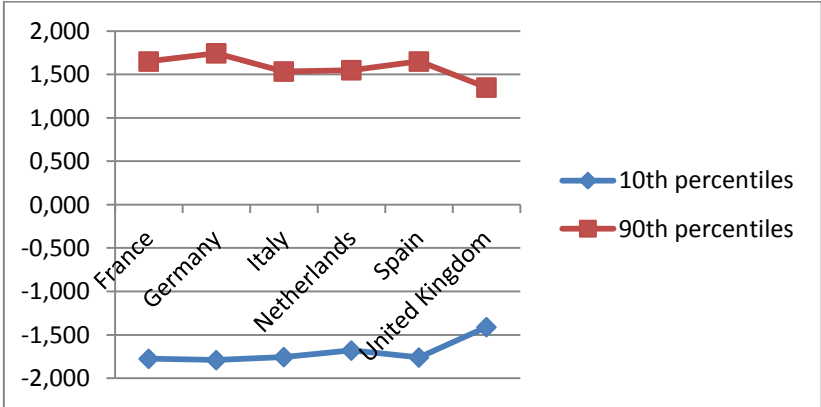
In figure 1 it becomes clear that the difference between the 10th and the 90th percentiles is an indication of the standard deviation of the daily returns by country. This means that the bigger the difference is between the daily return the higher the standard deviation is. The United Kingdom has the smallest difference, which means the lowest standard deviation. Germany has the biggest difference, which means the highest standard deviation. This finding is also supported by the data.

FIGURE 2. Mean daily returns by country
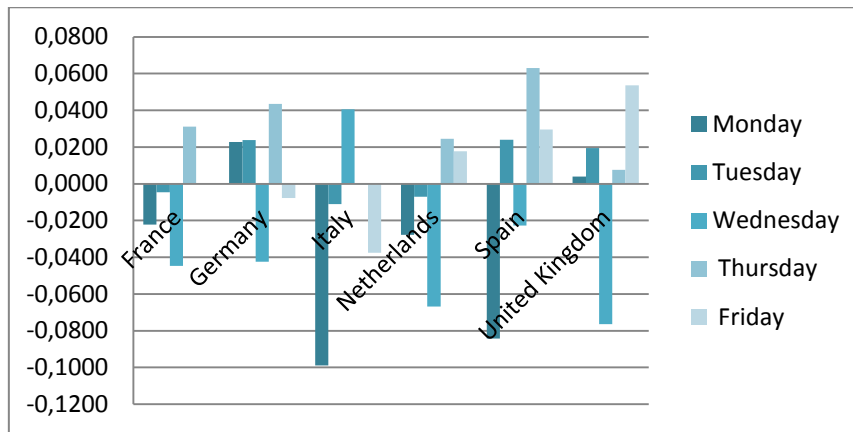
In figure 2 the mean daily returns are represented for the different countries in alphabetic order. This visual approach shows us directly the differences between the 6 countries. It also becomes clear how much the mean daily returns are for all the five different days. The related t-statistics (not mentioned in the figure) of the mean returns indicates that the returns are not significantly different than zero. However, the fact that the mean returns are not significantly different than zero does not mean that day-of-the-week effects do not exist. For example, it is possible that Monday returns are significantly different than Wednesday returns. In order to find evidence of day-of-the-week effects the OLS regression mentioned in the methodology section will be performed. The result of this regression could be found in table 3:

In table 3 the day-of-the-week effects are analyzed during January 2000 and December 2011.

TABLE 3. Day of the week effects during January 2000 and December 2011

Day of the week	OLS $Return_t = \alpha + \beta_i D_{it} + \varepsilon_t$					
	France	Germany	Italy	Netherlands	Spain	United Kingdom
Monday	-0,018	0,018	-0,097	-0,020	-0,108	0,003
	(0,070)	(0,073)	(0,068)	(0,071)	(0,069)	(0,058)
Tuesday	0,004	0,020	0,013	0,006	0,028	0,022
	(0,070)	(0,073)	(0,068)	(0,071)	(0,069)	(0,058)
Wednesday	-0,046	-0,063	0,078	-0,069	-0,031	-0,098
	(0,070)	(0,073)	(0,068)	(0,071)	(0,069)	(0,058)
Thursday	0,049	0,044	0,026	0,045	0,076	0,007
	(0,070)	(0,073)	(0,068)	(0,071)	(0,069)	(0,058)
Friday	0,010	-0,020	-0,020	0,037	0,035	0,065
	(0,070)	(0,073)	(0,068)	(0,071)	(0,069)	(0,058)

Notes: Standard errors are reported under the corresponding estimated coefficients. ** and * indicate the level of significance at the 1 percent and 5 percent level, respectively.

The OLS regression has only one β_i and one D_{it} variable. This means that if we select Monday for the dummy variable, the β_i co-efficient measures the excess return of Mondays, relative to non-Mondays. By doing this 5 separate times, other day of the week effects can be measured as well. These β_i coefficients are presented for every country and each day in table 3. Standard errors are reported in parentheses. For Italy, the Monday's β_i coefficient is -0,097. This is Monday's excess return, relative to non-Mondays. The standard error is 0,068. This gives a t-statistic of -1,42. This means that the excess return of Mondays is not significantly different than non-Mondays. The OLS regression in table 3 indicates that for all days no day-of-the-week effect exist. Hereby we reject the hypothesis(1) that the Monday effect exists in the European equity indices. Moreover, we found evidence that no day-of-the-week effect exist in these 6 countries. Due the fact that no day-of-the-week effects exists, hypothesis(2), that the four economic variables can explain the between-country differences in the Monday effect cannot be explained or tested either. The surprising results of this analysis part will now be discussed in the following section.

SUMMARY AND CONCLUSIONS

The results of this empirical research shows surprisingly that the Monday effect does not exist in the European equity markets between the period of January 2000 and December 2011. More specifically, this study shows that no day-of-the-week effect exists in 6 European countries. Due to the current theoretical framework a strong expectation had risen: that the Monday effect exist and that there are economic variables which can explain these differences in the Monday effect. However, this study failed to demonstrate this. This study has shown that in the last 12 years no day-of-the-week effect exist in the biggest European countries.

The fact that the Monday effect exists in European equity markets has been shown by a huge amount of literature (Theobald and Price, 1984; Condoyanni et al, 1987; Barone, 1990; Agrawal and Tandon, 1994; Chang et al, 1993; Dubois and Louvert, 1996; Tong, 2000). Also the expectation rose that economic variables have the potential to explain between-country differences in the Monday effect, partly due to different studies on international factors (Moshirian et al, 2008; Keef et al, 2009; Singleton and Wingender, 2003). This study shows that, although that daily mean returns vary for the different days and countries, these daily mean returns are not significantly different than zero and that no significant day-of-the-week effect exists. Despite the fact that no significant effect is found, it is shown that in 4 of the 6 countries the Monday mean returns are negative. But again, these results are insignificant. The question that needs to be asked is: what are the causes for the rejection of the hypothesis? First of all, the theoretical framework is strong and well-founded. It is clearly addressed what the current knowledge is about the Monday effect. Starting with evidence in the United States, then focusing on the international evidence regarding the Monday effect, and concluding with the different explanations given by all the studies. Thereafter the economic variables are analyzed which have the potential to explain the between-country differences in the Monday effect. Based on this strong theoretical framework we make a leap to the hypothesis. The hypothesis here is an expectation of a relationship between the Monday effect and possible economic variables. Also the hypotheses seems to clearly follow from the theory section. With regard to the data collection, the data has been collected in a common approach as is done in the literature. Doubts cannot be placed here. Also the data is analyzed in different ways and this did not resulted in a significant effect. The results of this study show that the Monday effect does not exist. This is contrary to the literature who found evidence of the Monday effect. The results of this study are also contrary to the literature who found evidence of a positive Monday effect. This effect is also did not found in this empirical research. However, another part of the Monday effect literature, as pointed out in the research

framework, found evidence that the Monday effect disappeared (Mehdian and Perry, 2001; Kamara, 1997; Chan et al, 2003). Our research is consistent with these findings for the Monday effect.

The underlying main question throughout this research was to find out '*what determines the international differences in the Monday effect*?' A huge field in the literature suggests that the Monday effect does exist. Based on all prior research it becomes clear that in some countries the Monday effect is present in some periods, while in other countries it does not exist in those periods. The problem with the current state of the literature is the fact that it is not explaining these international differences. Based on the problem in the current state of the literature, the main question was therefore formed in the introduction section. Thereafter, specific theories on US evidence, international evidence and the different explanations for the Monday effect were analyzed. Also economic variables which have the potential to explain the international differences in the Monday effect were analyzed. Based on the theory the expectation arose that the Monday effect exists and that economic variables have the potential to explain the international differences. Finally, this expected relationship was translated into a hypothesis, namely that the Monday effect exist and that four economic variables have the potential to explain international differences in the Monday effect. Then it was the task to test the hypothesis. By using DataStream the daily data was collected for a period of 12 year starting in January 2000 and ending in December 2011 for 6 European equity markets. Thereafter, the data was analyzed. Against all expectations, it appears that the Monday effect does not exist in the European equity markets. This means that the first hypothesis is rejected. The rejection of the first hypothesis made it impossible to test the second hypothesis, the fact that the 4 variables can explain the between-country differences in the Monday Effect. This study shows evidence that the day-of-the-week anomaly does not exist in the European equity markets. The fact that market anomalies, like the Monday effect and other day-of-the-week anomalies are not presence is consistent with the efficient market hypothesis. We could state that this study found evidence that the European equity markets are efficient markets and do not exhibit day-of-the-week anomalies. This means that it is not possible to earn abnormal returns. Despite the fact that mean return on Mondays are negative and mean returns on Fridays are positive for 4 of the 6 countries, we can conclude that there is no significant difference in daily returns.

For future researchers I would like make several suggestions and recommendations when analyzing the Monday effect. The fact that this study did not found a significant Monday effect in 6 European equity indices, does not mean that the Monday effect or any other day-of-the-week effect does not exist in other equity markets. The theoretical framework of this study indicates several studies who found recent evidence of the existence of the Monday effect (Siegel, 1998; Tong, 2000; Kok and

Wong, 2004; Hui, 2005). The first goal of this study was find evidence of the existence of the Monday effect in the European equity markets, as we know, such an effect is not found. The second goal within my research was showing that international differences between countries are a crucial characteristic when explaining the Monday effect. Unfortunately, we were not able to test if these economic variables have a significant explanatory power. However, the strong theoretical framework suggests that there are variables which can explain between-country differences in the Monday effect. Further research might profitably focus on the variables suggested here. Exploration of these issues is left for future research.

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APPENDIX

TABLE 1. Summary statistics for daily equity returns of France

CAC40 statistics	All Days	Monday	Tuesday	Wednesday	Thursday	Friday
Mean	-0,0080	-0,0223	-0,0045	-0,0447	0,0312	0,0003
t-stats	-0,28	-0,31	-0,08	-0,74	0,49	0,01
SD	1,57	1,80	1,48	1,52	1,58	1,47
Minimum	-9,04	-9,04	-7,39	-6,82	-6,38	-7,73
Maximum	11,18	11,18	6,96	9,23	6,32	9,27
Skewness	0,20**	0,58**	-0,08	0,03	0,04	0,16
Kurtosis	8,05**	10,63**	6,02**	6,70**	5,37**	8,29**
Observations	3130	626	626	626	626	626

*Notes: The France equity index is the Cotation Assistée en Continu from January 2000 to December 2011. ** and * indicate significance at the 1% and 5% levels, respectively.*

TABLE 2. Summary statistics for daily equity returns of Germany

DAX statistics	All Days	Monday	Tuesday	Wednesday	Thursday	Friday
Mean	0,0080	0,0227	0,0237	-0,0424	0,0435	-0,0077
t-stats	0,27	0,31	0,38	-0,67	0,67	-0,13
SD	1,63	1,84	1,57	1,59	1,63	1,52
Minimum	-8,49	-7,16	-8,49	-6,49	-6,84	-7,01
Maximum	11,40	11,40	11,28	5,68	7,34	7,23
Skewness	0,17**	0,45**	0,44**	-0,19*	0,06	-0,10
Kurtosis	7,47**	8,88**	10,16**	4,84**	5,71**	5,79**
Observations	3130	626	626	626	626	626

*Notes: The German equity index is the Deutscher Aktien Index from January 2000 to December 2011. ** and * indicate significance at the 1% and 5% levels, respectively.*

TABLE 3. Summary statistics for daily equity returns of Italy

MIBTEL statistics	All Days	Monday	Tuesday	Wednesday	Thursday	Friday
Mean	-0,0215	-0,0988	-0,0111	0,0406	-0,0005	-0,0376
t-stats	-0,79	-1,39	-0,19	0,70	-0,01	-0,65
SD	1,53	1,78	1,45	1,45	1,48	1,45
Minimum	-8,24	-8,24	-7,57	-6,65	-6,78	-7,14
Maximum	11,49	11,49	6,99	9,87	5,49	8,62
Skewness	0,09*	0,66**	-0,01	0,15	-0,46**	-0,27**
Kurtosis	8,6887**	10,93**	7,54**	7,55**	5,48**	8,00**
Observations	3130	626	626	626	626	626

*Notes: The Italian equity index is the Milano Italia Borsa from January 2000 to December 2011. ** and * indicate significance at the 1% and 5% levels, respectively.*

TABLE 4. Summary statistics for daily equity returns of Spain

IBEX 35 statistics	All Days	Monday	Tuesday	Wednesday	Thursday	Friday
Mean	0,0019	-0,0843	0,0240	-0,0228	0,0631	0,0296
t-stats	0,07	-1,23	0,42	-0,37	1,06	0,49
SD	1,53	1,72	1,43	1,53	1,49	1,50
Minimum	-9,14	-7,54	-5,45	-8,16	-6,27	-9,14
Maximum	14,43	14,43	5,36	9,42	6,95	8,71
Skewness	0,30**	1,26**	-0,09	0,10	0,03	-0,29**
Kurtosis	9,17**	14,88**	4,99**	7,16**	5,36**	8,31**
Observations	3130	626	626	626	626	626

*Notes: The Spain equity index is the Índice Bursatil Español from January 2000 to December 2011. ** and * indicate significance at the 1% and 5% levels, respectively.*