# THE PENNSYLVANIA STATE UNIVERSITY SCHREYER HONORS COLLEGE

# DEPARTMENT OF FINANCE

# THE EFFECT OF THE DECLINE OF THE GREEK ECONOMY ON EUROPEAN BUSINESSES

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### THE PENNSYLVANIA STATE UNIVERSITY

### **ABSTRACT**

# THE EFFECT OF THE DECLINE OF THE GREEK ECONOMY ON EUROPEAN BUSINESSES

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With all of the press and articles about the failing of the Greek economy, it is important as business people to keep track of how these events are affecting actual businesses. This study looks at specific events having to do with the Greek economy. It then looks at how the stocks of European companies within the Eurozone fluctuated on the days that these events were announced. The study was able to point out what types of events most affect the Eurozone companies. It also took a brief look at how Eurozone companies were affected vs. European countries not in the Eurozone. It surprisingly found that non-Eurozone companies reacted similarly to companies within the Eurozone. When doing business in other countries, it will be important to keep track of the news having to do with that country so that you can prepare for times when your stock might fluctuate. This also shows how interconnected the countries within Europe are. This study will be of value for anyone looking to do business within Europe in the upcoming years.

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# **Chapter 1: Introduction**

# I. History of the Euro

The Euro has been a topic of debate around the world and throughout Europe since the creation of the European Union. When it was first introduced, there was much debate about the pros and cons of combining that many nations under one currency.

Many countries feared that the euro was not just a way of standardizing the currency, but a way to standardize cultures and blur national identities. European countries feared losing their freedom to control the monetary systems of their own countries independently. The process of creating the Euro took decades because of the number of countries involved in the negotiations. Not only did each of these countries have to agree on the terms and criteria of the Euro, but they also had to adjust their economies to become eligible to participate. In order to be able to convert a country's currency to the Euro, the country had to meet certain criteria. The convergence criteria, or "Maastricht criteria," that any country must meet were defined as follows on the European Commission website:

- Consumer price inflation rate not more than 1.5 percentage points above the rate of the three best performing Member States
- Government deficit as percent GDP not more than 3%
- Government debt as percent of GDP not more than 60%
- Long term interest rate not more than 2 percentage points above the rate of the three best performing Member States in terms of price stability
- Participation in ERM II for at least 2 years without severe tensions

The creation of the Euro was a long process, slowed by political decisions within countries, opposition to the single currency idea and drawn out negotiations. However,

when it was introduced on January 1<sup>st</sup>, 1999 there were high hopes for what this currency could achieve. It immediately became an international currency on the same playing field as the dollar. For most of the countries involved, it put them on a level that they would not have been able to reach on their own. As cited in "The Euro" by Jeremy Smith, when it was first introduced, Christian Noyer, vice president of the European Central Bank at the time stated that "Though the largest single country in the euro area accounted for less than one-twentieth of world GDP, the area as a whole represented about one-sixth of the pie." The Euro has linked the countries of Europe in a way that has been beneficial to all. According to "The Euro's Debatable Future," from the Wall Street Journal, "The euro has permitted more coordinated action in Europe and has prevented competitive devaluations. This has been key, not only for the euro zone, but also for the rest of Europe and even for the global economy." With these countries working together as opposed to against each other, their focus has changed to the global market instead of worrying about what their neighboring countries were doing.

# II. Greek Economy

The Euro was able to connect these initial 11 countries, (now 17 with the additions of new countries throughout the years) so that when one country's economy succeeded the rest benefitted as well. Sharing a common currency would reduce transaction costs and eliminate the exchange rate uncertainty between countries. This will not only help the flow of goods and services between countries, but also increase the competition within the Eurozone and allow healthy competition between companies. This will also open the possibilities of mergers and acquisitions within the corporate world and allow companies to easily pick a prime location. This would strengthen the companies within Europe and bring them to a higher level.

On the contrary, when one country's economy failed, serious threat was posed to the Euro and all countries involved. Being a part of the Euro means that your country would lose national monetary and exchange rate policy independence. This means if one country has economic turmoil, it will bring down the exchange rate of the entire Euro, affecting all countries involved. The failing country would not be able to adjust their own monetary policy to avoid crisis because they no longer have this freedom. This threat became a reality in recent years with the failing of the Greek economy. "The Euro's Debatable Future," touched on what this crisis can do by stating, "Many European banks, starting with Germany's, are dangerously over-leveraged, undercapitalized and exposed to Greek, Irish and Portuguese debt." The countries of the Eurozone are connected not only through the common currency but through the debts of each country. Some of the larger economies support the smaller ones through loans, but since they are all interconnected, once one country defaults on a loan it could start a domino effect that stretches to every country under the Euro.

When the Euro was first introduced, it was only introduced to 10 countries.

Greece was not added to the Euro because it did not meet the criteria laid out in the treaty. It did, however, become the 11<sup>th</sup> country to join the Euro in 2002, shortly after the Euro was initially introduced. The official crash of the Greek economy began in early 2009 but was not unexpected. Decades of mismanagement within the Greek government and policies that involved excessive spending led to the ultimate demise of the Greek economy that Europe is experiencing now.

# **III.** Question of Thesis

Since its beginning in 2009, events having to do with the Greek economy crisis have been affecting all countries involved with the Euro. Because of this, doing business in Europe could be greatly affected. As a business person, looking at the risks and

opportunities of starting a business or investing in a business in any country is always a priority. This research will attempt to answer the question: "To what extent did specific events in Greece affect businesses headquartered throughout Europe?" By answering this question, the risks of investing in the "Eurozone" can be more evident. It will also allow investors already present in those areas to know what to expect for upcoming events because, unfortunately, this crisis is not over.

# **Chapter 2: Data and Methodology**

# I. Companies

By evaluating the price fluctuations of a company's stock on specific dates linked to the release of information regarding the Greek economy, this study should be able to determine how these companies are being affected. The first step of this research was to determine which countries should be evaluated in the study. The companies used in this study were picked based on a few factors. In order to have a good judge of the stock prices on an international market, the study had its research focused on companies that traded on NASDAQ. All Europe based companies that trade on the NASDAQ were filtered on the NASDAQ website. From there the selection was further filtered to European countries that are using the Euro. A diversified sample of these companies was then created, making sure to include a few from each country. The sample was also filtered based on the industry of the company so that it is diversified in that area as well. This left me with 41 companies headquartered out of countries that use the Euro. The complete list of Data was also collected on a few European countries that do not use the Euro in order to see if they were affected in the same way. I chose 21 of these countries and these countries remain separated in the analysis. The complete list of the sample of companies within the Eurozone can be found in **Appendix A**. The complete list of the sample of companies within European countries not in the Eurozone can be found in Appendix B.

## II. Events

The next step involved determining which dates to use. In order to find these dates, a variety of databases and sources were used. Through the databases on Penn State's website and timeline's laid out by "The Telegraph," "The Guardian," and "Global News" dates were found that involved Greece's debt crisis. The dates found were both

'good' and 'bad' news events so that the study could show if stock prices fluctuate differently when good things happen as opposed to when bad things happen. Most of the events used in the study are directly related to Greece, however a few were added that involved other areas of the Eurozone such as Portugal requesting a bailout. Many of these events are tied together and can be related back to the Greek economic crisis. Below is a list of events used in the study:

Nov 5th, 2009 : Prime Minister George Papandreou's new socialist government says Greece's 2009 budget deficit will be 12.7 percent of GDP, more than double the previously

published figure.

2 March 15th, 2010 : Eurozone finance ministers announce that they are ready to help Greece.

3 April 11th, 2010 : Eurozone finance ministers approve a €30bn aid
 package for Greece, which Athens refuses to activate.

4 April 23rd, 2010 : Greece officially requests a bailout.

5 April 27th, 2010 : S&P's downgrade of Greece to BB+ relegates it to junk status.

6 May 2nd, 2010 : The IMF and EU agree to a €110bn rescue package over three years.

May 10th, 2010 : Global policymakers install an emergency financial safety net worth €750bn to bolster financial markets and

shore up the euro against contagion from the Greek crisis.

| 8  | January 14th, 2011 | : | Fitch reduces Greek debt to 'junk' status.   |  |
|----|--------------------|---|--|--|
| 9  | March 20th, 2011   | : | Eurozone leaders decided to extend Greece's repayment to 7.5 years from three years, and slash the loan's rate by 1 per cent, from 5.8 percent to 4.8 percent.   |  |
| 10 | April 6th, 2011    | : | Portugal seeks bailout.  |  |
| 11 | May 8th, 2011      | : | Standard & Poor's cut Greece's debt rating to B from BB  |  |
| 12 | May 21st, 2011     | : | Greek economic reform plans were delayed, Papandreou says Greece must avoid debt restructuring and instead continue with budget cuts to resolve the debt crisis. |  |
| 13 | June 16th, 2011    | : | Political turmoil erupts over new austerity measures in Greece.  |  |
| 14 | June 20th, 2011    | : | There is no final deal on Greek aid.   |  |
| 15 | June 22nd, 2011    | : | Greek cabinet approves austerity budget plan.  |  |
| 16 | July 21st, 2011    | : | Eurozone leaders agree to a new bailout package.   |  |
| 17 | August 7th, 2011   | : | European Central Bank announces plan to buy Spanish and Italian government bonds to bring down borrowing costs so that the debt crisis won't spread to larger    |  |

# economies.

| 18 | September 20th, 2011 | : | IMF cuts debt forecasts.   |
|----|----------------------|---|--|
| 19 | October 4th, 2011    | : | Eurozone finance ministers delay a decision on giving  Greece its next installment of bailout cash.            |
| 20 | Oct 21st, 2011       | : | Eurozone finance ministers approve the next Greece bailout loans.  |
| 21 | Oct 26th, 2011       | : | Private investors agree to accept losses of 50 per cent on their Greek bonds.                                  |
| 22 | Nov 8th, 2011        | : | According to government officials, Greece is expected to name a new prime minister.                            |
| 23 | Nov 10th, 2011       | : | Former European Central Bank Vice-President Lucas Papademos has been named Greece's new prime minister.        |
| 24 | Nov 18th, 2011       | : | Greece predicts that its budget deficit will fall next year and that no new austerity measures will be needed. |

From here on out the events may be referred to as the numbers that they are next to in this chart.

# III. Hypothesis

The Greek economic crisis has been a great shock and downfall to the Euro. The initial worries of one country failing and the rest quickly following became a reality.

Since Greece's economy first began to fail, it has been the Eurozone's main priority to make sure that that worry is not proven true. Because of this, the world has been having to adjust its viewpoint of the Euro based on new bailout plans and new factors that could help fix the situation. For that reason, it is easy to assume that the stock prices of European companies would fluctuate based on what phase the crisis is in. In order to examine this appropriately, I've assigned either a positive or negative rating to the events examined in this study. For instance, Greece having to officially request a bailout is labeled as negative because it is something that would make the success of the Eurozone seem difficult to achieve, while Eurozone finance ministers approving the next Greece bailout loans is labeled as positive because it is a step in the direction of solving the crisis and stabilizing the Euro. The rest of the ratings are shown in the Table 1 below using the same numbers for the events as shown in the previous section.

**Table 1: Events Rated Positive or Negative** 

| Rating   |
|----------|
| negative |
| positive |
| negative |
| positive |
| negative |
| negative |
| negative |
|          |

| Event | Rating   |
|-------|----------|
| 13    | Negative |
| 14    | Negative |
| 15    | Positive |
| 16    | Positive |
| 17    | Positive |
| 18    | Negative |
| 19    | Negative |
| 20    | Positive |
| 21    | Positive |
| 22    | Negative |
| 23    | Positive |
| 24    | Positive |

After examining the different events, it can be assumed that events 1, 2, 3, 4, 5, 6, 8, 10, 11, 12, 13, 14, 18, 19, and 22 should cause the stocks of the Eurozone companies to decrease, while 7, 9, 15, 16, 17, 20, 21, 23, and 24 should cause the stocks of Eurozone companies to increase. It is also hypothesized that there will be more of a reaction to the negative events because it seems that people would be more likely to withdrawal their support from the reaction of bad news.

Some of the European countries that remain out of the Eurozone were also examined. The United Kingdom chose to not change its currency to the Euro because they did not want to be tied down by other countries and there was fear that it would hold back the UK as a financial powerhouse. Others remained off of the Euro for various reasons; some have yet to be able to meet the standards necessary to join the Euro. For any case, it can be assumed that these countries would not be affected by the news release of events dealing with the Greek economy. While they are still a part of Europe, they are not directly subject to the failure of the Euro and therefore should not be as affected.

## IV. Process

The final step is to find the stock price changes in these companies for these specific dates. Data were collected for the price of the stock at every date. Data were also collected for a day before each date and a day after in order to account for fluctuations before and after the event that may also be related directly to the event. From these prices, the return on the stock was then found for each of the groups of dates. Finally, the return on the market for each group of dates was recorded and the abnormal return was found by subtracting the return on the market from the return on the stock. By only using the abnormal return (or market adjusted return), the market variability for that

day is eliminated and the data only reflects how the company performed differently than what was expected from the market.

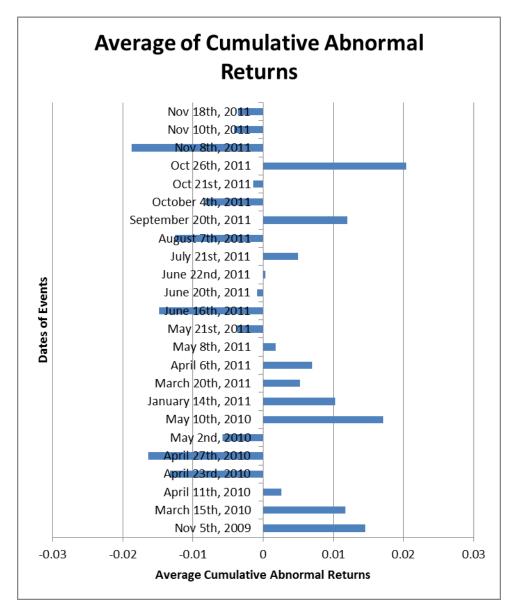
To combine all of this information, the cumulative return for the three day periods was then found. By adding up the abnormal returns for the day before the event, the day of the event and the day after, the study was able to account for all of the fluctuations that could be related to the event. These data were then used to answer the question presented and evaluated in the results section of this paper.

# **Chapter 3: Results**

# I. Eurozone Analysis

The three day abnormal returns were looked at to determine when the stock prices fluctuated. **Figure 1** below shows the cumulative average returns for each date examined.





From this chart we can see that all of the fluctuations fall within the range of -2% to 2%. That is, all of the fluctuations except October 26<sup>th</sup> which falls at about 2.03% which is just above the 2% range.

For this study it was important to separate the events between ones that are positive for the Greek economy and ones that are negative as we did in the hypothesis section of this paper. I first looked at the positive events to determine if they had a positive affect on the companies stock prices. **Table 2** below evaluates the cumulative abnormal returns for each event determined to be positive.

**Table 2: Positive Events Evaluated** 

| Date       | Average Abnormal<br>Return          | Percent Positive<br>Returns |
|------------|-------------------------------------|-----------------------------|
| 5/10/2010  | 1.707%                              | 56%                         |
| 3/20/2011  | 0.520%                              | 55%                         |
| 6/22/2011  | 0.030%                              | 49%                         |
| 7/21/2011  | 0.492%                              | 59%                         |
| 8/7/2011   | -1.255%                             | 33%                         |
| 10/21/2011 | -0.140%                             | 54%                         |
| 10/26/2011 | 2.037%                              | 68%                         |
| 11/10/2011 | -0.417%                             | 49%                         |
| 11/18/2011 | -0.356%                             | 61%                         |
|            | AVERAGE PERCENT<br>POSITIVE RETURNS | 54%                         |

As shown in this chart, there was not a substantial stock price fluctuation represented in the total data. 54% positive returns is not a high enough percentage to suggest an effect on all events. However, the two events with the highest percent of positive returns were event 21 and event 24 at 68% and 61% respectively. These are the only two events that showed a substantial enough of a percentage to justify that the stocks were affected by the event. Event 21 was October 26<sup>th</sup>, 2011 when private investors agreed to accept a loss of 50% on their Greek bonds. Event 24 was November 18<sup>th</sup>, 2011 when Greece announced that its budget deficit would fall in 2012 and that no new austerity measures would be needed. These data show that these were the only two events that affected the stock price of Eurozone companies; all of the other positive

events had an almost neutral or negative affect.

Next, I looked at the returns associated with the events labeled negative. Table 3 below shows the abnormal returns for these events.

**Table 3: Negative Events Evaluated** 

| Date of<br>Events | Average Abnormal<br>Return       | Percent Negative<br>Returns |
|-------------------|----------------------------------|-----------------------------|
| 1. 11/5/2009      | 1.456%                           | 31%                         |
| 2. 3/15/2010      | 1.169%                           | 56%                         |
| 3. 4/11/2010      | 0.260%                           | 28%                         |
| 4. 4/23/2010      | -1.324%                          | 72%                         |
| 5. 4/27/2010      | -1.639%                          | 72%                         |
| 6. 5/2/2010       | -0.580%                          | 72%                         |
| 8. 1/14/2011      | 1.022%                           | 42%                         |
| 10. 4/6/2011      | 0.698%                           | 42%                         |
| 11. 5/8/2011      | 0.178%                           | 50%                         |
| 12. 5/21/2011     | -0.371%                          | 68%                         |
| 13. 6/16/2011     | -1.487%                          | 67%                         |
| 14. 6/20/2011     | -0.083%                          | 51%                         |
| 18. 9/20/2011     | 1.196%                           | 41%                         |
| 19. 10/4/2011     | -0.827%                          | 49%                         |
| 22. 11/8/2011     | -1.872%                          | 66%                         |
|                   | AVERAGE PERCENT NEGATIVE RETURNS | 54%                         |

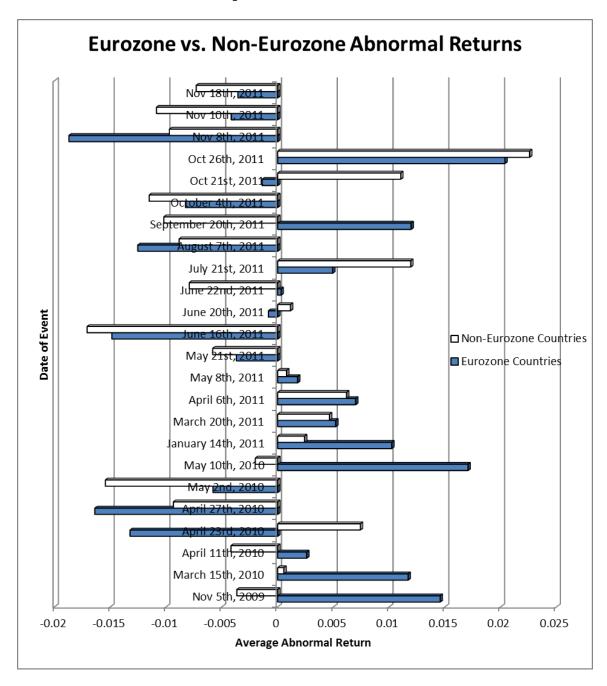
As can be seen, these events produced similar results to the positive event section. When an average of only 54% of the companies had negative returns for the events studied, it is not enough to determine that all of these events affected the Eurozone countries. However there were a few events that had a significant percent of returns being negative. These were events 4, 5, 6, 12, 13 and 22. The events with the three highest percent negative returns of 72% were when Greece officially requested a bailout on April 23<sup>rd</sup>, 2010, when S&P downgraded Greece to BB+, relegating it to junk status

on April 27<sup>th</sup> 2010 and when the IMF and EU agreed to a €110bn rescue package on May 2<sup>nd</sup>, 2010 which was not well received in Greece and was followed by many strikes. The next two events with the highest percent negative returns were when it was announced that economic reform plans for Greece would be delayed on May 21<sup>st</sup>, 2011 and on June 16<sup>th</sup>, 2011 when political turmoil erupted over new austerity measures in Greece. The final event with a 67% of the returns being negative was when it was announced that Greece would be naming a new Prime Minister. The rest of the events in the study did not have a high enough percentage of negative returns to signify that the companies were affected in by these events.

# II. Eurozone vs. Non-Eurozone

The other side of this study involves determining if European countries outside the Eurozone are affected in the same way as countries within the Eurozone. **Figure 2** below is a timeline showing the comparison of the Eurozone countries average abnormal returns and the non-Eurozone country's average abnormal returns.

Figure 2: Timeline of Abnormal Returns for Eurozone Companies vs. Abnormal returns for Non-Eurozone Companies



From this chart it can be seen that in 15 of the 24 events, the Non-Eurozone countries behaved similarly to the Eurozone countries. In the previous section regarding Eurozone countries, it was determined that, among the positive events, event 21 and 24 had the most positive impact on the Eurozone companies. **Table 4** below evaluates how the Non-Eurozone countries behaved for these two events.

**Table 4: Non-Eurozone Companies Abnormal Return for Positive Events** 

| Date           | Average Abnormal<br>Return | Percent Positive<br>Return |
|----------------|----------------------------|----------------------------|
| 21. 10/26/2011 | 2.258%                     | 67%                        |
| 24. 11/18/2011 | -0.731%                    | 67%                        |

It can be seen that the Non-Eurozone companies behaved similarly in these cases to the Eurozone countries.

As determined by the previous section, the negative events 4, 5, 6, 12, 13 and 22 all significantly impacted the Eurozone companies. **Table 5** below evaluates the non-Eurozone countries with these same events.

**Table 5: Non-Eurozone Companies Abnormal Return for Negative Events** 

| Date          | Average Abnormal<br>Return | Percent Negative<br>Return |
|---------------|----------------------------|----------------------------|
| 4. 4/23/2010  | 0.741%                     | 48%                        |
| 5. 4/27/2010  | -0.936%                    | 71%                        |
| 6. 5/2/2010   | -1.545%                    | 81%                        |
| 12. 5/21/2011 | -0.583%                    | 48%                        |
| 13. 6/16/2011 | -1.709%                    | 90%                        |
| 22. 11/8/2011 | -0.971%                    | 62%                        |

From this chart it is determined that events 5, 6 and 13 behaved similarly to the Eurozone companies, but events 4 and 12 did not. These events were when Greece officially requested a bailout and when Greek's economic reform plans were delayed and Papandreou said Greece must avoid debt restructuring and instead continue with budget cuts to resolve the debt crisis.

# **Chapter 4: Conclusion**

This study set out to answer the question: To what extent did specific events in Greece affect businesses headquartered throughout Europe? This paper proved that, while every event did not make an impact, there were certain events that did affect the stock market. A closer look at the data does find which events do have an effect and why these events might have more of an effect than others.

# I. Eurozone

One of the findings showed that all cumulative abnormal returns fell very near the -2% to 2% range. This is a large range of percentages, showing that the economic crisis has been all over the map. At some points the stocks jump, while at other points they fall a similar amount. It is important as a business investor to see that no single event led to the plummeting of a companies stock. It is also important to see that while the stock may go down for one event, it might come back up with the next positive event. The European economy is not stable right now. The next step of this study would be to look into how many positive events and how many negative events there have been to see if they balance each other out. In this study, there happened to be more negative events than positive events, making the overall effect a negative one since there were not enough positive events to counter balance the negative ones. This shows that Europe is still in the middle of this crisis and there is more to come.

It is also important to note that there were events that impacted the Eurozone companies both on the negative and the positive side. When looking at these events, most of them involved actions taken specifically by Greece. Many invovled Greece's reaction through riots or protests, or Greece's old government taking action through new plans, delays of plans or simply requesting a bailout. By knowing which types of information have an impact, a company or its investors can better prepare for what might

happen. For instance, if the Greek government continues to be unstable, and the people of Greece continue to revolt against plans from the IMF or Eurozone Council, then a company can expect many more fluctuations. The stock market had less of a reaction to outside sources creating plans or areas outside of Greece taking action. The market fluctuated the most when Greece showed internal signs of either becoming more stable or destabilizing. That is what is at the heart of this crisis and that is what needs to be fixed in order to restore confidence within Greece.

# II. Eurozone vs. Non-Eurozone

With the overall data showing that the Non-Eurozone companies acted similarly 15 out of the 24 events (or 62.5%), it can be assumed that the Non-Eurozone companies follow similar patterns to the Eurozone companies. When looking at the events that had the most impact on the Eurozone companies, there is an even higher statistic of 5 of the 7 (or ~71.4%) events following the same pattern. Since some countries were opposed to the Euro for fear that it would cause their economy to have a direct stake in the economies of the other Eurozone countries, these are interesting results. The risk still remains that companies within the Eurozone will be affected more if an economy collapses, however it is interesting to see that the countries oustide of the Eurozone do not remain unscathed and are still affected by the crisis. The two events that did not affect the non-Eurozone countries in the same way were Greece's official request for a bailout when Greek's economic reform plans were delayed and Papandreou said Greece must avoid debt restructuring and instead continue with budget cuts to resolve the debt crisis. These two events had a different effect on non-Eurozone countries because they were both initial actions. Since the non-Eurozone countries were not directly involved, they wouldn't have an immediate impact when Greece first requested a bailout, they were affected by later events that stemmed from Greece requesting a bailout. Papandreou

announcing his new plan was not an immediate threat to non-Eurozone countries, but, like the bailout request, also had an affect down the line. Overall, the non-Eurozone countries were generally affected the same as Eurozone countries besides these two exceptions.

# **III.** Further Study

This crisis within Europe is far from being over, so this study could continue for the extenuation of the Greek economic crisis. With the new Prime Minister in affect, it will be interesting to see what kind of Greek governement exists and how the stock market reacts to this government as opposed to how they reacted to the old prime minister. It will also be interesting to see how the people of Greece react to this government and what kinds of events happen. Since there were an uneven number of positive and negative events in this study, the study was unable to determine whether the companies were more affected by positive or negative events. A further study would be needed using the same number of positive and negative events to determine if stock prices of Eurozone countries fluctuated more from good news or bad news. It would also be interesting to take a closer look at non-Eurozone countries and how they are affected. This study only used 21 non-Eurozone countries, and therefore not enough to constitute a full study. But with the results that these 21 companies gave, it would be worthwhile to continue this in a full study.

The hypothesis was proven with some of the events in this study which warrants a closer look into this topic. This study has shown that there are cases where events dealing with the Greek economic crisis have directly affected companies within Europe. It has touched on a few instances when this happens, but it has opened many more questions. Which country had the most companies affected by the events? Did the industry that the company was in play a direct role in whether or not the company was affected? How

were these companies affected by other events invovling Greece or Europe as a whole?

All of the questions addressed in this study and the questions that it raised will be helpful to anyone investing in companies within Europe. It is important to know exactly what your risks are and what to look out for. Through this study, a company or investor can be more informed and prepared for an unknown future within the Greek economic crisis.

# **APPENDIX A Sample of Countries used within the Eurozone**

| Symbol | Name of Company                                   | Country Located |
|--------|---|-----------------|
| ACN    | Accenture plc.                                    | Ireland         |
| AIXG   | Aixtron SE  | Germany         |
| ALKS   | Alkermes plc                                      | Ireland         |
| AMRN   | Amarin Corporation PLC                            | Ireland         |
| ASML   | ASML Holding N.V.                                 | Netherlands     |
| ASPS   | Altisource Portfolio Solutions S.A.               | Luxembourg      |
| BBVA   | Banco Bilbao Viscaya Argentaria S.A.              | Spain           |
| CBI    | Chicago Bridge & Iron Company N.V.                | Netherlands     |
| CCH    | COCA COLA HELLENIC BOTTLING CO                    | Greece          |
| CLB    | Core Laboratories N.V.                            | Netherlands     |
| CPLP   | Capital Product Partners L.P.                     | Greece          |
| CRH    | CRH PLC   | Ireland         |
| CRYP   | CryptoLogic Limited                               | Ireland         |
| DB     | Deutsche Bank AG                                  | Germany         |
|        | Etablissements Delhaize Freres et Cie "Le         | ·               |
| DEG    | Lion" S.A.  | Belgium         |
| EDAP   | EDAP TMS S.A.                                     | France          |
| ESEA   | Euroseas Ltd.                                     | Greece          |
| FLML   | Flamel Technologies S.A.                          | France          |
| FMS    | Fresenius Medical Care Corporation                | Germany         |
| FSR    | Flagstone Reinsurance Holdings S.A.               | Luxembourg      |
| IR     | Ingersoll-Rand plc (Ireland)                      | Ireland         |
| IRE    | Governor and Company of the Bank of Ireland (The) | Ireland         |
| LUX    | Luxottica Group, S.p.A.                           | Italy           |
| MT     | ArcelorMittal                                     | Luxembourg      |
| NEWL   | NewLead Holdings Ltd.                             | Greece          |
| NMAR   | Nautilus Marine Acquisition Corp.                 | Greece          |
| NOK    | Nokia Corporation                                 | Finland         |
| NXPI   | NXP Semiconductors N.V.                           | Netherlands     |
| PHG    | Koninklijke Philips Electronics, N.V.             | Netherlands     |
| RYAAY  | Ryanair Holdings plc                              | Ireland         |
| SAP    | SAP AG  | Germany         |
| SI     | Siemens AG  | Germany         |
| STD    | Banco Santander, S.A.                             | Spain           |
| TOT    | TotalFinaElf, S.A.                                | France          |
| TRNX   | Tornier N.V.                                      | Netherlands     |
| UN     | Unilever NV                                       | Netherlands     |
| VE     | Veolia Environnement                              | France          |
| VELT   | Velti plc   | Ireland         |
|        | Open Joint Stock Company " Vimpel-                |                 |
| VIP    | Communications"                                   | Netherlands     |
| XL     | XL Group plc                                      | Ireland         |
| YNDX   | Yandex N.V.                                       | Netherlands     |

# **APPENDIX B Sample of Countries Used not in the Eurozone**

| Symbol | Name of Company                             | Country Located |
|--------|---|-----------------|
| GOLD   | Randgold Resources Limited                  | Jersey          |
| FWLT   | Foster Wheeler AG.                          | Switzerland     |
| NVO    | Novo Nordisk A/S                            | Denmark         |
| GSK    | GlaxoSmithKline PLC                         | United Kingdom  |
| BTI    | British American Tobacco Industries, p.l.c. | United Kingdom  |
| UL     | Unilever PLC                                | United Kingdom  |
| TRMD   | TORM A/S                                    | Denmark         |
| IHG    | Intercontinental Hotels Group               | United Kingdom  |
| PSO    | Pearson, Plc                                | United Kingdom  |
| STO    | Statoil ASA                                 | Norway          |
| NE     | Noble Corporation                           | Switzerland     |
| WFT    | Weatherford International, Ltd              | Switzerland     |
| BP     | BP p.l.c.                                   | United Kingdom  |
| ACE    | Ace Limited                                 | Switzerland     |
| PUK    | Prudential Public Limited Company           | United Kingdom  |
| SNN    | Smith & Nephew SNATS, Inc.                  | United Kingdom  |
| BT     | BT Group plc                                | United Kingdom  |
| VOD    | Vodafone Group Plc                          | United Kingdom  |
| ERIC   | Ericsson                                    | Sweden          |
| STM    | STMicroelectronics N.V.                     | Switzerland     |
| MGT    | MGT Capital Investments Inc                 | United Kingdom  |

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#### Academic Vita

# Academic Vita of Kelsi Carrick

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