# The Big Oil Spill:

# The Market Value Consequences of the Deepwater Horizon Disaster

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## 1. Introduction

Two and a half years ago the Deepwater Horizon oil rig spewed nearly five million barrels of oil into the Gulf of Mexico, making it the largest accidental oil spill in the history. The spill exceeded the 1989 Exxon Valdez oil spill as the largest ever to originate in waters controlled by the United States and the 1979 Ixtoc I oil spill as the largest spill in the Gulf of Mexico.

On April 20, 2010 the Deepwater Horizon oil rig, an ultra-deepwater offshore drilling rig, exploded in the Gulf of Mexico about 41 miles off the Louisiana coast, killing 11 rig workers and injuring 17 others. The fire burned for 36 hours and the Macondo Prospect leaked approximately 4.9 million barrels of oil before it was closed and sealed almost three months later on July 15. The Deepwater Horizon oil spill is also referred to as the BP oil spill, since BP was the main operator of the Macondo Prospect.

The spill caused extensive damage to the environment and businesses located in the Gulf region, like the fishing and tourism industries. It is inevitable that the companies that are responsible for the oil spill will face financial consequences since they have to indemnify the duped businesses and individuals and have to bear the costs of the cleanup of the spill. A Plaintiff's Steering Committee, a group of attorneys was formed to represent the plaintiffs, which are mostly local businesses and individuals impacted by the spill. The states directly affected by the spill, which are Louisiana, Mississippi, Alabama and Florida opened lawsuits against BP. Roughly 491 miles of coastline in these states was contaminated as a result of the oil spill.

Not to mention the possibility of being fined under several laws established to ensure preservation of the environment. For example, under the Clean Water Act each firm could be fined up to $4,300 per barrel of oil spilled if the government can prove that the oil spill was the result of gross negligence of BP or its partners.

The market value consequences for BP and other responsible companies could therefore be tremendous. It is interesting to study these market value consequences to see how the market reacts to a disaster of this magnitude.

It is also interesting because it can provide a lesson about the market value consequences in case of a similar disaster in the future. We learn what particular events regarding an oil spill are

important for the stock prices of BP and their partners, competitors, suppliers and other oilfield services companies. This provides both the companies itself as its shareholders with the knowledge to determine a plan of action in case of a similar event in the future.

In this research I will identify the companies that are directly involved in the operations regarding the Macondo Prospect and analyze the influence of the costs regarding the oil spill on the market value of these companies.

**Companies directly involved in the Deepwater Horizon disaster**

Before I can formulate relevant research questions I first have to identify the companies that are directly involved in the Deepwater Horizon disaster. I already stated that the Macondo Prospect was operated by BP, which makes BP the most interesting company for my research. However, there are other companies that performed operations in order to establish this oil well. BP leased the Macondo well from Transocean, so we can identify Transocean as the owner of the well. BP only had a 65 percent stake in the Macondo Prospect and we can identify Anadarko Petroleum Corporation and MOEX offshore as the other owners, with a 25 percent and 10 percent stake in the Macondo oil well respectively.

Another company directly involved is Halliburton. They performed a cement job on the well and could be responsible if investigation points out Halliburton delivered a bad job. Finally, there is Cameron International Corporation. This company installed the blowout preventer, which is a large, specialized valve used to seal, control and monitor oil and gas wells. It is a fail-safe device used only when a disaster is about to happen. In case of the Deepwater Horizon disaster this blowout preventer failed to do its job. Transocean, Anadarko Petroleum Corporation, MOEX offshore, Halliburton and Cameron International Corporation will be referred to as the partners of BP in the remainder of this study.

## 2. Research Plan

My main interest is in the returns to shareholders of BP and the partners as well as other companies in the oil industry. Since BP was the main operator of the Macondo Prospect, BP will be the starting point of my research. In the first section of this study I will describe BP as a company. I will discuss its business, the services they provide and in which industries they compete. By analyzing BP's business environment I can identify companies that could be indirectly affected by the oil spill, such as their competitors, suppliers and oilfield services companies.

To understand changes in the returns to shareholders of the affected companies, we first need to understand the magnitude of the economic consequences of the oil spill. Therefore I will investigate the consequences of the deepwater horizon oil spill and reactions of the parties involved, such as BP, the government, the states involved, fishing and tourism industries and other parties who are harmed by the spill. These consequences include environmental damages, litigation, cleanup costs and stricter regulation.

These consequences lead to events that have influence on the market value of BP. To identify the important events, I will compose a timeline of events relating to the Deepwater Horizon disaster. This will provide a structure for my research. Based on this timeline with important events I will event studies to analyze the effect on the shareholders return of BP. Of course this begins with the initial happening of the Deepwater Horizon oil spill in the Gulf of Mexico. Furthermore, the actions that BP undertakes to restore the Gulf of Mexico and the environment affected the returns of BP, since this requires BP to spend billions in cash. The announcement of a civil lawsuit against BP might affect the returns of BP, because this provides the threat that BP has to spend even more cash to pay fines. This timeline of events is given in table 1 and table 2.

By performing event studies I can determine the abnormal returns for BP with respect to the selected events. By analyzing these abnormal returns I can draw conclusions about the effect of the deepwater horizon oil spill on the returns to the shareholders of BP.

After analyzing the market value consequences for BP, I will expand this study by analyzing the market values of the partners, competitors, suppliers and oilfield services companies and the

events that triggered changes in their returns. For example, a moratorium on deepwater drilling could affect the returns of all companies in the oil industry, since this would reduce the drilling activity of these companies and possibly their earnings.

By performing event studies I can also determine the effect of the deepwater horizon disaster on the returns of the operators, competitors, suppliers and the oilfield services companies.

Which companies are included in this research will be made clear in the section where I discuss BP and its business environment.

## 3. BP and its business environment

**BP as a company**

Beyond Petroleum is a British multinational and one of the world's leading international gas companies. Starting as the Anglo-Persian Oil Company in 1908, the company has grown into the third-largest energy company and fourth-largest company in the world measured by 2011 revenues. In 2011 their sales and operating revenues were $375.52 billion and their current market capitalization is $134.38 billion (September 26, 2012). BP is active in every area of the oil and gas industry, including exploration and production, refining, distribution and marketing. BP is also very active in renewable energy, including in bio fuels, hydrogen and wind power. BP is operating in over 70 countries all over the world.

The operations of a huge company like BP are important for the entire economy. In this research I will include important companies related to the operations of BP. This includes the partners of BP, BP's competitors, suppliers, and other Oilfield Services Companies. In this section I will discuss this business environment of BP.

**Competitors**

BP is considered one of the six gas and oil supermajors. The other supermajors are ExxonMobil Corporation, Chevron Corporation, Royal Dutch Shell, Total S.A. and ConocoPhillips. The supermajors are sometimes collectively referred to as "Big Oil". The reason is to describe the economic power of the largest oil and gas producers, and also their influence on politics, particularly in the United States. In table 3 we can see how large these companies are.

**Table 3**

**Revenues and market capitalizations of the supermajors**

In this table the supermajors are ranked based on their revenues in 2011. The market capitalization used is the current market capitalization (September 26, 2012).

| Rank | Company | Revenue | Market Capitalization |
|---|---|---|---|
| **1** | Exxon Mobil | $486.43 | $421.11 |
| **2** | Royal Dutch Shell | $470.17 | $227.18 |
| **3** | BP | $375.52 | $134.38 |
| **4** | Chevron | $253.71 | $228.20 |
| **5** | ConocoPhillips | $251.23 | $69.24 |
| **6** | Total S.A. | $220.42 | $115.10 |

BP has to deal with very strong competitors. Exxon Mobil is the largest company in the world when looking at revenues and Royal Dutch Shell comes in second. Only Apple has a higher market capitalization at the moment with a market capitalization of $623.54 billion (September 26, 2012). However, it is very clear that the oil and gas industry is very important to the world economy.

It is interesting to study the competitors and analyze the effects of the Deepwater Horizon disaster. Their returns could increase, by taking over part of BP's business. But their returns could also decrease. The reason for this could be a damaged image for the oil and gas industry or stricter legislation to improve safety.

**Suppliers**

When dealing with a large company as BP, there is a large probability that events that affect BP also affect companies in their supply chain. BP has approximately 70 suppliers that list BP as one of their customers. There are 9 key suppliers that are dependent on BP for 10 percent or more with respect to their own revenues (Revere Data). This means they get 10 percent or more of their revenues from BP's business. These suppliers are Transocean, Superior Energy Services, Comstock Resources, Parker Drilling Company, Global Geophysical Services, Mistras, Capital Product Partners, Allis Chalmers and Barnwell Industries. These companies can be affected by events that hurt BP, which we can explain by the ripple effect. The ripple effect tells us that reduction in spending of an individual reduces the incomes of others and their ability to spend. Obviously, in this case this means that if BP reduces its spending, the income of their suppliers will also be reduced along with their ability to spend. Especially for the companies above this effect can have a huge impact on their profits, since their revenue depends on BP for at least 10 percent. When the future earnings are expected to decrease this will be discounted on the share price of these suppliers.

**Oil Support Services Companies**

Oil exploration and production is a complicated process. Several techniques are used to detect oil reservoirs, to extract the oil, transportation and refinery of the oil into end products like gasoline and diesel. All of the steps in the oil exploration and production process require the use of specialized technology. Most oil companies don't build the equipment needed to complete all of these complicated and costly tasks themselves. Even Exxon Mobil, which is a vertically integrated giant in the oil business, uses engineering and industrial firms to build and operate the oil rigs, tankers and pipelines. These companies are called oilfield services companies.

We can distinguish several types of oilfield service companies. The first type is the Oilfield Equipment Company. These companies build rigs and supply hardware for rig upgrades and oilfield operations. Cameron Corporation, National Oilwell Varco, FMC Technologies and Oceaneering International are such companies.

The second type is the Oil Exploration and Production Services Contractors. These are

companies that rent drilling rigs to oil and gas companies for both exploration and production. Transocean and Parker Drilling technology are companies that belong to this category.

The last type of Oilfield Service Company I will discuss is the Diversified Oilfield Services Company. These companies provide several oilfield services, which gives them access to multiple markets. Companies in this category are Schlumberger, Halliburton, Baker Hughes and Weatherford International.

Since these Oilfield Services Companies are providing services to other oil and gas companies like Exxon Mobil, Chevron and of course BP, it is very likely that they will also be affected by the Deepwater Horizon disaster. This is possible due to the ripple effect I mentioned earlier or for example due to stricter regulations imposed because of the disaster.

## 4. Consequences of the Deepwater Horizon disaster

In this section I will explain the consequences of the damage done to the environment and to the economy in the Gulf area. First I need to define the Gulf area in order to identify the states that are affected the most by the oil spill. The Gulf of Mexico is located at the southeastern corner of North America. The Gulf is bordered by the United States to the north, which means the Gulf is bordered by the states of Florida, Alabama, Mississippi, Louisiana and Texas.

The explosion of the Deepwater Horizon caused 4.9 million barrels of crude oil to leak into the waters of the Gulf of Mexico. One barrel contains 42 gallons of oil, which is equal to 158.99 liters. This amount of oil spilled is far beyond the natural seepage of crude oil. Natural seepage of crude oil is the natural exposure of the environment to oil. Natural processes can handle the seepage of crude oil that come to surface through cracks and small openings in the soil of the ocean. The amount of oil that seeps naturally into the Gulf of Mexico is approximately 1,300 barrels a day (U.S. National Research Council of the National Academy of Sciences).

Since the oil spill released an enormous amount of oil instantly, the environment is not capable to purge the waters from this crude oil spill. The huge amount of crude oil leaked in to the Gulf of Mexico leads to tar balls and oil slicks. The impact of this oil spill on the economy in the Gulf

States is enormous.

In order to understand the response after the Deepwater Horizon oil spill it is important to look at the environmental and economic consequences of the spill as well as the risk of possible litigation.

**Preservation of the environment by federal laws**

It is more and more important for companies to operate environment friendly and minimize the damage to the environment. The nature of the business of companies operating in the oil and gas industry exposes these companies to the risk of pollution and damage. This pollution and damage affects the reputation of these companies. This reputation is very important, since environment friendly products are preferred by consumers and they are willing to pay a higher price for these green products (Laroche et al. (2001), Oliver (2007)). The preservation of clean water, air and land has become an important factor for both consumers and producers.

There have been many federal laws established to ensure this preservation of the environment. In this specific case the Clean Water Act is an important law that is infringed. This law establishes the basic structure for regulating discharges of pollutants into the waters of the United States and regulating quality standards for surface waters. Under the Clean Water Act each firm could be fined up to $4,300 per barrel of oil spilled if the government can prove that the oil spill was the result of gross negligence of BP or its partners.

Another important law is the Comprehensive Environmental Response, Compensation, and Liability Act. This act is established to insure that the responsible parties or the government remediate the damages to the environment, and compensate the affected parties for the damages to natural resources.

Under the Oil Pollution Act (OPA), harmed individuals and businesses may file claims against the responsible party for economic and property damage.

These three laws are only a few of many that could be used in court to hold BP accountable of paying for the damage done.

**Fishing industry, tourism and real estate**

The Deepwater Horizon oil spill damaged the fishing industry, tourism and real estate prices. It caused these industries to be temporarily shut down or resulted in a strong reduction of business.

The Gulf of Mexico waters produce 73 percent of the United States' domestically harvested shrimp and 59 percent of its oysters, according to the National Marine Fisheries Service. The Gulf Coast is very important to the commercial seafood production. Their production of fish, crab, oysters and shrimps accounts for approximately 18 percent of the total commercial seafood production in the United States.

The fishing industry is directly harmed by the closure of large areas of federal and state waters. At the peak of the closure, 88,522 square miles of all federal waters in the Gulf of Mexico were off-limits to fishing. This is nearly 37 percent of all federal water in the Gulf of Mexico. All of the federal waters in the Gulf of Mexico were open for fishing again as of 19 April 2011. This precautionary measure was introduced to ensure the safety of seafood. Obviously, this affected the supply of seafood in the Gulf area negatively. Moreover, the demand for seafood from the Gulf of Mexico decreased. Buyers were induced to buy products from other regions or imports, resulting in a loss of market share for the Gulf seafood industries. This is both due to a disruption in the seafood supply and a decrease of consumer confidence.

MRops, a marketing research company commissioned by the Louisiana Seafood Promotion Board, conducted a study after the oil spill and showed that 70 percent of the consumers that were questioned expressed some level of concern about the safety of seafood. Moreover, 23 percent of the consumers questioned have reduced their consumption of seafood (The Associated Press). As a result, the consumption of seafood decreased even in areas that were not contaminated. This indicates that the reputation of the Gulf's seafood industry was deteriorated.

The Gulf of Mexico is a very popular vacation destination for travelers. Tourism generates $65 billion annual revenue for businesses in the Gulf Coast, so the damage caused by the Deepwater Horizon oil spill can have a tremendous impact on the economy in the Gulf Coast.

Within the first few weeks after the oil spill a large number of hotel reservations and home rental reservations were canceled. The oil spill scared people off, resulting in a decline of tourism in the Gulf States.

Oxford Economics estimated in a report prepared for the U.S. Travel Association the potential impact of the Gulf oil spill on tourism. They estimated the losses to the Gulf Coast tourism by measuring the duration and scale of negative impacts on tourism of comparable disasters that happened in the past. Their findings were that the BP oil spill would disrupt tourism in the Gulf Coast for a minimum of fifteen months, with a loss of revenues of $7.6 billion. In the worst case scenario this loss could be $22.7 billion.

The oil spill also affected the real estate industry in the Gulf area. The sales of houses in this area decreased, for example in Texas there was a decrease in sales of 25 percent. This is associated with a drop in the real estate prices in this area. There were price decreases of 5 to 15 percent (Clear Capital 2010), scaring people off to invest in a house in the Gulf area. This induces buyers to wait for the house prices to drop even further. An example of the impact on real estate prices is St. Joe Company. This major real estate developer owned several hundred thousand acres in Florida's northwest Panhandle as of March 31, 2010. St. Joe's closing share price was $35.70 on April 20, 2010, but has declined to $20.56 as of October 15, 2010, which means a decrease of 42.4 percent. St. Joe estimated that the Deepwater Horizon oil spill has decreased the total value of real estate between Mobile, Alabama and Clearwater, Florida with $4.32 billion.

**Effect on oil prices**

When an oil spill of this magnitude occurs, it is possible that the oil price is affected. There were 4.9 million barrels leaked and after production processes, a barrel produces 19.5 gallons of gasoline. This means that 95.55 million gallons of gasoline are now unusable. However, the oil spill has not driven up oil prices instantly.

The amount of oil spilled is only a small percentage of the oil produced in the Gulf. Moreover, the Deepwater Horizon oil spill was not producing yet. The Macondo Prospect was an exploratory project, which means that the loss of oil had no effect on current output. Wood

Mackenzie estimated that oil production would decrease by 80,000 barrels per day in 2011 as a result of the oil spill, which is less than 0.1 percent of the world's oil production. The spill only threatens oil supplies if it leads to more restrictions on offshore drilling that would prevent new offshore production from being developed.

After the explosion there was a small increase in the oil price, followed by a steep decrease in May 2010. On May 21, 2010, the price of oil had dropped to $68.03 compared to an oil price of to $86.19 on May 3. The reason for this drop is concerns about the level of oil consumption. The economy in China was slowing down and in Europe a debt crisis prevailed, which decreased the demand for crude oil. Figure 1 shows the oil price between April and June, 2010.

The Obama administration also established oil drilling restrictions. On May 28, 2010, offshore oil drilling restrictions were announced. Two of these restrictions are a ban on all new applications for permits to drill in deep water for at least six months and also work on mobile rigs doing exploratory drilling in deep water is stopped. This last restriction affects approximately 30 rigs. The oil price increased with 4 percent after this drilling restriction, which could depict the impact of the offshore oil drilling restrictions on the oil price. This impact doesn't seem to persist, what can be explained by the fact that this restricting was only detrimental for the 30 rigs in a small area. The effects on global output are therefore not substantially. Only if the restrictions were imposed on a global scale this could threaten oil supplies.

Furthermore it is possible that this increase in the oil price was caused by a statement of China's State Administration of Foreign exchange in which they rejected that the country is reviewing its investment in European bonds. I will discuss this later.

## 5. Response BP

After the oil spill BP has pronounced an ongoing commitment to the Gulf area in the restoration of the environment and the economy. In their response to the Deepwater Horizon oil spill BP has spent billions of dollars in cleanup, compensation, research and restoration of the

environment and economy. According to the BP Sustainability Review 2010, BP has set aside $37.2 billion to cover all costs regarding to the Deepwater Horizon disaster as of Dec. 31, 2010. The company has spent $17.2 billion on its response activities. BP also set up a $20 billion Deepwater Horizon Oil Spill Trust in agreement with the U.S. government. Furthermore BP is committed to making additional payments of $1.25 billion each quarter until the end of 2013. In this section I will discuss the most important response activities by BP and the costs these activities entail for BP.

**Cleanup**

The first priorities of BP were to capture the well and the cleanup of the spill. Immediately after the disaster a major oil spill response was activated. A fleet of response vessels was deployed, equipped with recovery equipment capable of collecting spilled oil in open water. Also a protective boom was used to contain the oil and dispersant for use at sea was used to clean the waters. Approximately 5,000 vessels were used to clean the waters and about 90,000 people have participated in the cleanup. A total of 827,046 barrels were skimmed, which means this amount of oil is separated from the water. Another 265,238 barrels of oil were burned. More than 4,300 miles of shoreline was surveyed, of which 635 miles needed mechanical or manual cleaning. BP has spent approximately $14 billion in cleanup costs. On July 15, the well was finally captured and the leakage of oil was stopped.

**Environment**

BP has been working co-operatively with state and federal agencies to identify and evaluate the environmental impacts of the Deepwater Horizon disaster. They used a Natural Resource Damages (NRD) assessment process to identify the nature and extent of damage to natural resources and the necessary response activities regarding these injuries. As of 31 December 2011, BP had paid more than $600 million for assessment efforts. This is the largest NRD assessment performed under the Oil Pollution Act to date.

The completion of the NRD process can take years to complete, since a huge amount of data must be collected and analyzed. While working with state and federal agencies to determine

what project should be performed to restore the environment, BP has voluntarily committed $1 billion to implement early restoration projects. These projects are designed to facilitate efforts to restore natural resources in the Gulf that were damaged. This makes it possible to start with the restoration of the environment, even before damage claims against BP are settled and BP is required to provide the funding for this restoration by the Oil Pollution Act. More than 150 NRD studies regarding the Deepwater Horizon disaster are initiated since April 2010.

With respect to wildlife in the Gulf area BP and the trustees conducted more than 12,500 bird observational survey sessions from May 2010 to August 2011. They performed an effort to rescue, relocate, rehabilitate and release sea turtles. For example, they set up seven marine mammal and sea turtle rehabilitation centers. Furthermore, BP participates in dolphin health and population assessments and also provides the funds to finance these assessments. BP also provided $22 million to the national fish & wildlife foundation to establish the recovered oil fund for wildlife to support wildlife protection projects.

On May 24, 2010, BP announced a commitment of $500 million over 10 years to create an independent research program designed to create better understanding of the Gulf ecosystem and help the industry and others prevent and mitigate the potential impacts of oil spills in the region and elsewhere. This program, the Gulf of Mexico Research Initiative studies the impact of the oil spill and its associated response on the environment and ecological and human health in the Gulf of Mexico. They also focused on the development of new tools and technology for responding to future spills and improving mitigation and restoration.

**Economy**

In order to restore the level of tourism, BP has granted $87 million to the states of Alabama, Florida, Louisiana and Mississippi to use to promote tourism in 2010. In 2011 BP has committed another $92 million over a three-year period, of which $63.5 million paid in 2011 and the remaining $28.5 million to be paid in 2012 and 2013. The funds BP provided are used to launch tourism campaigns and increase marketing to attract visitors to the Gulf Coast. Furthermore, BP has launched a series of ‘My Gulf’ advertisements in 2011 to promote tourism along the Gulf Coast.

Another mainstay of the Golf Economy besides tourism is the seafood industry. BP supports closely monitoring and testing of seafood in the Gulf area to ensure that the Gulf seafood surpasses the US Food and Drug Administration safety guidelines. Shrimp, crab, finfish and oysters are sampled monthly and tests of federal and state officials show no evidence of contaminated seafood from oil or dispersants that could hurt human health. In 2011, BP has provided $9.3 million for seafood testing, with another $24.2 million to be paid in 2012 and 2013. In addition, BP has provided $7.1 million for seafood marketing in 2011, with another $41.4 million to be paid in 2012 and 2013.

**Claims and payments**

On June 16, 2010, BP agreed to create a $20 billion trust fund over three and a half years to meet obligations arising from the spill. This measure was established to provide confidence that BP would have the funds to compensate claims by the Gulf Coast Claims Facility, final judgments in litigation and litigation settlements, costs and claims by states for natural resource damages. Individuals who were affected by oil spill, like fisheries or tourist agencies, as well as the government and states could file a claim against BP in order to be compensated. This was possible under the Oil Pollution Act and the Comprehensive Environmental Response, Compensation and Liability act mentioned before.

On March 2, 2012 BP and the Plaintiff's Steering Committee agreed to settle their case. The Plaintiff's Steering Committee is a group of lawyers representing the individuals and businesses, who filed a claim against BP. This settlement will cost BP approximately $7.8 billion, including a commitment of $2.3 billion to compensate for economic loss in the seafood industry and to create a fund that supports advertizing to promote tourism in the Gulf Coast. This settlement does not include claims by the states and local governments, nor by the United States Department of Justice or other federal agencies. This will be the focus in the trial against BP on January 14, 2013.

A total of 154,000 claims were registered against BP as of August 1, 2012. The payments to claimants and the states made by BP as of August 1, 2012 were $7.1 billion and $1.3 billion respectively. The payments to the states include claims and settlements, tourism payments,

seafood testing payments, seafood marketing payments and research payments.

## 6. Who is liable for the damage done?

After the Deepwater Horizon disaster a lot of questions have arisen about the companies that should be held responsible for the oil spill. At first, BP has met the costs of the cleanup and compensation alone. On April 21, 2011, BP filed $40 billion worth of lawsuits against rig owner Transocean, cementer Halliburton and blowout-preventer manufacturer Cameron.

Furthermore, BP expected the minority partners of the Macondo well to share in the cleanup costs, compensation costs and pollution fines. Therefore BP filed lawsuits against MOEX offshore, which had a 10 percent stake in the well, and Anadarko Petroleum Co., which had a 25 percent stake in the well. This resulted in months of finger pointing and lawsuits being filed between BP and the other companies. MOEX offshore and Anadarko Petroleum Co. filed a lawsuit against BP because they have suffered economic loss as a result of BP's negligence and a breach of its duties. Also Transocean and Halliburton countersued BP, arguing that their contracts with BP indemnified them. Multiple studies were conducted on the Deepwater Horizon oil spill to identify the cause of the oil spill and designate the responsible parties. The pressure on BP's contractors increased when several studies were publicized that found blame not only with BP, but also on the contractors.

The Presidential Commission, which is a special task force established by the President to perform special research or investigation, reached the conclusion in January 2011, that the oil spill was the result of a number of separate risk factors, oversights and outright mistakes by multiple parties and a number of causes.

Furthermore, The U.S. Bureau of Ocean Energy Management, Regulation and Enforcement published a report on September 14, 2011 after a 17-month investigation, in collaboration with the U.S. Coast Guard Joint Investigation Team. The Coast Guard Joint Investigation Team concluded that BP, Transocean and Halliburton violated a number of safety regulations under the jurisdiction of the Bureau of Ocean Energy Management, Regulation and Enforcement. This report was the foundation for a 15 incident-of non-compliance charges against BP, Transocean

and Halliburton filed by the United States.

Finally, in October 2011, the US Department of Interior issued regulatory violations to BP, Transocean and Halliburton.

Obviously, the pressure on Transocean, Halliburton, Cameron International, MOEX offshore and Anadarko Petroleum Co. to contribute to the cleanup and compensation increased as these reports implied that the contractors responsible for well control and cementing should be held partially responsible for disaster.

As to this date, the lawsuits filed between BP and the other companies have brought some success for BP. The first party to succumb under the pressure of BP and the publicized reports was MOEX offshore. On May 20, 2011 BP announced that it has reached a settlement with MOEX offshore. Under this agreement MOEX offshore will pay BP $1.065 billion and all claims against each other will be dropped.

On October 17, 2011 BP agreed on a settlement with Anadarko Petroleum Corporation. BP would receive $4 billion from Anadarko Petroleum and all lawsuits against each other would be dropped. Anadarko's 25 percent stake in the Macondo well would be transferred to BP.

The last settlement reached with respect to the Deepwater Horizon oil spill is between BP and Cameron International. On December 16, 2011 BP and Cameron International, the designer and manufacturer of the blowout preventer, have agreed a settlement. Under this settlement Cameron will pay BP $250 million.

As part of the agreements BP agreed to indemnify MOEX Offshore, Anadarko Petroleum and Cameron International for compensatory claims regarding the oil spill, except civil, criminal or administrative fines and penalties and claims for punitive damages. With all four agreements it was pronounced that the agreement was not a confession of liability regarding the oil spill.

BP has still not reached settlements with Halliburton and Transocean. Both Halliburton and Transocean persevere that they are indemnified by BP through contracts against the losses regarding the oil spill. Litigation will be necessary in order to provide a solution for these companies.

## 7. Market Value Consequences

In this section the market value consequences of the Deepwater Horizon disaster will be aligned. First, the consequences to the market value of BP will be discussed. Subsequently I will discuss the market value consequences for the partners, competitors, suppliers and oilfield services companies.

### 7.1 Market Value Consequences BP

I will use the American Depositary Receipt of BP traded on the New York Stock Exchange. As shown in Figure 2 and 3, the stock price of BP decreased dramatically in the months following the disaster. Obviously, this is accompanied with a severe loss in the market capitalization of BP.

The closing share price of BP on April 19, 2010 was $59.48 and the market capitalization amounted $186.20 billion. On the day of the disaster, the stock price of BP went up from $59.48 to $60.48, which seems rather strange if we consider the magnitude of the disaster. By the 28$^{th}$ of April the stock price was $57.34, which means only a drop of $2.14, or 3.6 percent, in comparison with the opening stock price on April 20. This relative small price drop still seems lenient with respect to the magnitude of the Deepwater Horizon disaster. The perception of the market regarding the severity of the oil spill and the consequences for BP appeared to change on April 29. On April 29 we see the first severe drop in the share price of $4.78 in just one day, which is equal to 8.3 percent. This large decrease in share price seemed to be the inception of a continuous decline in share price of BP. After a consecutive flow of news and events a low was reached on June 25 and the stock price was plunged to $27.02. At this point, the share price was 54.6 percent lower than the opening price on April 20, meaning a decrease of $101.59 billion in the market capitalization of BP. Following this low, the stock price started to recuperate slowly but it was still fluctuating. The Macondo oil well was capped on July 15. By July 15 the stock price of BP was $38.92, which is 35 percent lower than the opening stock price on April 20, but 44 percent higher compared to its low of $27.02.

**Market response to events**

When we analyze the stock price data of BP we can see severe drops and increases of the stock price on certain days. I will identify the events that triggered these market reactions by performing event studies. The reaction of the market regarding the Deepwater Horizon disaster does not resemble a typical event study, where there is only one explicit event like a merger or earnings announcement. In the case of the Deepwater Horizon disaster, the market responded as if a series of events occurred. The result is a stock price decline of BP that lasted more than two months.

To conduct an event study we need the daily returns of BP and the other affected companies around the event date. For my research I used the Wharton Research Data Services to collect the daily stock returns needed. To acquire the right data I have used the tool CRSP – Daily Extract with Time Window. When acquiring the data I use a window size of 230 trading days before the disaster and 30 trading days after the disaster. The variables I select in the query are: trading days relative to event date, event date, holding period return and value weighted return.

First, to perform an event study the estimation window and the event window have to be specified. I will use an estimation window of 230 days before the disaster until 30 days before the disaster for all the event studies in my research. This means the estimation window for all event studies is May 20, 2009 to March 8, 2010. The estimation window is used to calculate the normal returns. The reason I use this fixed estimation window, is because the market responded as if a series of events occurred and the normal returns shouldn't be influenced by the impact of events regarding the Deepwater Horizon disaster. For example, I don't want the normal returns for an event in June to be contaminated by events happened in April and May.

The event window consists of the day before the event until the day after the event. This means I use an event window of three days. Obviously, the estimation window and the event window should not overlap, because the estimation window is used to calculate the normal returns, which are not influenced by the impact of the event on the returns.

The purpose of an event study is to measure the valuation effects of an event, in this case events regarding the Deepwater Horizon oil spill, by examining the effect of this event on the

stock price. We can do this by calculating the abnormal returns associated with the event. We can calculate the abnormal returns once we have defined a model of normal returns. This market model is a statistical model for calculating returns. I will first explain this model.

The normal returns are calculated by using the market model method and I use the value-weighted returns of CRSP as a benchmark for the market returns. The value-weighted return indices of CRSP contain the daily returns on a value-weighted market portfolio. The normal returns can be defined as the expected return if the event did not occur. For any firm they can be calculated by estimating the market model, defined in the following formula:

$$E(R_{it}) = \hat{\alpha}_i + \hat{\beta}_i R_{m,t} + \varepsilon_{it}$$

$$\text{With} \quad E(\varepsilon_{it}) = 0 \text{ and } \text{var}(\varepsilon_{it}) = \sigma^2_{\varepsilon i}$$

Where $R_{it}$ is the period-t return of firm $i$, $R_{m,t}$ is the period-t return of the market and $\varepsilon_{it}$ is the zero mean disturbance term. The parameters of the market model are represented by $\hat{\alpha}_i$, $\hat{\beta}_i$ and $\sigma^2_{\varepsilon i}$.

After calculating the normal returns with the market model we can calculate the abnormal returns. The abnormal returns are the actual returns minus the expected returns. We assume that the event is exogenous with respect to the change in market value of a security. This means that the abnormal returns reflect the change in returns caused by the event. We can calculate the abnormal returns with the following formula:

$$AR_{it} = R_{it} - \hat{\alpha}_i - \hat{\beta}_i R_{m,t} = R_{it} - E(R_{it})$$

By using the market model the variance of the abnormal return can be reduced by omitting the return that is related to the variation in the market's return. This enhances the ability to find the influence of events on the returns.

Since I use an event window of three days, the abnormal return observations must be aggregated in order to make overall inferences about the influence of a certain event.

Therefore I use the abnormal returns to obtain the accumulated abnormal returns. The following formula defines the cumulative abnormal returns:

$$CAR_{i,\,[-T,T]} = \sum_{t=-T}^{T} AR_{it}$$

The last step is to form a test statistic to determine the significance of the cumulative abnormal returns. The formula for the test statistic is as follows:

$$\text{TS} = \sqrt{N}\ \frac{CAR_{[-T,T]}}{\sqrt{(N-1)^{-1}\Sigma_i\left(CAR_{i,(-T,T]} - CAR_{[-T,T]}\right)^2}} \approx \text{N}(0,1)$$

However, before we can conduct the event studies, it is important to identify the events that had a dramatic effect on the share price of BP.

**Identifying important events with respect to the share price of BP**

In order to preserve clarity I will include only the events that happened within three months after the explosion on April 20. Within this time frame the most important events regarding the oil spill are captured and the short term nature of event studies is retained. This means that all dates mentioned in the events studies are in the year 2010.

**Event 1**

On April 20, the Deepwater Horizon oil rig, an ultra-deepwater offshore drilling rig, exploded in the Gulf of Mexico about 41 miles off the Louisiana coast, killing 11 rig workers and injuring 17 others. The stock price increased with 1.7 percent on the date of the explosion.

**Event 2**

On April 28, the National Oceanic and Atmospheric Administration estimated that the oil leak was approximately 5,000 barrels of oil a day, which is five times larger than initially estimated

by BP. Also, the US Coast Guard designated BP a responsible party under the Oil Pollution Act. This is confirmed in a press briefing from the white house on April 29. The stock price decreased from $57.34 on April 28 to $52.56 on April 29, a decrease of 8.3 percent.

**Event 3**

The Obama Administration issued a moratorium for deepwater drilling on April 30. The next trading day the stock price decreased with 3.8 percent in comparison with the opening stock price on April 30.

**Event 4**

On May 28, President Obama issued a moratorium on deep water offshore oil drilling. Furthermore, the Oilfield Services sector was downgraded by BMO Capital Markets. This last event seems to be the result of the offshore drilling ban, which coincided with a stock drop of oilfield services companies. On May 28, BP's stock price dropped with 5.6 percent.

**Event 5**

On May 29, BP announced that the top kill operation had failed and the flow of oil was still not stopped. On June 1, 2010, the US Attorney General starts a civil and criminal investigation against BP.

On Friday May 28, the closing stock price was $42.95 and the closing stock price on Tuesday June 1 was $36.52, which means a decline in the stock price of no less than 15 percent. The reason I omitted Monday 31 May 2010 is because this day is Memorial Day, therefore this was not a trading day.

**Event 6**

On June 9, investment banker Mathew Simmons predicted that BP would file for bankruptcy by the end of June. This prediction was reinforced by rumors that BP hired a bankruptcy lawyer. The concerns about the ability of BP to pay for the costs relating to the oil spill increased dramatically. There was frenetic trading with nine times the oil company's average daily volume and the stock price dropped 15.8 percent from $34.68 to $29.20 that day. This means that BP is now trading for less than its book value.

**Event 7**

On June 10, the day after the bankruptcy rumors, BP issued a statement saying BP remains a strong company and it will keep the market fully informed of further developments. Furthermore they said that they are generating significant cash flow and have a strong and valuable oil reserve, which will assure BP to survive the response to the spill. The shares closed at $32.78, which means an increase of 12.3 percent that day.

**Event 8**

On June 14, Democratic leaders of the House Energy and Commerce Committee reports that BP made several decisions for economic reasons that increased the possibility of a disaster. Since failure to complete the operation on the well before March 8 would cost BP approximately $533,000 a day, it seems plausible that BP chose for speed instead of the most appropriate options. According to the Financial Times, executives from ExxonMobil, Shell, Chevron and ConocoPhillips are expected to testify on June 15 that the BP spill was preventable. Also, the news reports this day that Barack Obama will press BP executives this week to set up an escrow account in order to pay damage claims by individuals and businesses. BP's stock price closed at $30.67 on June 14, which is 9.7 percent lower than the opening price of $33.97 the same day.

**Event 9**

On June 16, BP cancels dividend payments for the rest of 2010. Also, following a meeting with President Obama BP agrees to create a $20 billion fund over three and a half years to meet obligations arising from the spill.

**Event 10**

On July 6, the stock price of BP increased with 8.7 percent. BP stated that it had no plans to issue new shares to acquire funds to cover for upcoming costs. The issue of new stock would dilute the value of currently existing shares, so this statement was welcomed by the shareholders. Another reason for the increase in stock price is a report suggesting that Libya's sovereign wealth fund may invest in the oil giant. The stock price increased from $31.91 to $33.19.

**Event 11**

In the weekend of 10 and 11 July several published reports suggested that ExxonMobil requested clearance to make a bid for BP worth approximately $150 billion. It was also reported that BP wants sell its stake in the largest oil field of the United States, the Prudhoe Bay project in Alaska. The reason is to acquire more funds for the cleanup of the spill. The stock price went up with 8 percent on July 12, from $34.05 to $36.76.

**Event 12**

On July 15, the well was capped and the release of oil was finally stopped. The stock price increased with 7.6 percent from $36.18 to $38.92.

For all these events I performed events studies and the results are given in table 4.

**Table 4**

**Event study results for BP**

This table shows the results of the event studies performed for BP. An event window of [-1,+1] is used. The market capitalization used is the one on date t-2, with t being the event date.

| Event | Date | CAR | CAR*Market Capitalization in $ billion | t-statistic |
|---|---|---|---|---|
| Event 1 | April 20, 2010 | -0.0075 | -1.41 | -0.51 |
| Event 2 | April 28, 2010 | -0.0872 | -15.81 | -0.85 |
| Event 3 | April 30, 2010 | -0.1379 | -24.75 | -1.49 |
| Event 4 | May 28, 2010 | -0.1374 | -18.24 | -0.96 |
| Event 5 | June 1, 2010 | -0.1678 | -23.84 | -1.41 |
| Event 6 | June 9, 2010 | -0.1266 | -14.57 | -0.58 |
| Event 6* | June 9, 2010 | -0.2196 | -25.28 | -2.49 |
| Event 7 | June 10, 2010 | -0.0306 | -3.32 | -0.14 |
| Event 7** | June 10, 2010 | 0.1233 | 13.39 | 1.96 |
| Event 8 | June 14, 2010 | -0.0667 | -6.84 | -0.58 |
| Event 9 | June 16, 2010 | 0.0106 | 0.58 | 0.57 |
| Event 10 | July 6, 2010 | 0.0957 | 8.80 | 1.22 |
| Event 11 | July 12, 2010 | 0.0675 | 7.13 | 0.76 |
| Event 12 | July 15, 2010 | 0.0394 | 4.56 | 0.42 |

* Event window of [-1,0]

** Event window of [0,+1]

The results show that all of the events had a huge impact on the returns of BP. The results are not statistically significant, but they are economically large. The results are in accordance with the fluctuations in the stock price of BP, meaning that large negative abnormal returns are associated with severe drops in the share price of BP and the large positive abnormal returns are associated with large increases of the share price. This suggests that the events regarding the Deepwater Horizon are responsible for the large fluctuations of BP's stock price.

What strikes is that the abnormal returns around the day of the explosion are very small. A large decrease in share price was expected, but on the day of the explosion the stock price actually increased 1.7 percent, followed by a decrease in share price of only 1 percent the day after.

The large negative abnormal return regarding event 2 is understandable. An increased estimation of the number of barrels spilled a day would increase the costs for BP tremendously, since more oil leakage means BP faces more cleanup costs and BP could be fined up to $4,300 per barrel of oil spilled if it is found guilty to gross negligence under the Clean Water Act. The abnormal change in market capitalization around this date is more than $15 billion.

The events that had an even larger negative impact on the returns were the moratorium on deepwater drilling, the fail of the top kill operation together with the criminal investigation started against BP and the rumors that BP would file for bankruptcy. On June 9, BP's stock dropped with 15.8 percent, meaning a loss of $17.15 billion in market capitalization.

By contrast, the statement in which BP rejected the bankruptcy made the returns recuperate fast from the bankruptcy rumors the day before, with positive abnormal return of over 12 percent (with the event window of [0,+1]), meaning an abnormal increase of $12.66 billion in market capitalization. The statement of BP that it had no plans to issue new shares to acquire funds to cover for upcoming costs increased the returns enormously, with abnormal returns of 9.6 percent. The issue of new stock would dilute the value of currently existing shares, so the shareholders were delighted with this statement. We also see positive abnormal returns after rumors that BP might be taken over or some of its assets may be sold off and the capture of the well, which was expected.

One last remarkable event regarding the stock price was that there was a share price increase

on June 16, the day BP announced a dividend omission. Dividend omission announcements are normally associated with dramatic decreases in the share price (Michaely et al., (1995)). The share price of BP increased with 1.4 percent this day and the abnormal returns were 1.1 percent. We can explain this market reaction because experts expected this dividend omission due to political pressure, since even the Justice Department interfered. Furthermore, the creation of the $20 billion trust fund by BP to secure payments for environmental and economical damages may have been welcomed by investors.

**Market value consequences in the oil industry**

The events discussed above are the cause of the most severe fluctuations in the stock price of BP. However, BP is not the only company that suffered from the Deepwater Horizon disaster. The next sections of this research focus on the market value consequences for the other companies in the oil industry. The categories in which these companies can be divided are partners in the operation of the Macondo oil well, competitors, suppliers and oilfield services companies.

## 7.2 The market value consequences for the partners

BP had five important partners that were involved in the operation of the Macondo oil well. These partners are Transocean, Halliburton, Anadarko Petroleum Corporation, MOEX Offshore and Cameron International. Transocean was the owner of the Deepwater Horizon oil rig. Halliburton was in charge of the cement job on the oil well. BP was not the only company that leased a stake in the Macondo well from Transocean. Anadarko Petroleum Corporation had a 25 percent stake and MOEX Offshore a 10 percent stake in the oil well. Cameron International was the manufacturer of the blow out preventer, which should have prevented a spill of this magnitude but failed instead. Since MOEX offshore is traded only on the Tokyo Stock Exchange, I will not include MOEX Offshore in this study.

Since these companies are directly involved in the Deepwater Horizon oil spill it is likely they suffered consequences in terms of possible claims and a loss of investment. We can analyze the

consequences to the market value by analyzing the market capitalizations of these companies. Figure 4 depicts the changes in the market capitalizations of BP's partners. What strikes is the steep decrease in market capitalization of Transocean, Halliburton and Anadarko Petroleum and Cameron International that starts at the end of April. It is likely that these severe drops in the stock prices of the partners is related to news regarding the last developments about Deepwater Horizon disaster and the proceedings on the well after the spill. This includes news about the oil flow estimation and operations to seal the well, for example. Halliburton and Cameron International reached their low on June 1, with their stock price trading at a price that was 33 percent and 28.9 percent lower than their closing price on April 19, respectively.

Transocean and Anadarko reached their low a week later, on June 9. The stock of Transocean decreased between 20 April and June 9 from $88.29 to $42.58, which is a decrease of 51.8 percent. Anadarko's stock did even slightly worse, with a stock price decrease of 52.5 percent from $73.32 to $34.83. On June 9, the market capitalization lost by these 4 companies together amounted $44.60 billion, which is 43 percent lower than their combined market value prior the disaster. The average decrease in market capitalization at this point was 39.2 percent.

I use the same events as I used for BP to determine the influence of these events on the returns of the partners in the operation of the Macondo well. The results are shown in table 5.

**Table 5**
**Event study results for the partners**

This table shows the results of the event studies performed for BP's partners. An event window of [-1,+1] is used. The CAR shown is the CAR across all partners. The CAR*Market Capitalization is calculated by multiplying the firm specific CAR's with the market capitalization of the corresponding firm and the average of the partners is given in this table. The market capitalization used is the one on date t-2, with t being the event date.

| Event | Date | CAR | Average of CAR*Market Capitalization in $ billion | t-statistic |
|---|---|---|---|---|
| Event 1 | April 20, 2010 | 0.0064 | 0.13 | 0.43 |
| Event 2 | April 28, 2010 | -0.1072 | -2.59 | -4.57 |
| Event 3 | April 30, 2010 | -0.1066 | -2.77 | -6.07 |
| Event 4 | May 28, 2010 | -0.1707 | -3.54 | -7.84 |
| Event 5 | June 1, 2010 | -0.1450 | -3.11 | -4.98 |
| Event 6 | June 9, 2010 | -0.0637 | -1.33 | -1.22 |
| Event 6* | June 9, 2010 | -0.0941 | -1.94 | -1.55 |
| Event 7 | June 10, 2010 | -0.0111 | -0.24 | -0.79 |
| Event 7** | June 10, 2010 | 0.0545 | 1.05 | 1.88 |
| Event 8 | June 14, 2010 | 0.0326 | 0.62 | 1.27 |
| Event 9 | June 16, 2010 | 0.0251 | 0.39 | 0.95 |
| Event 10 | July 6, 2010 | 0.0356 | 0.74 | 1.90 |
| Event 11 | July 12, 2010 | -0.0247 | -0.44 | -1.32 |
| Event 12 | July 15, 2010 | 0.0359 | 0.64 | 7.33 |

* Event window [-1,0]
** Event window [0,+1]

We find large and significant abnormal returns for five events. The cumulative abnormal returns for event 2 are – 10.7 percent and highly significant. This means that the partners are very sensitive to news about the magnitude of the spill. This reaction is comprehensible, since the costs of the cleanup increase with the amount of oil spilled and the operators could be fined up to $4,300 per barrel of oil spilled if they are guilty to gross negligence under the Clean Water Act, just like we noticed for BP.

We also see a 10.7 percent negative cumulative abnormal return for the drilling moratorium. This moratorium reduces the drilling activity of these partners which affects their future

earnings and this is discounted on their stock price.

May 28 was a day with very bad news for the oil industry, since the Obama Administration issued the offshore drilling ban and the oilfield services sector was downgraded by BMO Capital Markets. The abnormal returns are -17.1 percent and we see a dramatic average cumulative abnormal decrease in the market capitalization of the partners of $3.54 billion.

The news that the top kill procedure had failed was even more dramatic for the operators of the well. The abnormal returns regarding this event were – 14.5 percent, which is huge. A part of this abnormal return might be assigned to the fact that a criminal investigation against BP was started, which might have increased pressure on the partners as well. The average decrease in market capitalization on June 1 was -14.5 percent and the four partners together lost a total of $12.43 billion in cumulative abnormal market capitalization.

Also the events regarding the bankruptcy are important for the partners, since a bankruptcy of BP could induce the government to seek action to let the operators pay for a larger share of the costs relating to cleanup and damages. This is reflected in negative cumulative abnormal returns of 9.4 percent when the rumors about a bankruptcy of BP originated and positive cumulative abnormal returns of 5.5 percent when these rumors were denied by BP.

The capture of the well was good news for all operators of the well. This is confirmed by the cumulative abnormal returns of 3.6 percent.

## 7.3 The market value consequences for the competitors

As stated in the section about the business environment of BP, BP is considered one of the six gas and oil supermajors. The other supermajors are ExxonMobil Corporation, Chevron Corporation, ConocoPhillips, Royal Dutch Shell and Total S.A. These companies are considered the competitors of BP. Considering the importance of these companies regarding the world economy it is interesting to analyze the reaction of the market regarding these companies. As Total S.A. and Royal Dutch Shell are European companies I will use their American Depositary Receipts traded on the New York Stock Exchange. Figure 5 shows the changes in the market capitalizations of the competitors of BP. What strikes is that the stock prices of BP's competitors are relatively stable in the first two weeks after the oil spill and then start to drop on May 4, 2010. Furthermore, we see that the drop in share price for the competitors is less severe compared to BP and the operators. We also notice that the stock prices of these five supermajors trend in the same direction.

I will use the same 12 events as I used for BP to detect changes in the market capitalizations of the competitors. The results are presented in table 6.

**Table 6**

**Event study results for the competitors**

This table shows the results of the event studies performed for the competitors of BP. An event window of [-1,+1] is used. The CAR shown is the CAR across all competitors. The CAR*Market Capitalization is calculated by multiplying the firm specific CAR's with the market capitalization of the corresponding firm and the average of the competitors is given in this table. The market capitalization used is the one on date t-2, with t being the event date.

| Event | Date | CAR | Average of CAR*Market Capitalization in $ billion | t-statistic |
|---|---|---|---|---|
| Event 1 | April 20, 2010 | 0.0009 | 0.39 | 0.18 |
| Event 2 | April 28, 2010 | 0.0053 | 0.39 | 0.90 |
| Event 3 | April 30, 2010 | -0.0053 | -1.49 | -0.60 |
| Event 4 | May 28, 2010 | 0.0178 | 1.76 | 2.64 |
| Event 5 | June 1, 2010 | 0.0053 | 0.30 | 1.06 |
| Event 6 | June 9, 2010 | 0.0118 | 1.80 | 1.31 |
| Event 6* | June 9, 2010 | 0.0000 | 0.22 | 0.00 |
| Event 7 | June 10, 2010 | 0.0005 | -0.28 | 0.07 |
| Event 7** | June 10, 2010 | 0.0084 | 1.08 | 2.08 |
| Event 8 | June 14, 2010 | -0.0007 | -0.45 | -0.09 |
| Event 9 | June 16, 2010 | 0.0133 | 1.42 | 2.35 |
| Event 10 | July 6, 2010 | 0.0122 | 1.58 | 4.30 |
| Event 11 | July 12, 2010 | 0.0033 | 0.20 | 0.70 |
| Event 12 | July 15, 2010 | 0.0139 | 1.54 | 2.23 |

* Event window [-1,0]

** Event window [0,+1]

The results show hardly any effects on the return of the competitors. This means that the supermajors are not that sensitive to events regarding the deepwater horizon disaster and large price fluctuations of BP. We see only very small abnormal returns for the drilling moratorium issued on April 30 and there are small positive returns with respect to the offshore drilling moratorium issued on May 28. A possible explanation for this is that the production operations are not affected by the moratorium and the supermajors have a diversified portfolio of projects, which makes them less vulnerable for this offshore drilling moratorium that only

covers a small area compared to the global work area of these companies.

What is remarkable as well is that we don't see any reaction regarding the bankruptcy rumors of BP. Furthermore it seems that the significant cumulative returns for event 9 and 10 are the result of an increasing oil price that was the result of forecasts that the supply of oil decreased in the United States.

The combined market capitalization of the supermajors on July 1 was $690.11 billion compared to a market capitalization of $812.76 on April 20. This means a decrease of 15 percent in total market capitalization, which is almost equal to the average decrease in market capitalization of the supermajors of 16.4 percent. That we can't find any negative abnormal returns for the supermajors, suggests that the market suffered a large decrease in price as well. By July 1, the market was down 14.2 percent compared to April 20. We see that this percentage is almost equal to the decrease in stock price of the supermajors.

The reason is that the stock prices of oil companies depend on macro variables such as the price of oil and economic growth more than it depends on firm specific characteristics. Therefore it is important to look at these macro variables in order to explain changes in stock price that are not the result of the Deepwater Horizon disaster. We already noticed that the stocks of the supermajors started to drop on May 4, 2010. The reason for this plummet of share prices is a resurface of pessimism about the debt crisis in Europe. This in turn led to a stronger dollar, making crude oil more expensive for foreign buyers and investors. The demand for oil decreased and as a result the price of oil dropped. Since the market value of oil companies depends on the oil price, I expect the market values of the competitors to decrease as a result of a drop in the oil price. On May 4, the oil price dropped with 4 percent and the average decrease in market value of the supermajors was 2.9 percent. On May 6 the oil price decreased with 4 percent associated with an average drop in market value of 3.5 percent. By May 25, the oil price had dropped with 24.8 percent compared to the price on May 3. What we see in figure 5 is that the share price of the supermajors dropped with 14.6 percent between May 3 and May 26. This seems to fit with the fact that the average correlation of the supermajors with the oil price is 0.4643, as we can see in table 7.

On May 27 there was an average increase in market values of the supermajors of 5.3 percent,

which was the result of good economic news and a 10 percent increase in the oil price. The oil prices were boosted after the news that China's State Administration of Foreign exchange rejected statements that the country is reviewing its investment in European bonds and a rising oil consumption provided optimism regarding future oil demand.

A summary of the events that influence the returns of the supermajors and the results of the events studies are given in table 8 and 9.

**Table 8**

**Events important to the returns of the competitors of BP**

This table identifies six events that are important to the returns of the competitors of BP. It provides an explanation why their returns are influenced and gives the actual average change in the returns of the competitors of BP.

| | Date | Event |
|---|---|---|
| Event 1 | May 4 | There is a resurface of pessimism about the debt crisis in Europe. This in turn results in a stronger dollar, making crude oil more expensive for foreign buyers and investors. The demand for oil decreased and as a result the price of oil dropped. The average drop in market value of the supermajors is 2.9 percent. |
| Event 2 | May 6 | The value of the euro plunged even more with respect to the dollar. The worries about the debt crisis in Europe are persistent and the oil price drops another 3.5 percent. The market value of the supermajors decreased on average with 3.5 percent. |
| Event 3 | May 10 | The European Union implements a rescue program worth approximately $1 trillion aimed at preventing the Greek debt crisis from spreading to Spain and to protect the euro, stock markets and global recovery. The oil price increased with 2.5 percent. The market capitalizations of the supermajors increased on average with 4.4 percent this day. |
| Event 4 | May 14 | The euro plunged to $1.2355, which is a 19-month low, on renewed worries over the European debt crisis. The market value of the supermajors dropped with 2.1 percent on average. |
| Event 5 | May 20 | German regulators introduced a ban on naked short-selling of European debt, CDSs and 10 primary banking shares. This trading ban imposed by Germany resulted in a new four-year low of the euro, trading against only $1.2146. Considering our previous findings, it is no surprise the oil price decreased with 2 percent on May 20. The result was an average decrease of 3.5 percent in the share prices of the supermajors. |
| Event 6 | May 27 | China's State Administration of Foreign exchange rejected statements that the country is reviewing its investment in European bonds.<br>A rising oil consumption provided optimism regarding future oil demand and the oil price increase with 10 percent. There was an average increase in the share price of the supermajors of 5.3 percent. |

**Table 9**
**Additional event study results for the competitors**

This table shows the results of the additional event studies performed for the competitors of BP on account of the events we identified in table 8. An event window of [-1,+1] is used. The CAR shown is the CAR across all competitors. The CAR*Market Capitalization is calculated by multiplying the firm specific CAR's with the market capitalization of the corresponding firm and the average of the competitors is given in this table. The market capitalization used is the one on date t-2, with t being the event date. The average change in share price shows the average change in share price of the competitors on the event date. This is to show that there was actually an event that caused a severe change in stock price.

| Event | Date | CAR | Average of CAR*Market Capitalization in $ billion | Average change in share price in % | t-statistic |
|---|---|---|---|---|---|
| Event 1 | May 4, 2010 | -0.0196 | -2.30 | -2.9 | -1.99 |
| Event 2 | May 6, 2010 | -0.0030 | 0.01 | -3.5 | -0.47 |
| Event 3 | May 10, 2010 | 0.0022 | 0.22 | 4.4 | 0.41 |
| Event 4 | May 14, 2010 | -0.0034 | -0.18 | -2.1 | -0.75 |
| Event 5 | May 20, 2010 | 0.0133 | 1.41 | -3.5 | 1.17 |
| Event 6 | May 27, 2010 | 0.0051 | 0.47 | 5.3 | 1.15 |

We only find significant results for event 1. For event 1 these cumulative abnormal returns are almost minus 2 percent, mostly assignable to Royal Dutch Shell and Total with cumulative abnormal returns of -4.6 percent and -3.7 percent, respectively. The reason for this severe drop compared to its competitors could be that these companies are based in Europe, so they are likely to be more affected by the debt crisis in Europe.

For May 6, there were no significant cumulative abnormal returns, although the average decrease in market value of the supermajors was 3.5 percent. This is because the entire market plummeted, the S&P 500 decreased with 3.2 percent, whereby the decrease in market value for the supermajors was not abnormal.

What strikes is that despite of an average decrease in the share price of the supermajors of 3.5 percent on May 20, we see positive abnormal returns of 1.3 percent. We can explain this because the market plunged as well. For the S&P 500 we see that it decreased with 3.9 percent on May 20, which is even more than the supermajors. The trading ban imposed by Germany

increased anxiety about increased regulation, which creates more uncertainty for investors. Together with the ailing euro and the decrease in oil price, it is no surprise the stock market plunged as a result of this event.

For event 6 we notice very small cumulative abnormal returns since the entire market had high returns because of optimism regarding the European debt crisis. This was due to China's State Administration of Foreign exchange rejection of statements that the country is reviewing its investment in European bonds a rising oil consumption provided optimism regarding future oil demand. This good economic news and the increase in oil price made the returns of both the supermajors and the market increase, with 5.3 percent and 3.3 percent respectively.

For event 3 and 4 we also find small and insignificant abnormal returns. This means that the returns of the supermajors do not deviate significantly from the market returns.

The findings above are in accordance with the fact that most of the time the stock price of the supermajors and the stock market can be expected to trend in the same direction. As we can see in table 7 is the average correlation of the supermajors with the S&P 500 0.8716. This is also depicted in figure 6. We also perceive a high correlation between the competitors reciprocally. This is because stock prices of oil companies depends on macro variables such as the price of oil and economic growth more than it depends on firm specific characteristics. The oil price is positively correlated with S&P500 index as well. We see a correlation between the S&P500 and the oil price of 0.5251, which is a slightly higher correlation as we perceived for the supermajors and the oil price. An increase in the oil price is associated with economic growth and bright future prospects, which results in increasing share prices. A decreasing oil price on the other hand is associated with worse future economic prospects, which results in lower future earnings forecasts and this has a negative impact on the stock prices.

## 7.4 The market value consequences for the suppliers

There are 9 key suppliers that are dependent on BP for 10 percent or more with respect to their own revenues. This means they get 10 percent or more of their revenues from BP's business. I already identified these companies to be Transocean, Superior Energy Services, Comstock Resources, Parker Drilling Company, Global Geophysical Services, Mistras, Capital Product Partners, Allis Chalmers and Barnwell Industries. Transocean, Global Geophysical Services and Mistras are left out of this group in my research, because Transocean is already in the group of partners and for Global Geophysical Services and Mistras there is a lack of data. Figure 7 shows the changes in the market capitalizations of these suppliers. Again we see no instant market reaction with respect to the stock price. On May 3, the share prices of the six suppliers are on average 7 percent higher than their opening share prices on April 20. On May 4 we see the first steep decrease and between May 4 and May 7 the market capitalizations of these companies drop with 13.8 percent. This seems consistent with the European debt crisis and the decrease in oil price of 24.8 percent we already perceived during this period in the section about the competitors. This is supported by the fact that the average correlation of the suppliers with the oil price is 0.4853, as we see in table 10. By excluding the outlier Barnwell this correlation is even larger with 0.5312.

Since these suppliers are dependent on BP for 10 percent or more with respect to their own revenues, I expect the stock prices of these companies to change with the changes in the stock price of BP as well. This means that the events that influenced the returns of BP are expected to also influence the returns of the suppliers. On July 2, the average drop in share price of the suppliers was 21.6 percent compared to their opening stock price on April 20. Since the market only dropped with 14.4 percent during this period, it is likely that the large drop in share price of the suppliers is indeed partially assignable to events regarding the Deepwater Horizon disaster.

The results of the events studies are shown in table 11.

**Table 11**

**Event study results for the suppliers of BP**

This table shows the results of the event studies performed for the suppliers of BP. An event window of [-1,+1] is used. The CAR shown is the CAR across all suppliers. The CAR*Market Capitalization is calculated by multiplying the firm specific CAR's with the market capitalization of the corresponding firm and the average of the suppliers is given in this table. The market capitalization used is the one on date t-2, with t being the event date.

| Event | Date | CAR | Average of CAR*Market Capitalization in $ million | t-statistic |
|---|---|---|---|---|
| Event 1 | April 20, 2010 | 0.0018 | 3.71 | 0.20 |
| Event 2 | April 28, 2010 | 0.0268 | 32.38 | 1.18 |
| Event 3 | April 30, 2010 | 0.0090 | 18.90 | 0.74 |
| Event 4 | May 28, 2010 | -0.0431 | -37.13 | -2.27 |
| Event 5 | June 1, 2010 | -0.0652 | -44.32 | -2.74 |
| Event 6 | June 9, 2010 | -0.0017 | 4.71 | -0.11 |
| Event 6* | June 9, 2010 | -0.0046 | 8.22 | -0.39 |
| Event 7 | June 10, 2010 | 0.0124 | -5.45 | 0.82 |
| Event 7** | June 10, 2010 | -0.0018 | -12.41 | -0.12 |
| Event 8 | June 14, 2010 | -0.0243 | -20.09 | -1.44 |
| Event 9 | June 16, 2010 | -0.0248 | -11.30 | -2.00 |
| Event 10 | July 6, 2010 | -0.0186 | -6.43 | -0.64 |
| Event 11 | July 12, 2010 | 0.0246 | -8.94 | 0.72 |
| Event 12 | July 15, 2010 | 0.0419 | 40.57 | 1.88 |

* Event window [-1,0]

** Event window [0,+1]

We find large and statistically significant cumulative abnormal returns for events 4, 5 and 9. For event 4, the reason for this large negative cumulative abnormal was the moratorium on deep water offshore oil drilling that was issued. A reinforcing event is that the oilfield services sector was downgraded by BMO Capital Markets, a sector to which these suppliers belong to. This resulted in an average drop of 3.3 percent in the share price of the suppliers.

On June 1, the stock prices of the suppliers decreased with another 6 percent and this is reflected in the cumulative abnormal return of -6.5 percent. This could partially be an

aftereffect of the downgrading of the oilfield services sector. It is also plausible this is the effect of the events hurting BP which are the failure of the top kill operation and the civil and criminal investigation against BP. Large decreases in the stock price of BP could endanger future earnings of the suppliers and this has a negative effect on their share prices.

The negative cumulative abnormal returns regarding event 9 are -2.48 percent. The event on this date was the $20 billion fund BP agreed to create to meet obligations arising from the spill and the canceling of dividend payments by BP. This could have consequences for future earnings of the suppliers, which is reflected in the negative cumulative abnormal return.

What strikes is that we find very small and insignificant cumulative abnormal returns regarding the rumors that BP would file for bankruptcy. The average drop in share price of the suppliers on June 9 was only a paltry 0.05 percent. Considering that their revenues depend strongly on BP the expectation was that a more severe negative cumulative abnormal return would be found for this event. For event 2, 8, 9 and 10 we find substantial cumulative abnormal returns, but they are not statistically significant. The reason that they are not statistically significant across all firms is that each of these events is influenced by one outlier. On April 28, the stock price of Superior Energy Services increased with 12 percent. For event 8, 9 and 10 Allis Chalmers is the outlier with changes in stock price of -15 percent, 18 percent and 11 percent respectively.

For event 11 we find large cumulative abnormal returns for all suppliers that are not significant on a 5 percent confidence level, but we can say that the returns of the suppliers are positively influenced by the capture of the well on a 10 percent confidence level.

Despite that we find some evidence that the returns of the suppliers are affected by the events regarding the Deepwater Horizon disaster, there seems to be influence from the market on the returns as well. Therefore I will perform the same additional event studies as I did for the competitors. The results are shown in table 12.

**Table 12**
**Additional event study results for the suppliers of BP**

This table shows the results of the additional event studies performed for the suppliers of BP on account of the events we identified in table 8. An event window of [-1,+1] is used. The CAR shown is the CAR across all suppliers. The CAR*Market Capitalization is calculated by multiplying the firm specific CAR's with the market capitalization of the corresponding firm and the average of the suppliers is given in this table. The market capitalization used is the one on date t-2, with t being the event date. The average change in share price shows the average change in share price of the suppliers on the event date. This is to show that there was actually an event that caused a severe change in stock price.

| Event | Date | CAR | Average of CAR*Market Capitalization in $ million | Average change in share price | t |
|---|---|---|---|---|---|
| Event 1 | May 4, 2010 | -0.0080 | 10.97 | -4.2 | -0.45 |
| Event 2 | May 6, 2010 | -0.0091 | -3.03 | -4.6 | -0.48 |
| Event 3 | May 10, 2010 | -0.0204 | -22.08 | 6.1 | -1.13 |
| Event 4 | May 14, 2010 | -0.0107 | -1.13 | -1.7 | -0.66 |
| Event 5 | May 20, 2010 | -0.0044 | 9.05 | -6.7 | -0.22 |
| Event 6 | May 27, 2010 | 0.0191 | 2.37 | 5.5 | 1.10 |

We find small and insignificant cumulative abnormal returns. This means that the returns of the suppliers do not deviate significantly from the market returns, although we see very large changes in the stock prices. This means that the share prices of the suppliers are moving with the market and are also sensitive to macro variables such as the price of oil and economic growth. This is supported by the findings in table 10, where see an average correlation with the S&P 500 of 0.6545. The correlation between the suppliers and the S&P500 increases to 0.7214 when we exclude the outlier Barnwell.

Therefore we can assign the decrease in market capitalization after April 20 partially to market developments as the European debt crisis and its influence on the oil price. The returns of the suppliers are thus affected by both the Deepwater Horizon disaster and market developments.

## 7.5 The market value consequences for the oilfield services companies

In the section about the Oil Service companies I have already described what oilfield service companies are and identified several types of service they provide. The companies I will include in my research are Schlumberger, Baker Hughes, Weatherford International, National Oilwell Varco, FMC Technologies and Oceaneering International. These service companies are interesting to analyze, because their market value could be damaged due to stricter legislation or the ripple effect I explained before. The changes in the market capitalizations of these companies are depicted in figure 8. Again we see no instant market reaction regarding the oil spill. On May 3 the share price of the oil service companies is on average 7 percent higher than their opening share prices on April 20. In accordance with our findings about the competitors and the suppliers we see the first severe and persistent drop in share price between May 4 and May 7. The average drop in share price in this short period is 13.8 percent. This presumes that the stock prices of these companies are affected by the decrease in the oil price. Table 13 substantiates this statement, because we can perceive that the stock prices of the oil support services companies have an average correlation of 0.4460 with the oil price.

We also perceive a large drop in the share price of the oil companies between May 28 and June 1. The combined market capitalization of the oilfield services companies decreased from $212.82 billion to $179.45 billion in only 2 trading days. The average decrease in share price was 15.8 percent. By July 1, the average decrease in market capitalization of the oilfield services companies is 19.3 percent compared to April 20. This decrease in market capitalization is partially due to market movements. We can perceive that the stock prices of the oil support service companies follow the same trend as market. Table 13 confirms this as we see an average correlation of the oilfield services companies with the S&P 500 of 0.7770. The high correlation between the oilfield service companies reciprocally also suggests that they are sensitive to the same macro variables. This is also shown in figure 9. The S&P 500 only decreased with 14.2 percent in the period between April 20 and July 1, which seems consistent with the correlation we found.

The decrease in the market capitalizations of the oilfield support services companies was 35.9

percent larger than the decrease of the S&P500. This means it is possible that the oilfield services companies are affected by the events regarding the Deepwater Horizon disaster. To see if the events regarding the Deepwater Horizon disaster also have influence on the stock prices I perform the same 12 event studies for the oilfield services companies as I did for BP. The results are given in table 14.

**Table 14**
**Event study results for the oilfield services companies**

This table shows the results of the event studies performed for the oilfield services companies. An event window of [-1,+1] is used. The CAR shown is the CAR across all oilfield services companies. The CAR*Market Capitalization is calculated by multiplying the firm specific CAR's with the market capitalization of the corresponding firm and the average of the oilfield services companies is given in this table. The market capitalization used is the one on date t-2, with t being the event date.

| Event | Date | CAR | Average of CAR*Market Capitalization in $ billion | t-statistic |
|---|---|---|---|---|
| Event 1 | April 20, 2010 | 0.0180 | 0.46 | 2.04 |
| Event 2 | April 28, 2010 | 0.0059 | 0.21 | 0.43 |
| Event 3 | April 30, 2010 | -0.0110 | -0.24 | -1.97 |
| Event 4 | May 28, 2010 | -0.1440 | -2.54 | -4.95 |
| Event 5 | June 1, 2010 | -0.0881 | -1.23 | -3.32 |
| Event 6 | June 9, 2010 | 0.0321 | 0.66 | 3.38 |
| Event 6* | June 9, 2010 | 0.0067 | 0.16 | 0.68 |
| Event 7 | June 10, 2010 | 0.0273 | 0.53 | 3.28 |
| Event 7** | June 10, 2010 | 0.0188 | 0.41 | 2.12 |
| Event 8 | June 14, 2010 | -0.0015 | -0.21 | -0.25 |
| Event 9 | June 16, 2010 | 0.0112 | 0.21 | 1.44 |
| Event 10 | July 6, 2010 | 0.0218 | 0.19 | 1.96 |
| Event 11 | July 12, 2010 | -0.0361 | -0.70 | -12.22 |
| Event 12 | July 15, 2010 | 0.0283 | 0.47 | 3.86 |

*Event window[-1,0]

**Event window[0,+1]

The drilling moratorium results in small but significant cumulative abnormal returns of -1.1 percent.

For May 28 we see very large cumulative abnormal returns. The reason is that President Obama issued a moratorium on deep water offshore oil drilling. In addition the oilfield services sector was downgraded by BMO Capital Markets. This was a huge disappointed for the oilfield services sector. The average drop in share price for the oilfield services companies was 5.7 percent this day.

On June 1 the share prices plunged even more, with an average decrease of 9.6 percent. This could partially be an aftereffect of the drilling moratorium. It is also possible that this is the effect of the failure of the top kill operation and the civil and criminal investigation against BP, which could damage the confidence in the operations in the oil industry and increase the pressure for stricter regulation.

We see positive cumulative abnormal returns of 3.2 percent for June 9. This doesn't seem related to the bankruptcy rumors of BP. On June 9 the oil price increased with 3.5 percent after a report from the Energy Department showed crude oil inventories declined more than expected. As we already noticed, the stock price of oil companies is related to the price of oil and this provides the explanation for this increase in stock price. Normally we would expect the market to increase because of this large increase in the oil price as well, but that the market did not increase could be a reaction to the bankruptcy of BP. This way we can explain these abnormal returns.

The positive abnormal return for June 10 also does not seem like a reaction to denial of the bankruptcy rumors by BP. An explanation for these positive cumulative abnormal returns is that China reported a 48 percent surge in monthly exports, which was at the same time favorable for the ailing euro. Furthermore, the German court declined to immediately block Germany's contribution to the effort to prevent defaults in the euro zone. The oil price increased with 1.5 percent.

Finally, we also see positive and significant cumulative abnormal returns of 2.83 percent for the capture of the well.

As we already perceived the oilfield services companies are also sensitive to economic news

and changes in the oil price. I have identified severe changes in the stock prices of the oil services companies and the events that caused these large changes are consistent with the events identified for the competitors and suppliers. The results are presented in table 15.

**Table 15**
**Additional event study results for the oilfield services companies**

This table shows the results of the additional event studies performed for the oilfield services companies on account of the events we identified in table 8. An event window of [-1,+1] is used. The CAR shown is the CAR across all oilfield services companies. The CAR*Market Capitalization is calculated by multiplying the firm specific CAR's with the market capitalization of the corresponding firm and the average of the oilfield services companies is given in this table. The market capitalization used is the one on date t-2, with t being the event date. The average change in share price shows the average change in share price of the oilfield services companies on the event date. This is to show that there was actually an event that caused a severe change in stock price.

| Event | Date | CAR | CAR*Market Capitalization in $ billion | Average change in share price in % | t-statistic |
|---|---|---|---|---|---|
| Event 1 | May 4, 2010 | -0.0221 | -0.49 | -4.3 | -2.61 |
| Event 2 | May 6, 2010 | -0.0082 | -0.03 | -4.1 | -1.36 |
| Event 3 | May 10, 2010 | -0.0275 | -0.58 | 6.6 | -2.1 |
| Event 4 | May 14, 2010 | -0.0010 | 0.19 | -3.1 | -0.12 |
| Event 5 | May 20, 2010 | 0.0139 | 0.14 | -5.9 | 1.96 |
| Event 6 | May 27, 2010 | -0.0596 | -1.13 | 3.5 | -2.47 |
| Event 6* | May 27, 2010 | -0.0157 | -0.28 | 3.5 | -1.16 |

*Event window[-1,0]

We see that the oilfield services companies react stronger to the event on May 4 than the market, resulting in significant abnormal returns of -2.2 percent.

Although the average increase in share price on May 10 was 6.62 percent, we still see negative cumulative abnormal returns. The reason for this negative cumulative abnormal return is the negative return of these companies on May 7. The average decrease in share price on May 7 is 4.3 percent, where the decrease in the market price of the S&P 500 is only 1.7 percent. Investors remained bearish about the debt crisis in Europe and oil prices decreased 3 percent on May 7.

Furthermore we see very large and significant cumulative abnormal returns of -5.96 percent for

May 27. The reason for this large cumulative abnormal return is the dramatic price decrease on May 28. We see that when we exclude May 28 from the event study the cumulative abnormal return is only -1.6 percent and not significant anymore.

## 8. The winners

While the Deepwater Horizon disaster has damaged many companies and individuals, there are companies and individuals that have experienced a huge benefit from the oil spill. Among these winners are more than 150 private companies that have been hired by BP to carry out the cleanup. For example, O'Brien's Response Management, a subsidiary of SEACOR Holdings, was the biggest contractor hired by BP to work on the clean-up. The environmental services division of SEACOR Holdings reported more than a 4,000 percent increase in second-quarter profits as a result of the clean-up, with April to June profits increasing from $1.8 million in 2009 to $78.8m million in 2010.

Nalco Holding Company is another good example that the use of dispersants from chemical companies to break up the surface oil can have a huge positive impact on the share price of these companies. On May 3 the shares of Nalco Holding Company increased with 18 percent after the announcement that its dispersant products would be used for the cleanup.

The cleanup was also profitable for areas where cleanup operations are based, such as Louisiana's Plaquemines Parish. State revenue increased by 80 percent as rental properties, hotels, restaurants and other facilities were used by cleanup agents. By contrast, Vermilion Parish in western Louisiana experienced a 45 percent decrease in state revenue in the same period, because their location was close enough to the spill to turn off tourists but too far to play a significant role in the cleanup.

The Deepwater Horizon disaster has enriched many lawyers. Lawyers could file lawsuits against BP, Transocean, Halliburton, or Cameron or any combination of these companies. With a combined market capitalization of approximately $175 billion as of July 15 they are an attractive target. It is no wonder that thousands of lawsuits have been filed against BP. In these large complex lawsuits, with billions of dollars on the line, lawyers can be pointed out as

winners in the Deepwater Horizon Disaster.

Insurance companies are also likely to profit from the oil spill. As a result of the Deepwater Horizon disaster, more firms working offshore will need extra insurance. According to Bryce (2010) insurance costs for offshore drillers will increase with approximately 150 percent. In addition, each company working on a project may be required to get it own coverage, where previously an insurer would agree to cover all companies working on that project. This means that companies drilling offshore will face higher costs in favor of insurance companies.

## 9. Conclusion

The Deepwater Horizon disaster had a tremendous impact on the market capitalizations of BP and its partners. BP is a much smaller company than it was before the accident, having sold $30 billion, or approximately 20 percent, of its assets to pay for cleanup, compensation and lawsuits costs related to the accident. Its current stock price (October 6, 2012) is still approximately 30 percent below where it was before the accident. We already saw that the low for BP was reached on June 25, 2010 with a stock price of $27.02. At this point, the share price was 54.6 percent lower than the opening price on April 20. In the period between 20 April and 25 June, the S&P500 decreased with only 10.1 percent. If we subtract the 10.1 percent decrease of the market from the market capitalization of BP on April 20, we still have a loss of $82.82 billion in market capitalization of BP, which can't be explained by market movements.

On July 15, the day of the capture of the well, the market value of BP has recuperated somewhat from its low and the share price was 34.6 percent lower compared to the opening share price on April 20. The S&P 500 dropped 8.4 percent with respect to the opening price on April 20. This means that by July 15, there was a decrease of $48.62 billion in BP's market capitalization, which couldn't be explained by market movements. From table 16 we can infer that the stock price decrease of BP was not due to decreases in the oil price. The correlation between BP and the oil price was a paltry 0.0021, which means BP's share price was not sensitive to changes in the oil price.

We saw that in the BP Sustainability Review 2010 that BP spent $17.2 billion on its response

activities. BP also set up a $20 billion Deepwater Horizon Oil Spill Trust in agreement with the U.S. government to be used to pay for claims and fines. This means BP has set aside billion to cover all costs regarding to the Deepwater Horizon disaster as of Dec. 31, 2010. This $37.2 billion explains a large part of the $48.62 billion market value of BP that was destroyed. The other part could be assigned to reputational losses or lower future earnings as the result of selling off their assets to pay for the cleanup, compensation and litigation.

We can conclude that the deepwater horizon disaster had a tremendous impact on the returns of BP, destroying not less than $82.82 billion of BP's market capitalization at its low and $48.62 billion by the day the well was finally capped.

For the partners we noticed that on June 9 the combined market capitalization was only $59.61 billion, which was the lowest market capitalization within a timeframe of April 20 and July 15. Compared to the combined opening market capitalization on April 20 of $104.22, this means a decrease of 43 percent, i.e. a decrease of $44.60 in market capitalization. The average decrease in market capitalization at this point was 39.2 percent. That this wasn't only the result of the decreasing oil price is clear in table 17. We only see an average correlation of the share price of the partners with the oil price of 0.2481.

By July 15, the stocks of the operators recovered a part of the lost value, but they were still down with 25.9 percent on average compared to April 20. The total market capitalization lost by the partners was $28.41 billion at this point. This was mostly assignable to Transocean and Anadarko, who were down with 38 percent and 33 percent respectively. These two companies accounted for $22.98 billion of the $28.41 loss in market capitalization. Halliburton and Cameron lost 11 percent and 21 percent of their market capitalization. This difference can be explained by the fact that Transocean and Anadarko were the owners of the well and therefore they were impacted to a greater extent by the disaster.

The market was down 8.5 percent compared to April 20, meaning that a loss of $19.61 billion remains that can't be explained by market movements.

This means that the events regarding the Deepwater Horizon disaster had a huge impact on the returns of the partners, however in a lesser extent to Halliburton. This seems logical, since BP and the partners on the well were all responsible for operations on the well and had to suffer

the consequences of their actions. Furthermore was the explosion of the Macondo Prospect a big loss of investment for Transocean and Anadarko Petroleum.

For the competitors we found that their stock prices were not sensitive to events regarding the Deepwater Horizon disaster. Their stock prices depend on macro variables such as the price of oil and economic growth, therefore they move in the same direction as the market. This is supported by the findings that the stock prices of the supermajors are highly correlated with the S&P 500, as we found an average correlation of the supermajors with the S&P 500 of 0.8716. We also found that the correlation of the supermajors with the oil price was on average 0.4605.

However, in the long run the competitors could benefit from the disaster. The more BP suffers financially and their image deteriorates, the harder it gets for BP to close lucrative contracts in OPEC countries, build refineries or find partners to operate with. This would be beneficial for their competitors. This is speculation however and this should already be reflected in today's stock price if this was expected to happen.

For the suppliers of BP we found that the returns are affected by both the Deepwater Horizon disaster and market developments. Their stock prices are thus also sensitive to macro variables such as the price of oil and economic growth. We found significant abnormal returns for the events on May 28, June 1 and June 16. Furthermore we found that on July 2, the average drop in share price of the suppliers was 21.6 percent compared to their opening stock price on April 20. Since the market only dropped with 14.4 percent during this period, we can conclude that the large drop in share price of the suppliers is indeed partially assignable to events regarding the Deepwater Horizon disaster.

By July 1, the average decrease in market capitalization of the oilfield services companies is 19.3 percent compared to April 20. The S&P 500 only decreased with 14.2 percent in this period. As we already perceived the oilfield services companies are also sensitive to economic news and changes in the oil price, which explains a large part of the decrease in market capitalization. The difference between the oilfield services companies and the S&P 500 can partially be explained by the fact that the oilfield services sector was downgraded by BMO Capital Markets. This was the result of a moratorium on deep water offshore oil drilling issued by the Obama

Administration. The oilfield services companies were thus heavily impacted by the drilling ban, but the other events seemed of little importance with respect to their share prices.

We learn from this study that the costs of the Deepwater Horizon disaster are defrayed not only by BP and its partners but also by the supply chain of BP. This is an example of the information transfer effect. The oilfield services companies were affected in particular by the drilling moratorium. The competitors of BP are hardly affected by the oil spill, making these companies a relative safe investment during a disaster when they are not directly involved. We also learned that the market may not always respond immediately to a disaster, since it took nine days before we perceived the first large decrease in the stock price of BP and its partners. When the consequences of the disaster were finally recognized by investors they reacted rationally by massively selling their shares. This rational behavior and the events that happened resulted in a stock price decrease that was persistent for two months, so this could be a lesson for shareholders not to underestimate the consequences of a disaster of this magnitude in the first place.

Furthermore this study has shown what particular events regarding an oil spill are important for the stock prices of BP and their partners, competitors, suppliers and other oilfield services companies. This provides both the companies itself as its shareholders with the knowledge to determine a plan of action in case of a similar disaster.

One limitation of this study is that it is hard to make a good comparison across the oil companies. The companies vary for example in size, vertical integration and geographical markets. Furthermore they might have a different product portfolio mix in order to diversify their revenues. This can explain differences in the market value consequences of the oil spill across oil companies.

Another limitation is that this research only focuses on BP and its direct business environment. The consequences of the oil spill are spread to fisheries and the tourism industry and presumably to banks in the Gulf region for example. It would be too extensive to include this in this study, but it provides opportunities for further research.

Therefore it would be interesting for future research to expand this study to the market value consequences for fisheries and the tourism industry. Since banks in the Gulf region depend on

the revenues in this region they could be interesting to study as well. Furthermore it is possible to have a closer look at the market value consequences for oil companies that are Permian based or based in the Middle East for example. It is possible that they have experienced a benefit from the disaster by taking over a part of the oil business from the Gulf region.

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## 11. Appendix

**Table 1: Timeline of events prior the blowout**

This table shows a timeline of events that occurred prior the blowout. These events include the proceedings in order to complete the well.

| Date | Event |
|---|---|
| December, 1998 | Constructing of the Deepwater Horizon oil rig begins by Hyundai Heavy Industries in Ulsan, South Korea. |
| February, 2001 | The rig is delivered and valued at more than $560m. |
| February 15, 2010 | Deepwater Horizon drilling rig begins drilling on the Macondo Prospect, aiming to drill a well 18,000ft below sea level. |
| March 8, 2010 | Target date for the completion of the Macondo well. Not completing the well will cost BP approximately $533,000 a day. |
| April 1, 2010 | BP is warned by Halliburton that BP's use of cement was against their best practices. |
| April 6, 2010 | BP receives a permit from MMS for the Macondo well with the following note: "Exercise caution while drilling due to indications of shallow gas and possible water flow" |
| April 9, 2010 | The last section is drilled with a wellbore 18,360 feet below sea level. However the last 1,192 feet need casing. Halliburton recommends BP liner casing that will provide four redundant barriers to flow. BP ignores this recommendation and chooses a single liner with fewer barriers, because it is faster and cheaper. |
| April 15, 2010 | BP ignores Halliburton advice to use 21 centralizers and uses 6 instead. They also ignore recommendations to circulating the drilling mud from the bottom of the well all the way up to the surface to remove air pockets and debris, which can contaminate the cement. BP cycles only 261 barrels of mud, which is a fraction of the total mud used in the well.<br><br>BP files a request for a permit to revise its plan to deal with a blockage. Company officials apologize to federal regulators for inadvertently failing to include the type of casing they were using earlier. The MMS approves an altered permit for BP to use a single liner with fewer barriers. |
| April 17, 2010 | The drilling is completed and the well is being prepared to be cemented. A test shows the blowout preventer to be functional. According to Gagliano using only 6 centralizers would likely produce channeling and a failure of the cement job. |
| April 18, 2010 | A report by Halliburton executive Jesse Gagliano says the well is considered to have a severe gas flow problem. |

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|---|---|
| | Schlumberger Limited deploys a crew to conduct a cement bond log to determine whether the cement has bonded to the casing and surrounding formations. |
| April 19, 2010 | Halliburton completes cementing of the final production casing string |
| **April 20, 2010 7 am** | BP decides to cancel a recommended cement bond log test. Performing the test would have taken between 9 and 12 hours and the costs would have been $128,000. This saves BP $118,000, since by canceling the cement bond log test BP only had to pay $10,000.<br>BP officials gather on the platform to celebrate seven years without an injury on the rig. |
| **9:45 pm CDT** | **The Deepwater Horizon oil rig explodes and the rig is on fire. 11 of the 126 crew members are missing and 17 crew members are injured.** |

**Table 2: Timeline of events after the blowout**

This table shows a timeline of events that occurred after the blowout. These events include inter alia news about oil drilling restrictions, response activities and litigation.

| Date | Event |
|---|---|
| April 28, 2010 | The US Coast Guard designated BP a responsible party under the Oil Pollution Act. |
| April 30, 2010 | A moratorium for deepwater drilling is issued by the Obama Administration |
| May 24, 2010 | BP commits $500 million to Gulf of Mexico Research Initiative to study the impact of the spill and the response of the environment |
| May 27, 2010 | May 27 Obama announces a six-month moratorium on new deepwater oil drilling permits in 500 feet of water or more |
| May 29, 2010 | BP announced that the top kill operation failed and the flow of oil was not stopped, despite 30,000 barrels of heavy mud being pumped into the well. |
| June 1, 2010 | The US Attorney General starts a civil and criminal investigation against BP. |
| June 9, 2010 | Investment banker Mathew Simmons predicted that BP would file for bankruptcy by the end of June. The concerns about the ability of BP to pay for the costs relating to the oil spill increase. The Obama Administration threatens to impose additional penalties to BP and the Justice Department is looking into BP dividends. |
| June 10, 2010 | BP issued a statement rejecting the rumors about a possible bankruptcy. |

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|---|---|
| June 14, 2010 | Democratic leaders of the House Energy and Commerce Committee say BP made several decisions for economic reasons that increased the possibility of a disaster. The Financial Times reports that executives from ExxonMobil, Shell, Chevron and ConocoPhillips are expected to testify on June 15 that the BP spill was preventable. |
| June 16, 2010 | Following a meeting with President Obama, BP agrees to create a $20 billion fund over three and a half years to meet obligations arising from the spill. BP cancels dividend payments for the rest of 2010. |
| June 23, 2010 | BP establishes the Gulf Coast Restoration Organization, including clean up, communicating with the public and public officials and implementing the compensation fund. |
| July 6, 2010 | BP stated that it had no plans to issue new shares to acquire funds to cover for upcoming costs. Rumors arise that Libya's sovereign wealth fund may invest in BP. |
| July 15, 2010 | The well is capped after releasing approximately 4.9 million barrels of crude oil. |
| July 27, 2010 | BP announces it has taken a $32.2 billion pre-tax charge for the spill, including the $20bn claims fund, and will sell up to $30bn worth of assets as part of prudent approach to managing its finances. |
| December 15, 2010 | The federal government is suing BP, Transocean and Anadarko. The reason is to have them pay for the massive expenses involved in the cleanup and environmental recovery from the spill. |
| April 21, 2011 | BP filed $40bn worth of lawsuits against rig owner Transocean, cementer Halliburton and blowout-preventer manufacturer Cameron. |
| May 20, 2011 | BP announced that it has reached a settlement with MOEX offshore. Under this agreement MOEX offshore will pay BP $1.065 billion |
| June 20, 2011 | Anadarko Petroleum Corporation agrees to pay BP $4 billion and the two companies settled all claims between them. Anadarko relinquished its 25 percent stake in the Macondo well to BP and in return BP will indemnify Anadarko for damage claims arising under the Oil Pollution Act. |
| December 16, 2011 | Cameron International agreed to pay a $250 million settlement to BP PLC to settle all claims related to the Deepwater Horizon with neither party admitting responsibility. |
| March 2, 2012 | BP and the lawyers for plaintiffs in the trial over the 2010 oil spill agreed to settle their case. This settlement will cost BP approximately $7.8 billion.<br>The government and states will pursue their claims against companies involved |

| | |
|---|---|
| April 18, 2012<br><br>May 3, 2012 | BP has finalized the settlement with Plaintiff's Steering Committee.<br><br>The BP Gulf Spill Trial is postponed until 14 January 2013. This trial will determine who is to blame for the damage done and costs could total tens of billions of dollars. |

**Figure 1: Crude Oil Price**

This figure shows the price of crude oil during the period April – June, 2010.

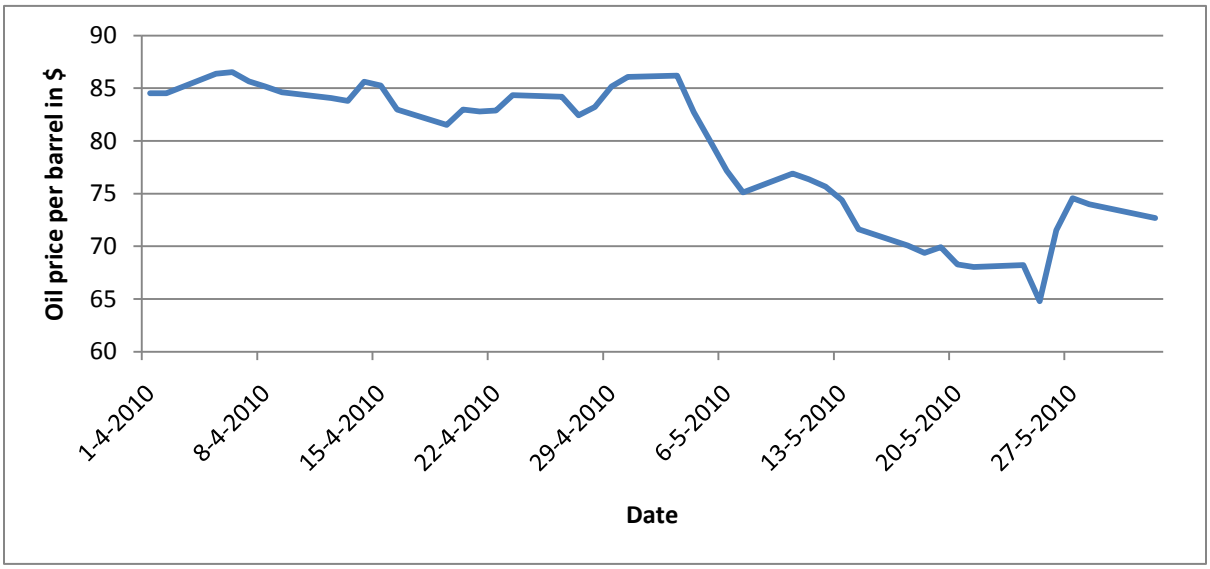


**Figure 2: The stock price of BP**

This figure depicts the stock price of BP in the period April 1 - July 20, 2010. The data is retrieved from Datastream.

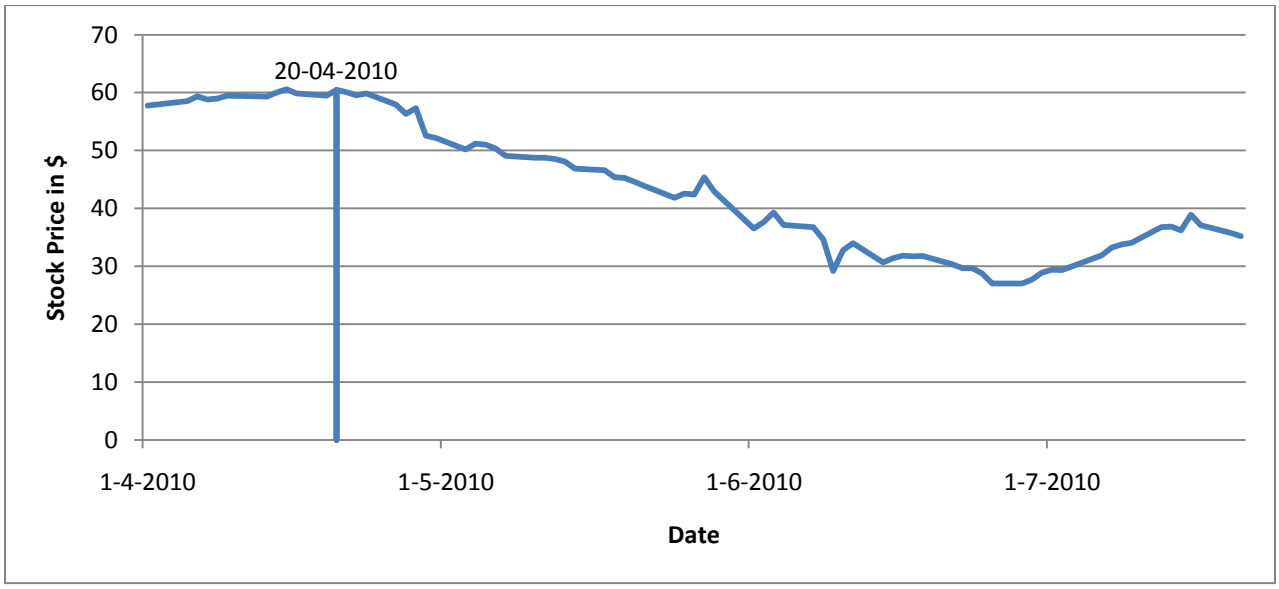

**Figure 3: The market capitalization of BP**

This figure depicts the market capitalization of BP in the period April 1 - July 20. The data is retrieved from Datastream.

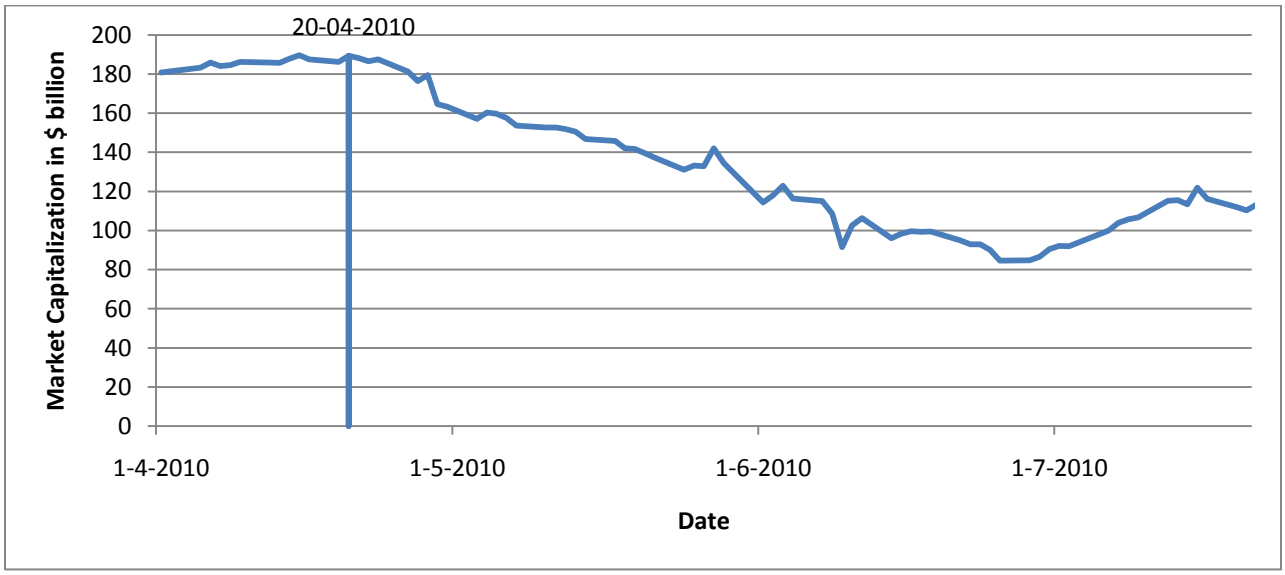


**Figure 4: Changes in the market capitalizations of BP's partners**

This figure shows the changes in the market capitalizations of BP's partners in the period April 1 – July 20. The closing market capitalization on April 19 represents the 100% index level. The data is retrieved from Datastream.

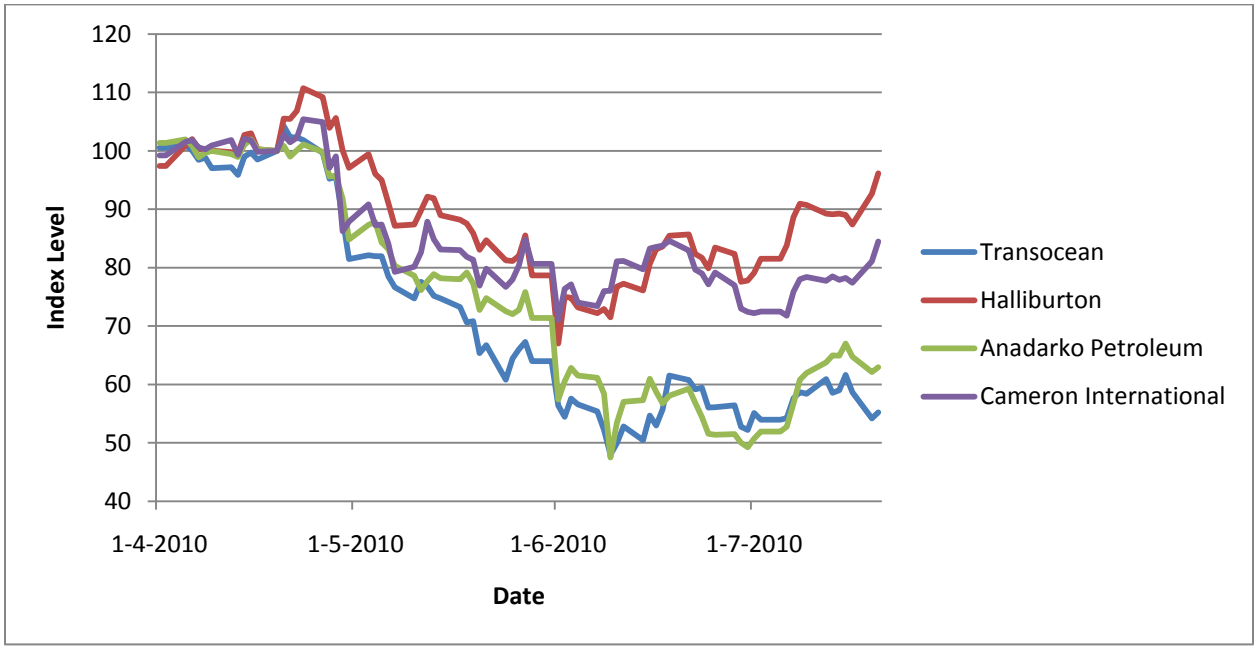

**Figure 5: Changes in the market capitalizations of BP's competitors**

This figure shows the changes in the market capitalizations of BP's competitors in the period April 1 – July 20. The closing market capitalization on April 19 represents the 100% index level. The data is retrieved from Datastream.

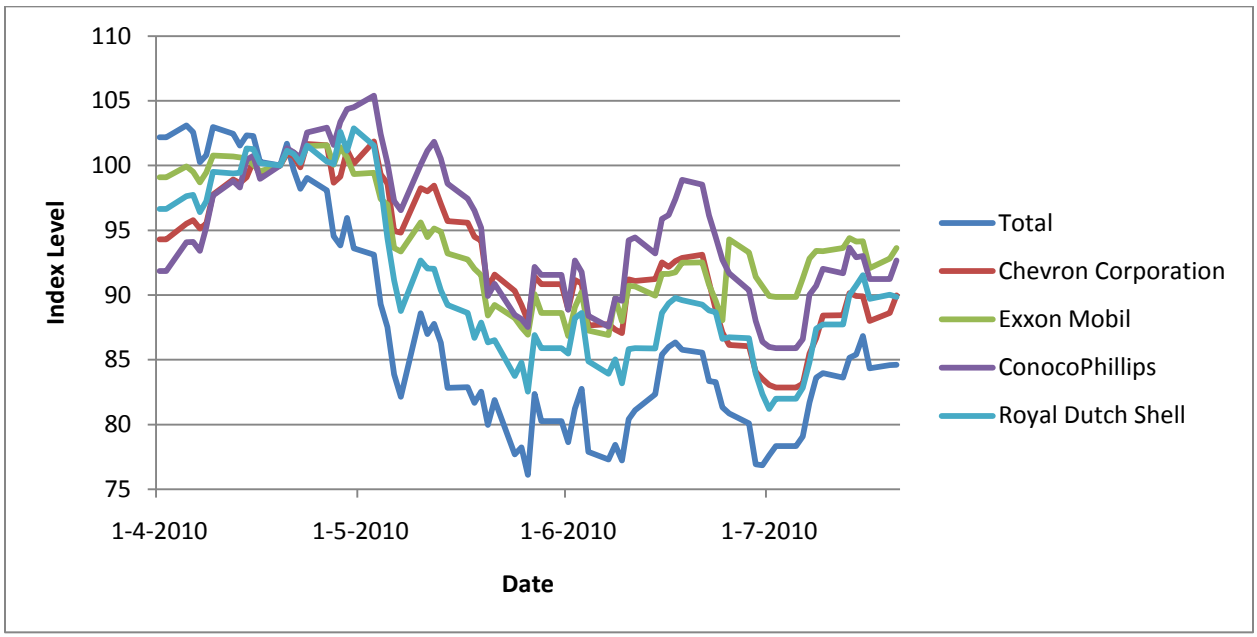


**Figure 6: The supermajors follow the market trend**

This figure shows that the competitors of BP trend in the same direction as the market, which is represented by the S&P 500, in the period April 1 – July 15. The closing market capitalization on April 19 represents the 100% index level. The data is retrieved from Datastream.

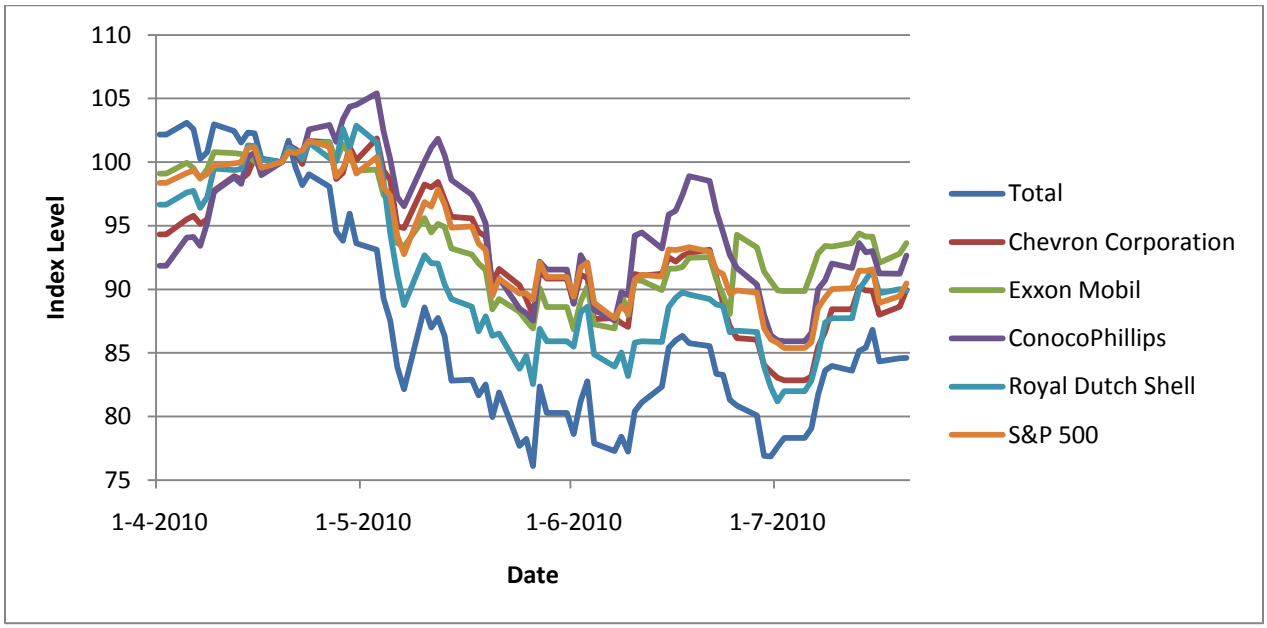

**Table 7: Correlation of the supermajors with S&P500 and Oil Price**

This table shows the correlation between the competitors of BP and the S&P 500 in the period April 20 – July 15. It also shows the correlation between the competitors and the oil price and the correlation between the competitors reciprocally.

| | Total | Chevron | Exxon | Conoco | RDS | S&P 500 | Oil |
|---|---|---|---|---|---|---|---|
| **Total** | 1 | 0.8379 | 0.8198 | 0.8036 | 0.8279 | 0.8965 | 0.4425 |
| **Chevron** | 0.8379 | 1 | 0.8361 | 0.9038 | 0.7168 | 0.9119 | 0.5014 |
| **Exxon Mobil** | 0.8198 | 0.8361 | 1 | 0.8863 | 0.7599 | 0.8705 | 0.4457 |
| **ConocoPhillips** | 0.8036 | 0.9038 | 0.8863 | 1 | 0.7851 | 0.8984 | 0.4959 |
| **Royal Dutch Shell** | 0.8279 | 0.7168 | 0.7599 | 0.7851 | 1 | 0.7808 | 0.4168 |
| **S&P 500** | 0.8965 | 0.9119 | 0.8705 | 0.8984 | 0.7808 | 1 | 0.5251 |
| **Oil Price** | 0.4425 | 0.5014 | 0.4457 | 0.4959 | 0.4168 | 0.5251 | 1 |

**Figure 7: Changes in the market capitalizations of BP's suppliers**

This figure shows the changes in the market capitalizations of BP's suppliers in the period April 1 – July 20. The closing market capitalization on April 19 represents the 100% index level. The data is retrieved from Datastream.

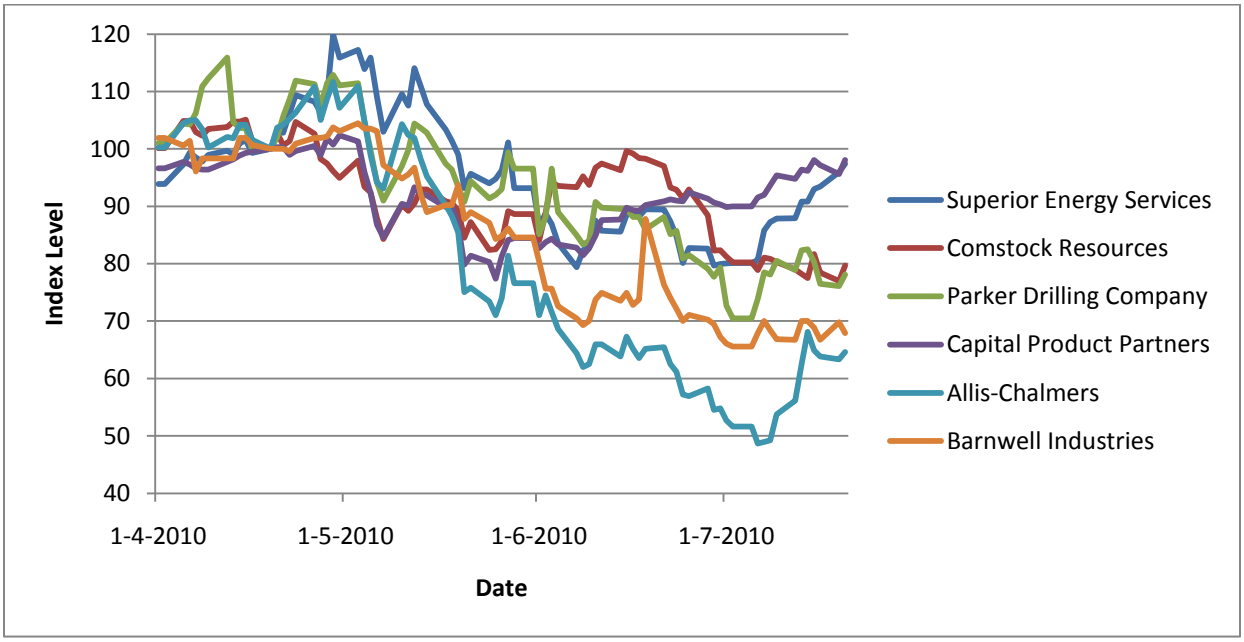

**Table 10: Correlation of the suppliers with S&P500 and Oil Price**

This table shows the correlation between the suppliers of BP and the S&P 500 in the period April 20 – July 15. It also shows the correlation between the suppliers and the oil price and the correlation between the suppliers reciprocally.

| | Superior | Comstock | Parker | Capital | Allis-C | Barnwell | S&P 500 | Oil Price |
|---|---|---|---|---|---|---|---|---|
| **Superior Energy** | 1 | 0.5769 | 0.6340 | 0.5208 | 0.6416 | 0.3426 | 0.8013 | 0.5171 |
| **Comstock Resources** | 0.5769 | 1 | 0.6193 | 0.6036 | 0.4796 | 0.1506 | 0.7413 | 0.4562 |
| **Parker Drilling** | 0.6340 | 0.6193 | 1 | 0.5708 | 0.5899 | 0.2066 | 0.6971 | 0.5292 |
| **Capital Product** | 0.5208 | 0.6036 | 0.5708 | 1 | 0.6197 | 0.2294 | 0.6444 | 0.6230 |
| **Allis-Chalmers** | 0.6416 | 0.4796 | 0.5899 | 0.6197 | 1 | 0.2827 | 0.7229 | 0.5306 |
| **Barnwell** | 0.3426 | 0.1506 | 0.2066 | 0.2294 | 0.2827 | 1 | 0.3197 | 0.2554 |
| **S&P 500** | 0.8013 | 0.7413 | 0.6971 | 0.6444 | 0.7229 | 0.3197 | 1 | 0.5251 |
| **Oil Price** | 0.5171 | 0.4562 | 0.5292 | 0.6230 | 0.5306 | 0.2554 | 0.5251 | 1 |

**Figure 8: Changes in the market capitalizations of the oilfield services companies**

This figure shows the changes in the market capitalizations of the oilfield services companies in the period April 1 – July 20. The closing market capitalization on April 19 represents the 100% index level. The data is retrieved from Datastream.

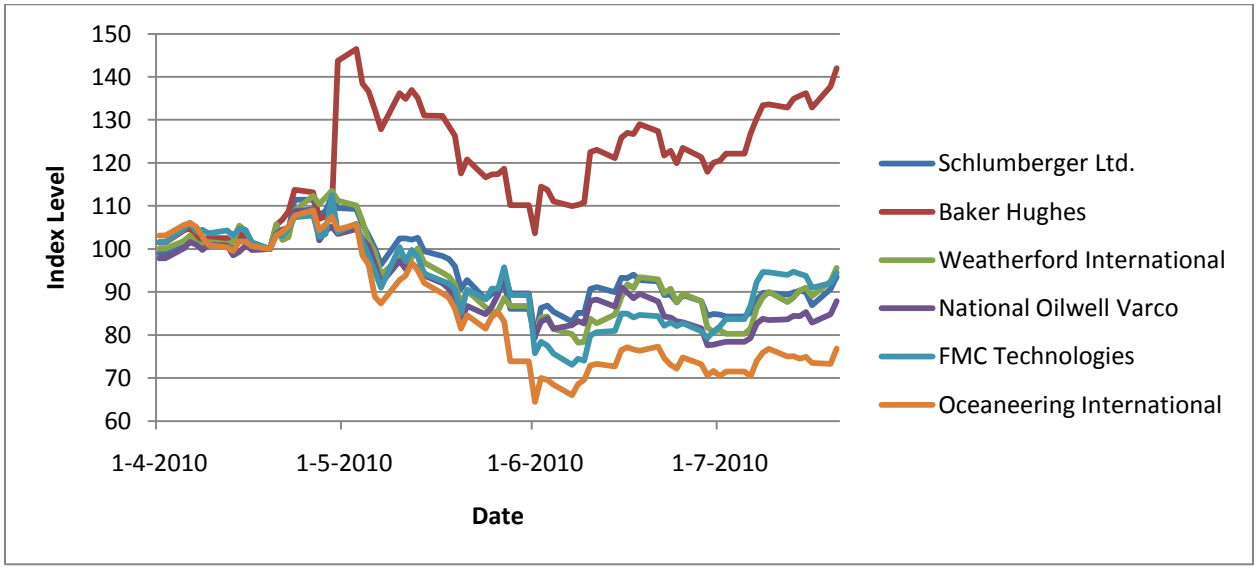

**Figure 9: The oilfield services companies follow the market trend**

This figure shows that the oilfield services companies trend in the same direction as the market, which is represented by the S&P 500. The closing market capitalization on April 19 represents the 100% index level. The data is retrieved from Datastream.

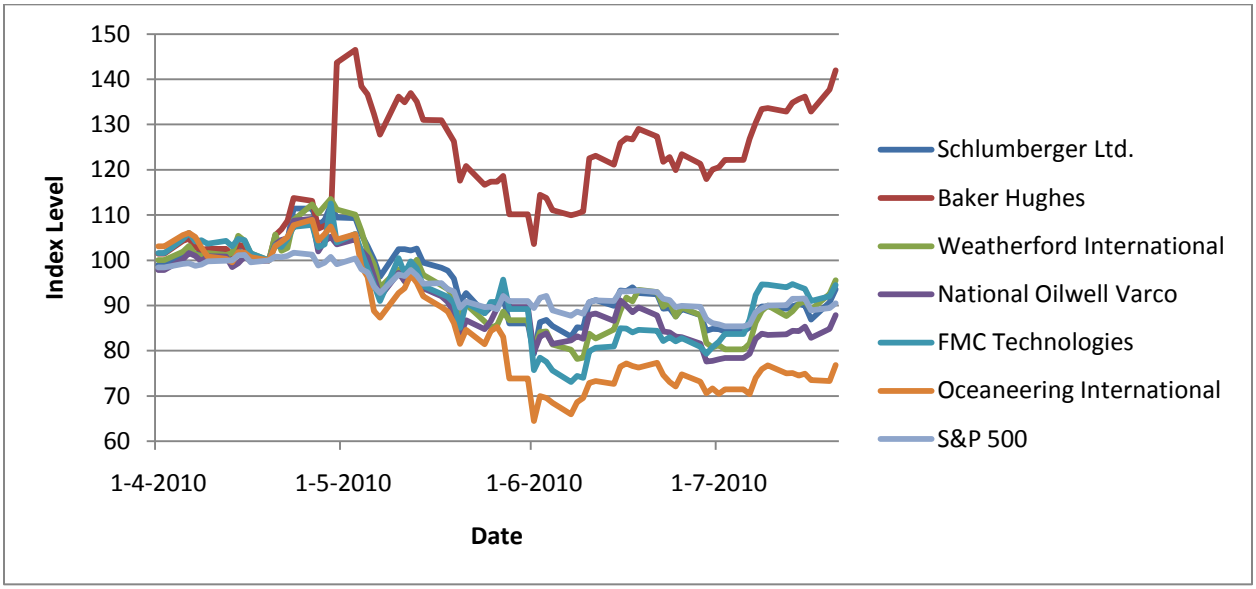


**Table 13: Correlation of the oilfield services companies with S&P500 and Oil Price**

This table shows the correlation between the oilfield services companies and the S&P 500 in the period April 20 – July 15. It also shows the correlation between the oilfield services companies and the oil price and the correlation between the oilfield services companies reciprocally.

| | Schlum-berger | Baker Hughes | Weather-ford | National Oilwell | FMC | Ocean-eering | S&P 500 | Oil Price |
|---|---|---|---|---|---|---|---|---|
| **Schlumberger** | 1 | 0.9162 | 0.8119 | 0.8674 | 0.8402 | 0.8686 | 0.7999 | 0.4351 |
| **Baker Hughes** | 0.9162 | 1 | 0.7820 | 0.8453 | 0.7999 | 0.8306 | 0.7996 | 0.3992 |
| **Weatherford** | 0.8119 | 0.7820 | 1 | 0.7926 | 0.7499 | 0.6836 | 0.7544 | 0.5363 |
| **National Oilwell** | 0.8674 | 0.8453 | 0.7926 | 1 | 0.8671 | 0.8012 | 0.8131 | 0.5069 |
| **FMC** | 0.8402 | 0.7999 | 0.7499 | 0.8671 | 1 | 0.8082 | 0.7842 | 0.3906 |
| **Oceaneering** | 0.8686 | 0.8306 | 0.6836 | 0.8012 | 0.8082 | 1 | 0.7108 | 0.4079 |
| **S&P 500** | 0.7999 | 0.7996 | 0.7544 | 0.8131 | 0.7842 | 0.7108 | 1 | 0.5251 |
| **Oil Price** | 0.4351 | 0.3992 | 0.5363 | 0.5069 | 0.3906 | 0.4079 | 0.5251 | 1 |

**Table 16: Correlation of BP with S&P 500 and Oil Price**

This table shows the correlation between BP and the S&P 500 in the period April 20 – July 15. It also shows the correlation between BP and the oil price.

| | BP | S&P 500 | Oil Price |
|---|---|---|---|
| **BP** | 1 | 0.3442 | 0.0021 |
| **S&P 500** | 0.3442 | 1 | 0.5251 |
| **Oil Price** | 0.0021 | 0.5251 | 1 |

**Table 17: Correlation of the partners with S&P500 and Oil Price**

This table shows the correlation between the partners of BP and the S&P 500 in the period April 20 – July 15. It also shows the correlation between the partners and the oil price and the correlation between the partners reciprocally.

| | Transocean | Halliburton | Anadarko | Cameron | S&P500 | Oil Price |
|---|---|---|---|---|---|---|
| **Transocean** | 1 | 0.5829 | 0.6801 | 0.5500 | 0.4312 | 0.0841 |
| **Halliburton** | 0.5829 | 1 | 0.7022 | 0.8611 | 0.6695 | 0.3653 |
| **Anadarko** | 0.6801 | 0.7022 | 1 | 0.5767 | 0.5046 | 0.1474 |
| **Cameron** | 0.5500 | 0.8611 | 0.5767 | 1 | 0.6570 | 0.3958 |
| **S&P500** | 0.4312 | 0.6695 | 0.5046 | 0.6570 | 1 | 0.5251 |
| **Oil Price** | 0.0841 | 0.3653 | 0.1474 | 0.3958 | 0.5251 | 1 |