Legal Analytics Final Project

Michael J. Yassay

A39958266

Bribery, Oil, and the Foreign Corrupt Practices Act

The world is moving toward a global economy, and I am looking to enter an industry that connects most countries. I will be looking to pursue a career in the energy sector with a focus on oil and gas. This summer I will be working for DNV GL, an oil and gas company in their contracts department. I chose to write my Upper Level Writing Requirement on the Foreign Corrupt Practice Act (FCPA) as there has been much attention focused on the oil and gas industry in recent news. I wanted to use my opportunity in Legal Analytics to evaluate a quantitative aspect of compliance. An important focus in any sector is that of risk and reward, I will be using proven oil reserves as the reward and the Bribe Payers Index as the risk. With data on the risk and reward I will construct a plot that assists with compliance as well as opportunity identification.

Foreign Corrupt Practices Act

The Foreign Corrupt Practices Act makes it illegal for a corporation to make payments in order to obtain or retain business. The focus is on bribery and I have a particular interest in this due to my summer internship. The oil and gas industry is receiving an increased focus from the Department of Justice and the Securities and Exchange Commission through the enforcement of the FCPA. FCPA enforcement actions can cost companies up to a million dollars a day, and has cost multiple companies over 500 million dollars. It is extremely important to have a compliance program in place with enough personnel to evaluate potential concerns. If a company does not devote enough resources to compliance the potential investigations may have a devastating effect.

Corruption Perceptions Index

The Corruption Perceptions Index (CPI) was the data I initially chose to run this analysis. During further research I concluded that I would be able to provide more value to my summer internship and have a stronger relationship with the FCPA by using the Bribe Payers Index (BPI). While researching the relationship between corruption and the oil industry it became clear that there is disconnect between perceptions and reality. The focus of this analysis is the risk and reward associated with contracting in countries where bribe paying is more than a perception.

Bribe Payers Index

The Bribe Payers Index offered the perfect relationship for analysis in terms of the focus on bribe payers by the FCPA and the increased competitive activity in the oil and gas industry due to the large decrease in the value of crude oil. “The 2011 Bribe Payers Index ranks 28 of the world’s largest economies according to the perceived likelihood of companies from these countries to pay bribes abroad.”[[1]](#footnote-1) The 2011 index is the most recently published data and will allow for the development of an analytical procedure that may be replicated when more recent data is published.

The current state of affairs in the oil and gas industry has proven to be fertile ground for bribery. “Foreign bribery has significant adverse effects on public well-being around the world. It distorts the fair awarding of contracts, reduces the quality of basic public services, limits opportunities to develop a competitive private sector and undermines trust in public institutions.”[[2]](#footnote-2) Not all countries have anti-bribery legislation and thus some companies are on unequal footing. The following analysis will attempt to show areas of opportunity and areas that should be avoided during oil and gas contracting/exploration.

Proven Oil Reserves

British Petroleum (BP) has complied data on all aspects of the oil and gas industry and has defined proven reserves as “the estimated quantities of oil which geological and engineering data demonstrate with reasonable certainty to be recoverable in future years from known reservoirs under current economic and operating conditions.”[[3]](#footnote-3) The BP oil database is the foundation of my analysis. The focus of the analysis was initially to focus on the changes in proven oil reserves; however, upon further investigation the largest changes were clustered around initial oil discoveries many years ago as opposed to year over year changes.

Difficult Areas

One of the most difficult areas was cleaning the data. This did not surprise me, as it became a mantra in both Legal Analytics and Quantitative Analysis. I chose to use three different datasets to conduct my analysis. Using dplyr was very helpful; however, it was a frustrating experience realizing I could only combine two datasets at a time. I chose to use the “full\_join” command, then I removed all rows containing an “n/a” (with “na.omit”) to arrive at a more complete analysis. These actions brought my data down to 8 countries, which may seem small, yet the included countries accurately represents the major counties where bribing is a concern. I decided to clean the data in an attempt to have more countries to use in my cluster analysis and was able to bring the total to 11.

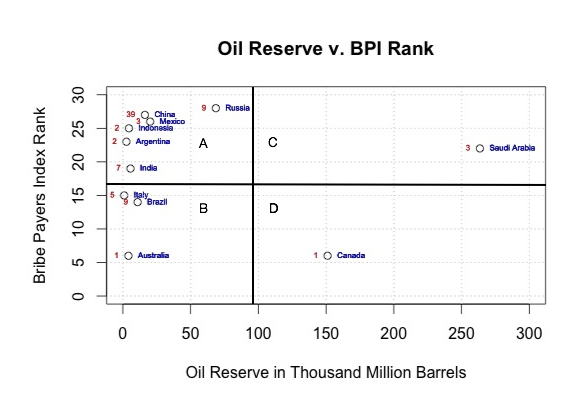
I wanted to have an aesthetically pleasing graph and pulled out my ggplot2 book by Hadley Wickham. While putting the graph together I ran into multiple difficulties with the axis and data point labels. I realized that the importance of the graph is to display information in an efficient matter and chose to revert to using the “plot()” function. Here is was able to manipulate all portions of the plot and choose aesthetics that did not take away from the analysis.

Value and Insurance

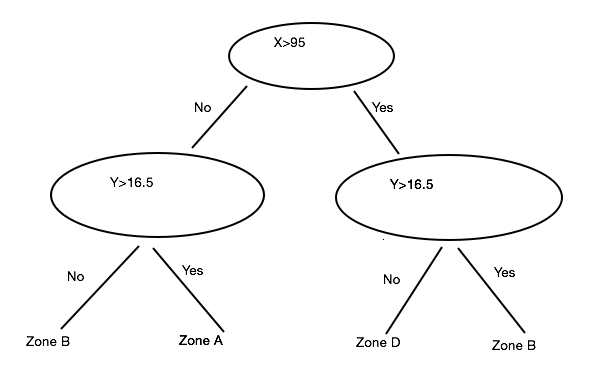
The value of the project comes in many different ways. While working through my analysis I found that a better way to evaluate the FCPA in terms of oil and gas is the BPI instead of the CPI. This will allow me to have a better base moving forward with both my internship and career. I will also be able to use what I learned here to present a reasoned opinion this summer and take the techniques and apply them to the offices that are run by DNV GL in over 100 countries.

During my evaluation of the FCPA and the resulting enforcement actions I have become aware that there is a severe lack of insurance in this area. With enforcement actions costing up to a million dollars a day I have only been able to find insurance coverage on FCPA related claims that covers a maximum of five million dollars. An underserved area may indicate an opportunity if one can charge appropriate premiums, or it may indicate that companies need to do a better job of self compliance. The oil and gas industry should find a way to develop adequate insurance as well as a focus on energy. It was devastating if the oil and gas industry believed that it was in the business of combustibles instead of energy. Such a narrow focus would place many companies on the same track as the railroad industry.

Analysis



The red number to the left of each respective country indicates the number of FCPA enforcement action brought against corporations in the respective country. The X value is the oil reserve in the thousand million barrels, and the Y value is the bribe payers index rank. The plot is designed to display the possible risk/reward factor involved in pursuing an oil and gas venture in a specific country.



This analysis will be able to become more complete in the future when there is more data available for each country. Bribery is becoming a focus especially in the oil and gas industry, with FCPA claims costing hundreds of millions of dollars this will be an area that receives increased focus in the near future. The current information allowed for partitioning into four areas. With more data and countries involved, the area will most likely need to be portioned into 6 or even 9 zones. The decisions will become more nuanced with more areas, as some zones will require more attention to evaluate the risk and reward.

**Zone A**

This zone has a high BPI and low oil reserves and should be avoided when considering contracting for oil and gas. Unless a very favorably opportunity presents itself the risk/reward proposition for this zone is unappealing. If a company is currently I this zone it must have a compliance program that cost effective as monetary reserves based on quantity are unlikely high enough to cover FCPA enforcement actions.

**Zone B**

This zone has a high BPI and high oil reserves and should be the focus of possible insurance (as discussed above) or increase focus on compliance by the company. Due to the probability that much of the oil and gas industry operates in this zone, companies should devote significant compliance efforts and resources here. An effective compliance program will not only help prevent incidents, but it will also aid any investigation if there has been an infraction.

**Zone C**

This zone has a low BPI and low oil reserves. This is an area that should be pursued before Zone A, yet not before Zone D and most likely not before Zone B. If a country is in Zone A it should look for possibilities in Zone C to provide similar reward for less risk.

**Zone D**

This is the optimal zone as it has a low BPI and high oil reserves. While it may offer the highest reward with the lowest risk a competent enforcement program is still essential. The plot has a possibility of providing a false sense of security in this zone as this area will most likely have the highest form of competition for contracts.

Conclusion

Using data on the BPI and proven oil reserves I have partitioned the available space to assist in decision making decision in the oil and gas industry. Using the graph above, a company can decide whether they will pursue exploration/contracting in a particular country. The company may also recognize they are currently doing business in a country that has a high propensity for bribery. Once this is recognized the existence of competent compliance can be assessed. An incompetent compliance program not only opens the possibility of bribery, but also a FCPA enforcement action. The enforcement action will be extremely expensive and time consuming, which is why it may be advantageous for insurance companies to begin coverage in this area.

Moving Forward

The analysis and techniques learned in R for this project will allow me to provide value to the compliance department during my summer internship. The base I have provided will allow me to identify unneeded risk in the current ventures being pursued by DNV GL. While I understand that interns may not be able to make an immediate impact I would deem my time there successful if my analysis led to FCPA awareness. If I have access to DNV GL data I will be able to provide cluster analysis on a large scale and highlight any areas, which need increased attention by the legal department. The analysis will also be helpful the contract department because they will be better prepared when dealing in countries that are identified as a concern in terms of bribery.

Posted to Github

I have posted this project, the data sets, and my R input onto Github. The address to find this is .

R Input

setwd("Desktop/LA Final/")

library(foreign)

install.packages("dplyr")

install.packages("ggplot2")

library(dplyr)

library(ggplot2)

mydata1 <- read.csv("BP Oil.csv", header=T)

mydata2 <- read.csv("CPI Index.csv", header=T)

mydata3 <- read.csv("FCPA.csv", header=T)

mydata4 <- read.csv("Bribe.csv", header=T)

part <- full\_join(mydata4,mydata1, by="Country")

final <- full\_join(part, mydata3, by="Country")

summary(final)

tbl\_df(final)

glimpse(final)

View(final)

final2 <- na.omit(final)

View(final2)

install.packages("tableplot")

library(tableplot)

x <- (final2$Average.Oil)

y <- (final2$Rank)

plot(x,y, main="Oil Reserve v. BPI Rank", xlab="Oil Reserve in Thousand Million Barrels", ylab="Bribe Payers Index Rank", xlim=c(0,300), ylim=c(0,30))

install.packages("calibrate")

library(calibrate)

text(final2$Average.Oil, final2$Rank,labels=final2$Country, cex=0.5, pos=4, col="blue")

text(final2$Average.Oil, final2$Rank,labels=final2$Enforcement.Actions, cex=0.5, pos=2, col="red")

grid(nx = NULL, ny = NULL, col = "lightgray", lty = "dotted")

R Output

> setwd("Desktop/LA Final/")

> library(foreign)

> install.packages("dplyr")

trying URL 'http://cran.rstudio.com/bin/macosx/mavericks/contrib/3.2/dplyr\_0.4.1.tgz'

Content type 'application/x-gzip' length 4884470 bytes (4.7 MB)

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downloaded 4.7 MB

The downloaded binary packages are in

/var/folders/bk/1xrrcvwn05x07dlyb99vdkpc0000gn/T//RtmpCLuFvl/downloaded\_packages

> install.packages("ggplot2")

trying URL 'http://cran.rstudio.com/bin/macosx/mavericks/contrib/3.2/ggplot2\_1.0.1.tgz'

Content type 'application/x-gzip' length 2670945 bytes (2.5 MB)

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downloaded 2.5 MB

The downloaded binary packages are in

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> library(dplyr)

Attaching package: ‘dplyr’

The following object is masked from ‘package:stats’:

filter

The following objects are masked from ‘package:base’:

intersect, setdiff, setequal, union

> library(ggplot2)

Need help? Try the ggplot2 mailing list: http://groups.google.com/group/ggplot2.

> mydata1 <- read.csv("BP Oil.csv", header=T)

> mydata2 <- read.csv("CPI Index.csv", header=T)

> mydata3 <- read.csv("FCPA.csv", header=T)

> mydata4 <- read.csv("Bribe.csv", header=T)

> part <- full\_join(mydata4,mydata1, by="Country")

Warning message:

In outer\_join\_impl(x, y, by$x, by$y) :

joining factors with different levels, coercing to character vector

> final <- full\_join(part, mydata3, by="Country")

Warning message:

In outer\_join\_impl(x, y, by$x, by$y) :

joining factor and character vector, coercing into character vector

> summary(final)

Country Rank Oil.1995 Oil.1996 Oil.1997

Length:83 Min. : 1.00 Min. : 0.00 Min. : 0.00 Min. : 0.00

Class :character 1st Qu.: 7.50 1st Qu.: 0.76 1st Qu.: 0.76 1st Qu.: 0.76

Mode :character Median :14.50 Median : 3.13 Median : 3.45 Median : 3.67

Mean :13.96 Mean : 20.41 Mean : 20.86 Mean : 21.15

3rd Qu.:19.75 3rd Qu.: 10.80 3rd Qu.: 11.68 3rd Qu.: 12.50

Max. :28.00 Max. :261.45 Max. :261.44 Max. :261.54

NA's :55 NA's :34 NA's :34 NA's :34

Oil.1998 Oil.1999 Oil.2000 Oil.2001 Oil.2002

Min. : 0.00 Min. : 0.00 Min. : 0.00 Min. : 0.00 Min. : 0.00

1st Qu.: 1.02 1st Qu.: 1.18 1st Qu.: 1.17 1st Qu.: 1.16 1st Qu.: 1.13

Median : 4.10 Median : 4.74 Median : 4.57 Median : 4.54 Median : 4.57

Mean : 22.19 Mean : 25.14 Mean : 25.56 Mean : 25.74 Mean : 26.85

3rd Qu.: 17.42 3rd Qu.: 15.11 3rd Qu.: 16.87 3rd Qu.: 16.84 3rd Qu.: 17.20

Max. :261.54 Max. :262.78 Max. :262.77 Max. :262.70 Max. :262.79

NA's :34 NA's :34 NA's :34 NA's :34 NA's :34

Oil.2003 Oil.2004 Oil.2005 Oil.2006 Oil.2007

Min. : 0.00 Min. : 0.00 Min. : 0.00 Min. : 0.00 Min. : 0.00

1st Qu.: 1.28 1st Qu.: 1.33 1st Qu.: 1.45 1st Qu.: 1.51 1st Qu.: 1.51

Median : 4.73 Median : 4.30 Median : 4.19 Median : 4.46 Median : 4.07

Mean : 27.11 Mean : 27.30 Mean : 27.50 Mean : 27.73 Mean : 28.46

3rd Qu.: 16.04 3rd Qu.: 15.53 3rd Qu.: 15.59 3rd Qu.: 15.61 3rd Qu.: 27.32

Max. :262.73 Max. :264.31 Max. :264.21 Max. :264.25 Max. :264.21

NA's :34 NA's :34 NA's :34 NA's :34 NA's :34

Oil.2008 Oil.2009 Oil.2010 Oil.2011 Oil.2012

Min. : 0.00 Min. : 0.00 Min. : 0.00 Min. : 0.00 Min. : 0.43

1st Qu.: 1.50 1st Qu.: 1.50 1st Qu.: 1.60 1st Qu.: 1.60 1st Qu.: 1.60

Median : 5.00 Median : 4.50 Median : 4.50 Median : 4.40 Median : 4.20

Mean : 29.93 Mean : 30.78 Mean : 32.96 Mean : 33.78 Mean : 34.28

3rd Qu.: 26.83 3rd Qu.: 25.91 3rd Qu.: 24.68 3rd Qu.: 23.90 3rd Qu.: 25.23

Max. :264.06 Max. :264.59 Max. :296.50 Max. :297.57 Max. :297.57

NA's :34 NA's :34 NA's :34 NA's :34 NA's :34

Oil.2013 Average.Oil Enforcement.Actions

Min. : 0.43 Min. : 0.37 Min. : 1.000

1st Qu.: 1.60 1st Qu.: 1.28 1st Qu.: 1.000

Median : 3.96 Median : 4.47 Median : 1.500

Mean : 34.29 Mean : 27.47 Mean : 3.182

3rd Qu.: 25.06 3rd Qu.: 20.17 3rd Qu.: 3.000

Max. :298.35 Max. :263.53 Max. :39.000

NA's :34 NA's :34 NA's :39

> tbl\_df(final)

Source: local data frame [83 x 23]

Country Rank Oil.1995 Oil.1996 Oil.1997 Oil.1998 Oil.1999 Oil.2000 Oil.2001

1 Netherlands 1 NA NA NA NA NA NA NA

2 Switzerland 1 NA NA NA NA NA NA NA

3 Belgium 3 NA NA NA NA NA NA NA

4 Germany 4 NA NA NA NA NA NA NA

5 Japan 4 NA NA NA NA NA NA NA

6 Australia 6 3.80 3.82 4.04 4.77 4.74 4.94 4.96

7 Canada 6 48.37 48.94 48.80 49.82 181.56 181.50 180.94

8 Singapore 8 NA NA NA NA NA NA NA

9 UK 8 NA NA NA NA NA NA NA

10 USA 10 NA NA NA NA NA NA NA

.. ... ... ... ... ... ... ... ... ...

Variables not shown: Oil.2002 (dbl), Oil.2003 (dbl), Oil.2004 (dbl), Oil.2005 (dbl),

Oil.2006 (dbl), Oil.2007 (dbl), Oil.2008 (dbl), Oil.2009 (dbl), Oil.2010 (dbl),

Oil.2011 (dbl), Oil.2012 (dbl), Oil.2013 (dbl), Average.Oil (dbl), Enforcement.Actions

(int)

> glimpse(final)

Observations: 83

Variables:

$ Country (chr) "Netherlands", "Switzerland", "Belgium", "Germany", "Japa...

$ Rank (int) 1, 1, 3, 4, 4, 6, 6, 8, 8, 10, 11, 11, 13, 14, 15, 15, 15...

$ Oil.1995 (dbl) NA, NA, NA, NA, NA, 3.80, 48.37, NA, NA, NA, NA, NA, NA, ...

$ Oil.1996 (dbl) NA, NA, NA, NA, NA, 3.82, 48.94, NA, NA, NA, NA, NA, NA, ...

$ Oil.1997 (dbl) NA, NA, NA, NA, NA, 4.04, 48.80, NA, NA, NA, NA, NA, NA, ...

$ Oil.1998 (dbl) NA, NA, NA, NA, NA, 4.77, 49.82, NA, NA, NA, NA, NA, NA, ...

$ Oil.1999 (dbl) NA, NA, NA, NA, NA, 4.74, 181.56, NA, NA, NA, NA, NA, NA,...

$ Oil.2000 (dbl) NA, NA, NA, NA, NA, 4.94, 181.50, NA, NA, NA, NA, NA, NA,...

$ Oil.2001 (dbl) NA, NA, NA, NA, NA, 4.96, 180.94, NA, NA, NA, NA, NA, NA,...

$ Oil.2002 (dbl) NA, NA, NA, NA, NA, 4.57, 180.40, NA, NA, NA, NA, NA, NA,...

$ Oil.2003 (dbl) NA, NA, NA, NA, NA, 3.75, 180.37, NA, NA, NA, NA, NA, NA,...

$ Oil.2004 (dbl) NA, NA, NA, NA, NA, 3.89, 180.04, NA, NA, NA, NA, NA, NA,...

$ Oil.2005 (dbl) NA, NA, NA, NA, NA, 3.72, 180.49, NA, NA, NA, NA, NA, NA,...

$ Oil.2006 (dbl) NA, NA, NA, NA, NA, 3.51, 179.81, NA, NA, NA, NA, NA, NA,...

$ Oil.2007 (dbl) NA, NA, NA, NA, NA, 3.43, 178.83, NA, NA, NA, NA, NA, NA,...

$ Oil.2008 (dbl) NA, NA, NA, NA, NA, 4.24, 176.26, NA, NA, NA, NA, NA, NA,...

$ Oil.2009 (dbl) NA, NA, NA, NA, NA, 4.06, 175.87, NA, NA, NA, NA, NA, NA,...

$ Oil.2010 (dbl) NA, NA, NA, NA, NA, 3.83, 175.22, NA, NA, NA, NA, NA, NA,...

$ Oil.2011 (dbl) NA, NA, NA, NA, NA, 3.87, 174.59, NA, NA, NA, NA, NA, NA,...

$ Oil.2012 (dbl) NA, NA, NA, NA, NA, 3.92, 174.32, NA, NA, NA, NA, NA, NA,...

$ Oil.2013 (dbl) NA, NA, NA, NA, NA, 3.96, 174.32, NA, NA, NA, NA, NA, NA,...

$ Average.Oil (dbl) NA, NA, NA, NA, NA, 4.10, 151.08, NA, NA, NA, NA, NA, NA,...

$ Enforcement.Actions (int) NA, 1, NA, 3, NA, 1, 1, NA, NA, NA, NA, NA, NA, 9, 1, 5, ...

> View(final)

> final2 <- na.omit(final)

> View(final2)

> install.packages("tableplot")

trying URL 'http://cran.rstudio.com/bin/macosx/mavericks/contrib/3.2/tableplot\_0.3-5.tgz'

Content type 'application/x-gzip' length 56903 bytes (55 KB)

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downloaded 55 KB

The downloaded binary packages are in

/var/folders/bk/1xrrcvwn05x07dlyb99vdkpc0000gn/T//RtmpCLuFvl/downloaded\_packages

> library(tableplot)

Loading required package: grid

> x <- (final2$Average.Oil)

> y <- (final2$Rank)

> plot(x,y, main="Oil Reserve v. BPI Rank", xlab="Oil Reserve in Thousand Million Barrels", ylab="Bribe Payers Index Rank", xlim=c(0,300), ylim=c(0,30))

> install.packages("calibrate")

trying URL 'http://cran.rstudio.com/bin/macosx/mavericks/contrib/3.2/calibrate\_1.7.2.tgz'

Content type 'application/x-gzip' length 306954 bytes (299 KB)

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downloaded 299 KB

The downloaded binary packages are in

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> library(calibrate)

Loading required package: MASS

Attaching package: ‘MASS’

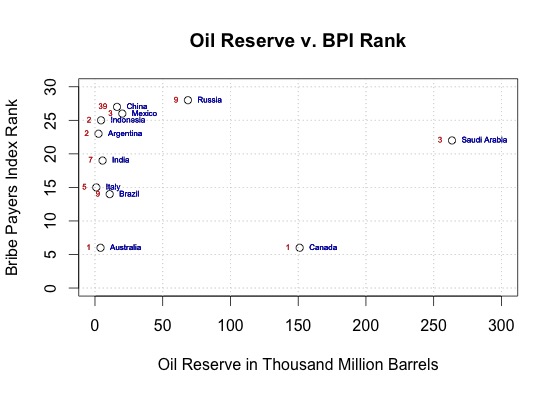
The following object is masked from ‘package:dplyr’:

select

> text(final2$Average.Oil, final2$Rank,labels=final2$Country, cex=0.5, pos=4, col="blue")

> text(final2$Average.Oil, final2$Rank,labels=final2$Enforcement.Actions, cex=0.5, pos=2, col="red")

> grid(nx = NULL, ny = NULL, col = "lightgray", lty = "dotted")



1. Hardoon, Deborah, and Finn Helnrich. "Bribe Payers Index Report 2011 View Country Results View Sector Results." *2011 Bribe Payers Index*. Transparency International, 2011. Web. 02 May 2015. <http://www.transparency.org/bpi2011/results>. [↑](#footnote-ref-1)
2. Id. [↑](#footnote-ref-2)
3. "BP." *Oil Reserve Definitions*. N.p., n.d. Web. 02 May 2015. <http://www.bp.com/en/global/corporate/about-bp/energy-economics/statistical-review-of-world-energy/review-by-energy-type/oil/oil-reserves/oil-reserve-definitions.html>. [↑](#footnote-ref-3)