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# **Natural Disasters and Stock Market Responses of Regulated Utilities**

Zhen Zhu, Kuang-Chung Hsu, & Tyler Nicholson

## **Abstract**

In this study, we investigate the impact of natural disasters on the stock price of electric utilities. There appear to be more frequent occurrences of natural disasters with higher costs in more recent years exemplified by the wildfires in California. Electric utilities are regulated businesses and they can usually recover the costs associated with these natural disasters. However, there are several reasons why the values of electric utility companies can be influenced negatively. Among them are inverse condemnation laws in the presence of a natural disaster liability, added burden of investment to harden the grid, lags in cost recovery, lost revenue, uncertainty with rate case outcomes and so on.

We intend to document the market reactions to various types of natural disasters including wildfires, hurricanes, ice storms, earthquakes, and tornadoes. Utilizing the event study methodology, we calculate the abnormal returns and cumulative abnormal returns to gauge the magnitude of the impact of the major natural disasters on affected electric utilities, especially those utilities in states where frequent natural disasters occur. We are set to compare and contrast the market reactions after documenting them to further understand the market perceptions of the impact of various natural disasters.

# Offshore Drilling: Effects to Local Communities

James Hackney

## Abstract

In this study, I will research the effects that oil spills can have on local communities from offshore drilling. What I intend to bring from this subject is theories that oil spills can hurt the local economy. Places bordering the Gulf of Mexico, such as Alabama and Florida rely on the gulf for food and tourism. For example, how did the Deepwater Horizon spill affect the surrounding coast locations and what are some reputable effects from having such a “disaster”? I intend to provide evidence that these oil spills can hurt in the long run to these local communities.

After the BP oil spill, local residents felt the effects financially. There we 37,193 claims against BP for the financial loses local residents incurred. Based on a hearing with the Committee on Energy and Commerce, I will compile evidence of financial losses that local residents have incurred. Then I will provide an analysis of these losses to understand the characteristics of the losses in order to better understand how local communities have been impacted by these offshore drilling.

# Oil Supply

Mart Gentry Barclay Cheatham

## Abstract

The objective of this research is to econometrically detail the relationship of oil supply and demand. Oil prices have been decreasing. The working hypothesis is that oil is oversupplied to the market, decreasing price. The methodology to address the hypothesis will consist of applied analytics concerning data from the Energy Information Administration, the International Energy Agency, etc.

This research has vast implications for the Oklahoma economy due to its close ties with the oil market. An oversupply of oil makes drilling expensive wells, like hydraulic fracking, uneconomic. Additionally the jobs of many Oklahomans depend on the price that can be commanded by a barrel of oil.

# **Load Forecasting for Oklahoma Gas and Electric**

Mart Gentry Barclay Cheatham

## **Abstract**

I show the analytics and process of forecasting electricity demand for Oklahoma Gas and Electric. Energy demand data (Load MW) was collected from the Southwest Power Pool. Data from 2015 - 2016 were used as a training set to forecast demand for the year 2017. In this research, I will use pure time series models such as ARIMA and TBATS as well regression models.

Theory and preliminary evidence suggest that there is a strong correlation between temperature data and demand. However, in order for temperature data to work, we will need to transform the temperature data into Cooling Degree Days and Heating Degree Days. I will go through the modeling process to demonstrate how we can successfully model the demand using these temperature data as well as economic information.

This research appears to have practical importance as utilities need to schedule electric production to make sure demand is met by supply such that no blackout will be generated by lacking of sufficient planning.

# Oklahoma Electricity

Mart Gentry Barclay Cheatham

## Abstract

To examine electricity in Oklahoma, data from the Energy Information Administration was sorted based on operable generators in Oklahoma. The data suggests that natural gas is the dominant energy source in Oklahoma at 47% of total capacity.

Renewable and non-renewable energy sources in Oklahoma were compared.

Renewables are more responsive to current market conditions. Renewable energy, in Oklahoma, is competitive against non-renewables. For example, energy from onshore wind turbines, solar photovoltaic, and conventional hydroelectric generators have very little to no startup time. Whereas non-renewables have a considerably longer startup time.

Renewable energy sources make non-renewables less competitive by nature. Renewable Energy sources are particularly competitive in that they take demand from non-renewables which forces these plants to operate at a lower output level, making them less money. To compensate, the more invariable plants close due to being unprofitable and unable to keep up with the market. Coal may be cheap, but it is less variable.

As a statement of fact, renewables are more efficient than non-renewables year-round. As a measure of the seasonal power factor in Megawatts divided by the nameplate capacity, during the summer, renewables like Hydroelectric and Wind Turbine power have perfect efficiency, which is about 20% more efficient than coal, and 9% more efficient than natural gas in an internal combustion engine.

# **OIL AND GAS EXPLORATION AND PRODUCTION WASTE MANAGEMENT**

Bebe Jessica

## **Abstract**

Over the past decades, the activities of exploration and production of oil and natural have considerably increased due to technological advancement in drilling and exploration. As the byproduct of these oil and gas activities, drilling and extraction wastes have been generated in a large amount. Those wastes include produced water, drilling muds, acid water, drill cuttings, basic sediment, and servicing fluid. The drilling and exploration wastes can damage our environment if not dealt with appropriately. Many states also provide regulations to guide these activities. Our project intends to look into.

# **Factors Affecting the Variation of Gasoline Prices and the Effects of it**

Eng Kit Ooi

## **Abstract**

In this study, I will attempt to investigate the factors that are affecting the variation of gasoline prices at gas stations. It seems that gas stations across the United States sell their gas at different prices even though they are of the same grade. That being said, one of the issues I will address in this research include the reason why gas may be cheaper across the street. Several factors that could potentially affect the variation in gas prices includes state taxes, fuel regulation, location of the gas station, the volume of gas retailers carry, fuel brand as well as location competition.

I also intend to look into the economic aspects of things by looking at the earnings of gas stations. I will distinguish whether gas stations generate more of their money from selling gasoline or from basic essential goods in-store. I will also look into the survival risk of a gas station. I will document my findings and determine if gas stations can survive if their competitors across the street are selling gasoline at a cheaper price. Lastly, I will also attempt to determine the main factor that attracts customers to a particular gas station. I will use data and statistical models to discuss if price is the main determinant to why a customer selects that gas station.

This study is expected to prove that gasoline prices are not the driving factor to a gas station's success.



# **BENEFITS AND HARMS OF ELECTRIC RETAIL CHOICE**

Bebe Jessica

## **Abstract**

Since the mid '90s, electric deregulation has taken hold in several states throughout the U.S. In order to have a better vision of the before and after of deregulation, it is important to understand the concept of energy deregulation. Deregulation of the electric market is the process by which states allow various autonomous electric providers to compete with one another to supply energy to residents, rather than one utility company dominating the entire electric market.

Throughout this project, I will try to understand the incentives behind deregulation or the series of events that caused some states to switch from regulation to deregulation, and weigh the pros and the cons. The particularity of this project is that it will suggest some strategies that could have been executed to avoid the market manipulations performed by Enron who played a major role in the history of deregulation.

# **The Future of Natural Gas Price: In the U.S.**

Devon Smith-Dunn

## **Abstract**

The purpose of this paper is to get a better understanding of what natural gas prices will look like in the future. In order to do so, we must look at the major factors in determining price. Natural gas and electricity prices are highly correlated since gas is primarily used in the generation of electricity. Natural gas has become a favorite in the electricity market because of its low carbon dioxide emissions and is known to be the cleanest of the fossil fuels. As the demand for electricity ebbs and flows, so will the demand for natural gas. We will examine the demands for electricity as it will greatly impact the prices that natural gas brings. The demand for electricity is con growing. Weather temperatures greatly impact the demand for electricity (heating and cooling) and is hard to predict. As more electricity is needed (demanded) the more natural gas will be needed to help fill this demand. We will study, briefly, the temperatures of now and what can reasonably be expected in the future. Demand from other countries (exporting) will be another factor we will look at. As emerging economies, and developed ones, become over populated or in need of more electricity generation they will look at natural gas as a player in filling this gap. Up until late 2017 (early 2018), the U.S. was a net importer of natural gas, but things shifted as the U.S. market became oversupplied with natural gas as a direct result of fracking/drilling. We will study the production of natural gas.

# Possible Variables Affecting Sales of Tesla Vehicles

Eng Kit Ooi

## Abstract

This research will critically examine the variables that affect the sales of Tesla car and attempts to forecast it based on previous years data. Several factors that could potentially affect the changes in the sales volume of Tesla vehicles such as disposable personal income (DPI), gasoline price (GP), price of electricity (EP), and population (P) are of interest.

The justifications for each variable are: Disposable personal income is of importance since motor vehicles are goods that require a large amount of capital to invest in. Economic theory suggests that more income results into higher spending on all goods including Tesla Cars (assuming Tesla cars are also normal goods) i.e., increase in sales. Price of gasoline and price of electricity were selected as predictors in the model since Tesla vehicles do not require fuel to operate and any change in gasoline and/or electricity prices could potentially affect Tesla sales. The last independent variable in the model is the population. The justification here is that when population is high, there should be more sales of automobiles vehicles (and the opposite is also true).

The results potentially suggest that price of gas and price of electricity are the main driving force for the car sales of Tesla. The research will determine the goodness of fit of the predictors for the model. Statistical models and data will also be used to determine the impact of each predictor with respect to the car sales.

# **To Burn or Not to Burn? The question of Natural Gas Flaring**

NICKROOZ NEKOUI

## **Abstract**

Extraction of oil is often accompanied by the production of associated gas - a byproduct of the oil production. In many cases, these associated gas is flared or burned. Flaring is the process by which natural gas is burned off in a controlled manner when extracting oil. Flaring gas or not is an economic decision. In instances where the amount present along with oil is minimal and would be of no benefit, gas is brought up and burned off. Further, due to the low price of Natural gas, it's not economical to build the necessary infrastructure to capture it; doing so would result in a negative return. In addition to economics involved in this flaring process, environmental concerns is usually another issue involved. Instead of methane (natural gas is primarily methane) going up to our atmosphere, Carbon dioxide is released instead after flaring, which is a less detrimental element in comparison to other greenhouse gasses like methane. However, what would the effect on our oil and natural gas industry if we were to capture all these minuscule amounts that we end up just burning off? This is where my research takes place. In my research, I intend to first discuss pros and cons of flaring. In addition, I will present evidence on amount of gas flared for different oil/gas producing states. In addition, I will examine the environmental effect of the gas flaring by exploring the data on greenhouse emissions. A related issue is the state policies regarding gas flaring.

# **Recycle Drilling Waste**

Hector Bullock

## **Abstract**

For this research study, we explain the process of disposal, treatment, and future state policies for recycling drilling waste. There are three types of drilling mud: water based, oil-based, and synthetic based mud. Current traditional disposal companies are not following legitimate recycling criteria that is required by the U.S. EPAs for the disposal of this mud waste. There are multiple methods to undergo a pre-treatment filtration. Research found different contaminants in the mud that undergo separation during the filtration and recycling process. Recent recycling policies and new concepts of use after the filtered drilling mud has come to be complacent during testing for approval to recycle the drilling mud, therefore easily manipulated to pass regulatory tests. Our study is set to compare and contrast the multiple methods of recycling drilling mud, while exposing regulation faults during testing phases. Research should show alternatives for future applications for drilling mud after recycling.