Wavelet Analysis of Crude Oil Futures: Project Overview*

Ian Akash Morrison

This work is produced by The Connexions Project and licensed under the
Creative Commons Attribution License †

Abstract

Overview and objectives of the project

Overview

The oscillation of stocks, futures, or commodity prices over time in financial markets seems highly random. But taken as a time series, the data looks similar to signals we might study in the field of electrical engineering. This begs the question, **can we analyze these signals using common principles of signal processing? Might we uncover a cycle or periodicity in the signal? Can we predict prices and make millions of dollars?** We found through analysis of crude oil futures data from 1986 to the present that though common Fourier methods used in ELEC 301 could not uncover reliable periodicity, the related method of wavelet analysis produces both short-term periodicity in the CWT and a significantly de-noised signal in the DWT.

This is also an investigation into a field referred to "financial engineering" from the perspective of two electrical engineers. On a personal level, we are studying both electrical engineering and economics at Rice University and are interested in learning what components of signal processing are applicable to the analysis of financial markets.

The data set that was chosen was historical oil futures daily closing prices from 1986 until 2011 due to its expected periodicity with the seasonal cycle of demand for oil and gas.

Placeholder for Picture

*Version 1.1: Dec 19, 2011 2:56 pm -0600

†http://creativecommons.org/licenses/by/3.0/

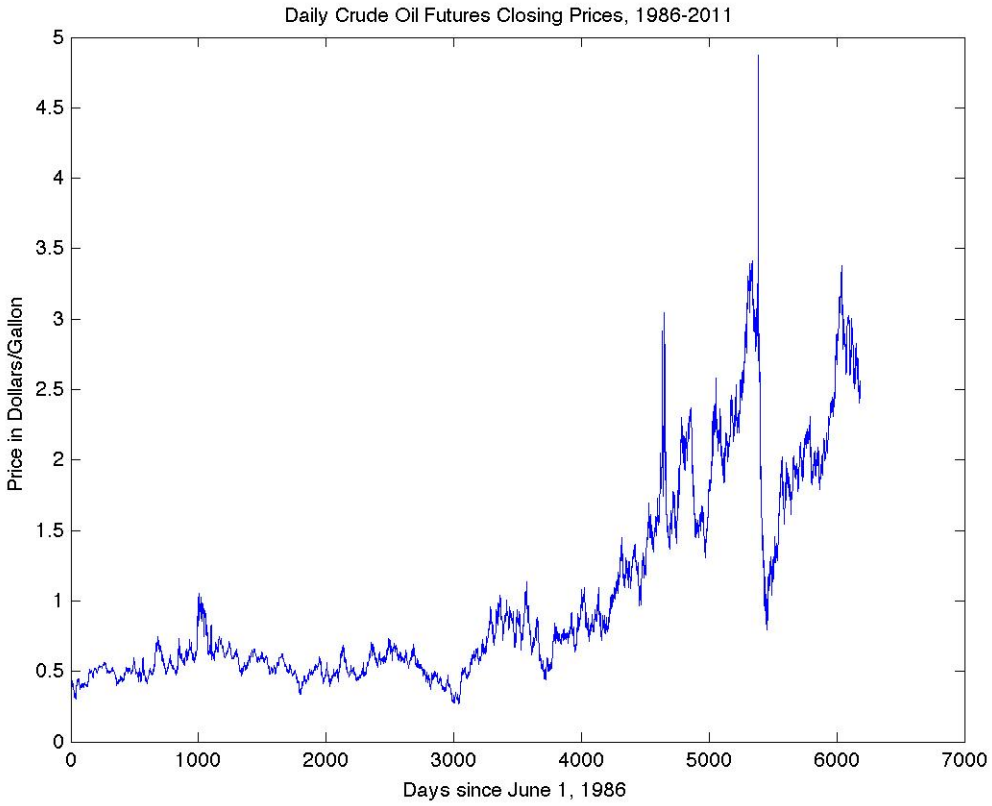

Figure 1: Historical Prices of Crude Oil Futures

Objectives

1. Investigate financial engineering.
2. Utilize signal processing techniques to analyze commodity futures prices.
3. Predict future prices.
4. Make million$!