

# Performance Prediction of Commodity Prices Using Foreign Exchange Futures

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## Abstract

In an experimental quantitative research design, data from the Futures Market for commodities and foreign exchange futures covering 1986-2011 were obtained and addressed. A General Regression Neural Network was overlaid on this data to deduce a time-series prediction model for wheat prices. Performance prediction error was only 4.42%.

## Problem

Policy makers of the U.S. Federal Reserve who must make use of estimates of commodity futures prices found current commodity futures forecasts consistently unreliable and unsatisfactory. (Bernanke, 2008). This is also a problem for farmers, investors and traders active in the commodity futures market.

The problem is how to obtain the most accurate commodity price forecasts. Why do financial analysts bother to ensure the best forecasting accuracy? Because, to make profit in the market, *It is far better to foresee even without certainty than not to foresee at all.* (Henri Poincaré, 1854-1912).

## Purpose

The purpose of this quantitative study of archival records of the commodity exchange market and the Forex market was to explore whether a statistically significant relationship exists between commodity futures prices and Forex futures prices. If so, analysts can use the movements of the Forex futures market to predict commodity futures prices better than previous methods. Farmers, traders and investors would have a new tool at the COMEX.

## Relevant Literature

### Origins of Dow Jones Financial Markets Predictions

The theories developed by **Fibonacci** (1175-1250), **Dow** (1851-1902), **Elliot** (1871-1948), and **Gann** (1878-1955) are essentially the backbones to the study of the movements of financial markets (Frost & Prechter, 2005; Schlanger, 2009)

### Forecasting Commodity Prices and Comments

Questions regarding forecast accuracy and financial markets eventually became a substantive topic of retrospective studies exemplified by Hansen and Hodrick (1980), Turnovsky (1983), Fama (1984), Hodrick and Srivastava (1986), (Choe, 1990a), Bernanke (2008), ), Chen, Rogoff and Rossi (2008).

### Hypotheses of Futures Prices as a Predictor of the Future Spot Rates.

Aggarwal and Sundararaghavan (1987), Yin (2001), Wang and Ke (2002), Gerner and Duijvestijn (2003), Mohan and Love (2004), Wolfers and Zitewitz (2004), Armstrong (2005).

### Social Science Research

Trochim & Donnelly (2006), Joe Parcell and Vern Pierce (2006), Sayer (2006), Krichene (2008), Lai and Xing (2008). , *The Economist's View (09-09-2008)* , Hak & Dul (2009)

### Statistics and Forecasting Instruments.

Aczel & Sounderpandian (2009), Todorov (2009) , Mackay (2010), Ali (2010), Palisade Corporation. (2011). *NeuralTools*.

## Research Questions

**RQ1:** Can Forex futures be used instead of commodity futures as a prime factor in the prediction of future commodity prices?

**RQ2:** To what percentage of error can foreign exchange futures prices predict the commodity prices (i.e., What is the performance prediction?)

## Procedures

Historical data were downloaded from the websites of the **U.S. Commodity Futures Trading Commission** and **Wikisopit Historical Futures Data**.

The data included daily commodity closing prices in the futures market for each trading day from 1985 through 2011. From these data bank, specific data for **wheat** and **US \$1 Treasury Note** were extracted for data mining purposes.

## Data Analysis

The **Runs test** was used to validate data randomness. Then the analysis progressed through, (a) moving averages, (b) exponential smoothing, (c) the linear trend, (d) the quadratic trend, (e) the exponential trend, (f) the autoregressive, and (g) the least-squares models for seasonal data. These tests did not provide adequate results.

Then the data were processed through **general regression neural networks application** owing to its enormous computing powers and ability to analyze data from two different sources. It mimics the human brain even for a non-random data like these. A relationship formula was attained.

## Findings

A functional parsimonious formula was realized.

The general regression neural network formula does allow historical Forex futures prices to predict futures prices for commodities.

The mean average percentage error was 4.42%, This is acceptable.

## Limitations

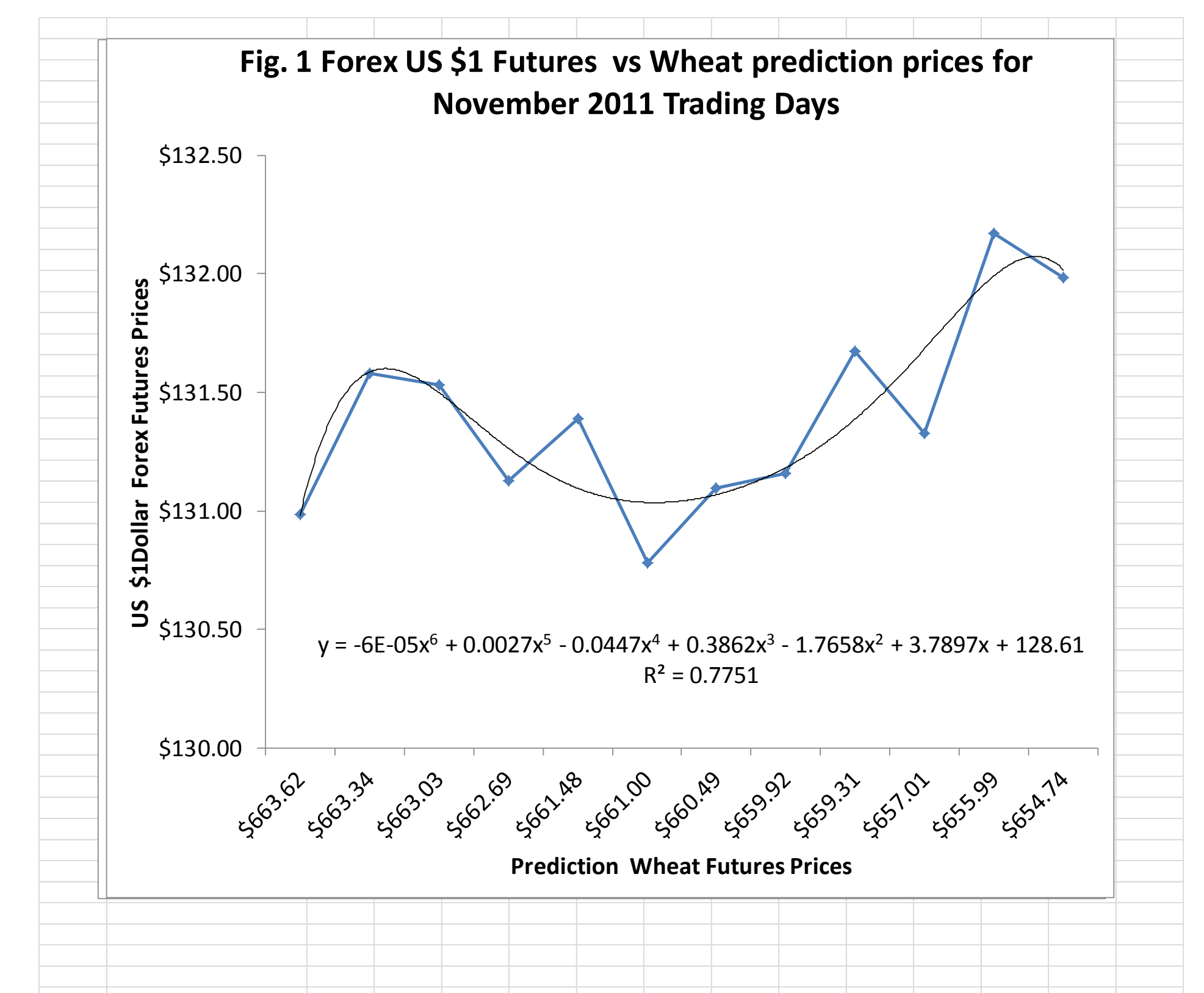
Data from two different data bases in the Futures Market environment were used given the information by the developers of the neural network software. It is supposed to mimic the human brain and it worked for this analysis. Even though the results were positive, statistical analysis of this type of data may not provide enough insight into actual human behavior.

## Conclusions

This study demonstrated that historical records from Forex futures can be paired with matching records from wheat (or any commodity) futures and obtain a prediction of market prices to within a 4.42% error margin.

The public, traders, investors, and analysts can include this method as a new tool in the arsenal in the ongoing search for a more reliable commodity futures predictions.

This method can serve as confirmation of the results of other analytic and fundamental methods of obtaining predictions of Financial Markets movement.



## Social Change Implications

This new futures price prediction awareness would stabilize commodity market predictions, which in turn would bring social change that could affect the agribusiness community in

- planning planting banking financing
- buying and selling warehousing.

The commodity futures market would become more efficient as well. It would lead to the betterment of social conditions through better understanding of financial markets.