# Commodity Price and Machine Learning

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# Presenter Introduction

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  - Located in Minneapolis, Minnesota
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- Sawyer Tucker
  - BBA in Computer Information Systems     Western Michigan University, 2021
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- Greg Wagner
  - BS in Mathematics from Davidson College, 2018
  - Located in Fort Myers, Florida (part of the Washington, DC cohort)
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- Christopher Nash
  - BBA of Computer Information Systems from Western Michigan University, 2021
  - Located in Milwaukee, Wisconsin
  - LinkedIn

# Project Introduction

- Commodities are raw materials or agricultural products

- Traded in Chicago Mercantile Exchange Group and the New York Mercantile Exchange
  - Like stocks, prices fluctuate minute-to-minute

- Unlike stocks, commodities are an asset that can be used or consumed
  - Value in being able to predict future prices of commodities

- Half our group is entering an agriculturally-focused field, so we examined three crops: corn, wheat, and soybeans

# Initial Questions

▶ How have the prices of commodities like wheat, corn, and soybeans changed over time?

▶ What affects the prices of these commodities?

▶ Can we predict the price of these commodities in the future?

▶ Does our model change as we receive incoming data from the API?

▶ Which states are the top producers and consumers of these commodities?

▶ Which nations are the top producers and consumers of these commodities?

# Data Sources

- Commodities API - updates every two minutes
  - Corn, wheat, soy, gold, relevant foreign currencies
  - Used in ML model

- Economic Research Service API - US Department of Agriculture
  - Reports how much and what type of commodity is produced in USD

- Foreign Agricultural Service Data API - National Agriculture Stats Service
  - What is being exported and to whom in USD

# Data Platform Overview
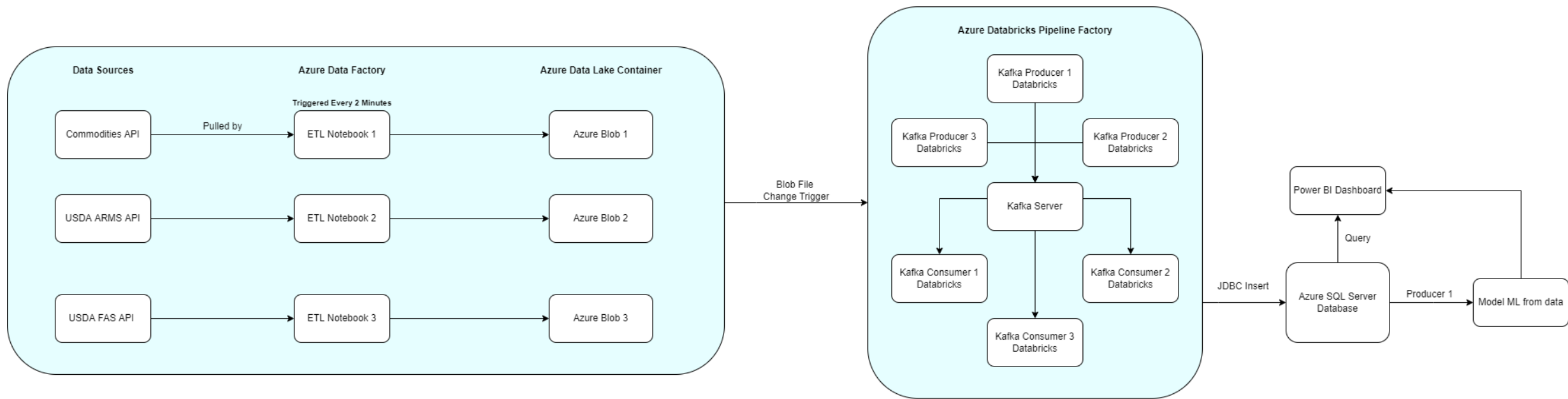
# Machine Learning

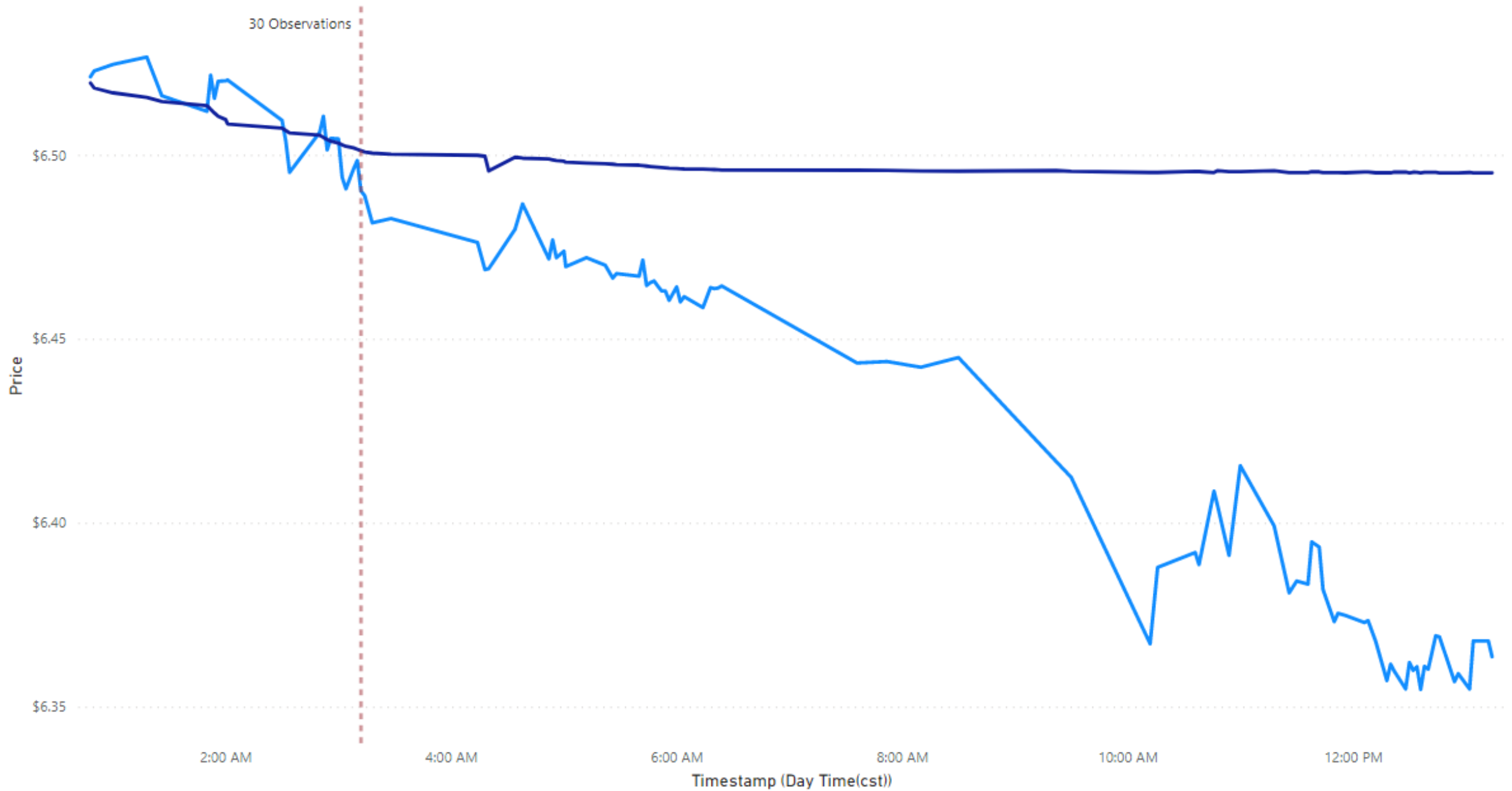- Using ARIMA forecasting model for Wheat/Corn/Soybeans
  - AutoRegressive Integratted Moving Average
- Training with 90% commodity data, testing with last 10
- Using autoARIMA python package to select best hyperparameters for each commodity
  - Corn: {1, 0, 3} p, d, q values respectively
- MAPE = 0.00235 ~ 99.765% accurate
- Limitation - modeling must be graphed on a separate PowerBI report

# ARIMA Testing
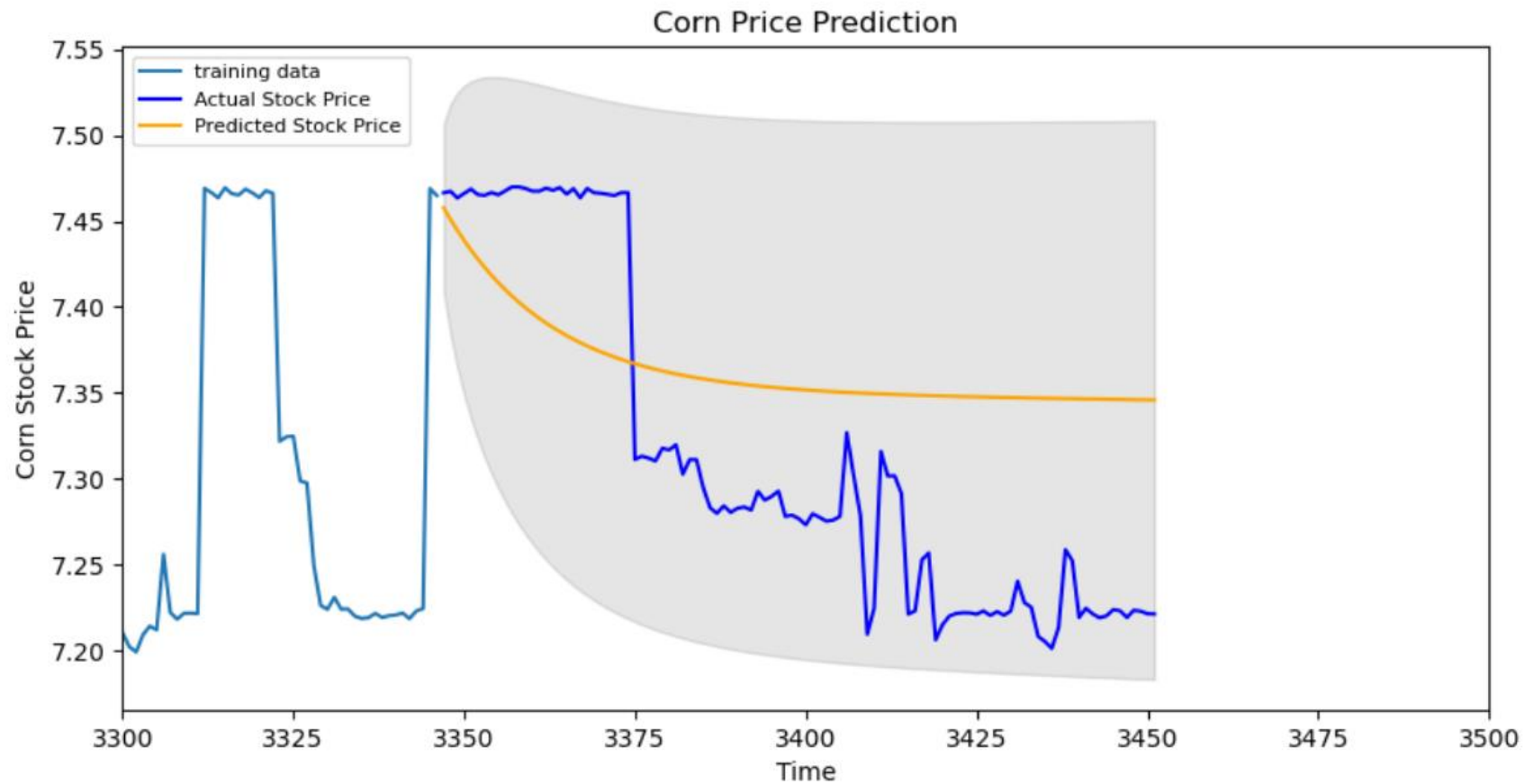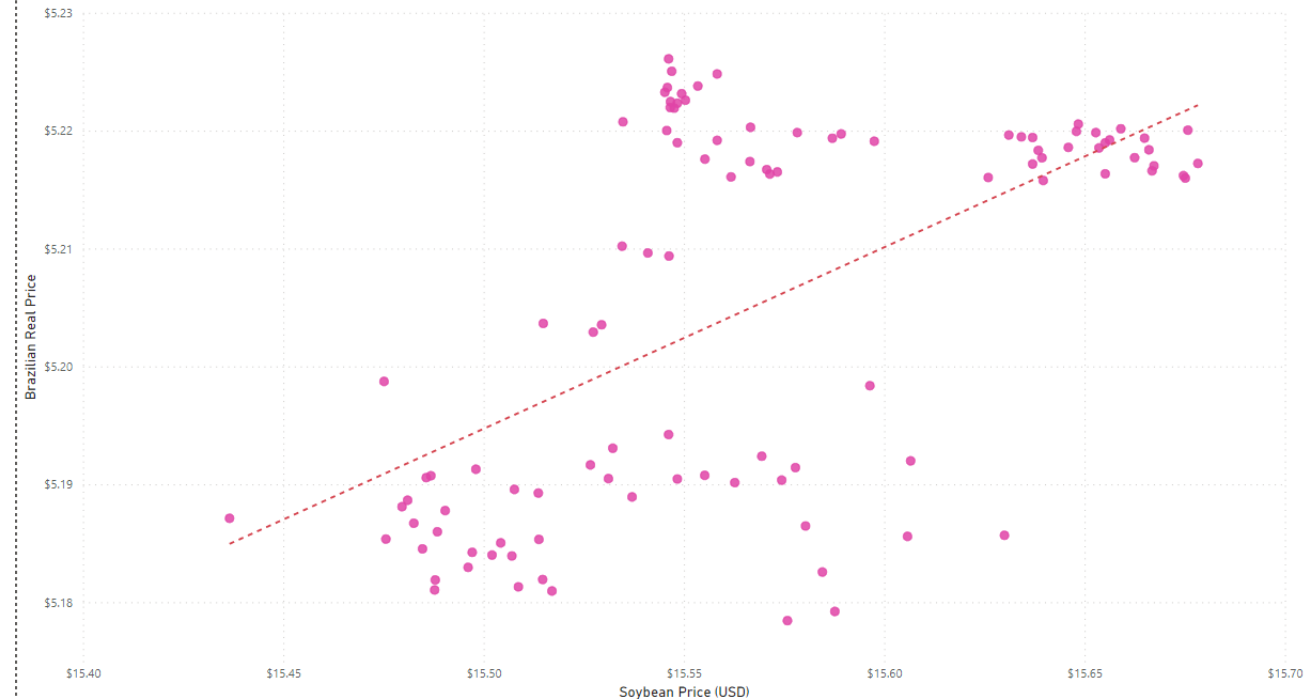
# Corn - Forecasted Price vs. Actual (USD)

● Actual Corn Price  ● Forecasted Corn Price

30 Observations

$6.50

Price

$6.45

$6.40

$6.35

2:00 AM          4:00 AM          6:00 AM          8:00 AM          10:00 AM          12:00 PM

Timestamp (Day Time(cst))

# Recommendations

- Predicting time series data is tricky and needs to be updated frequently to retain accuracy
  - Real world events and weather patterns change our model
  - Example: The Russia-Ukraine (global), Canada Truckers (more local)
- Minnesota is a top producer of Corn and Soybean in the US
- Possible Commodity-Currency Link

Soybean vs. Brazilian currency prices (USD)

THANK YOU

ANY QUESTIONS?