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**Evaluation of the Performance of Large Scale Economic Models**

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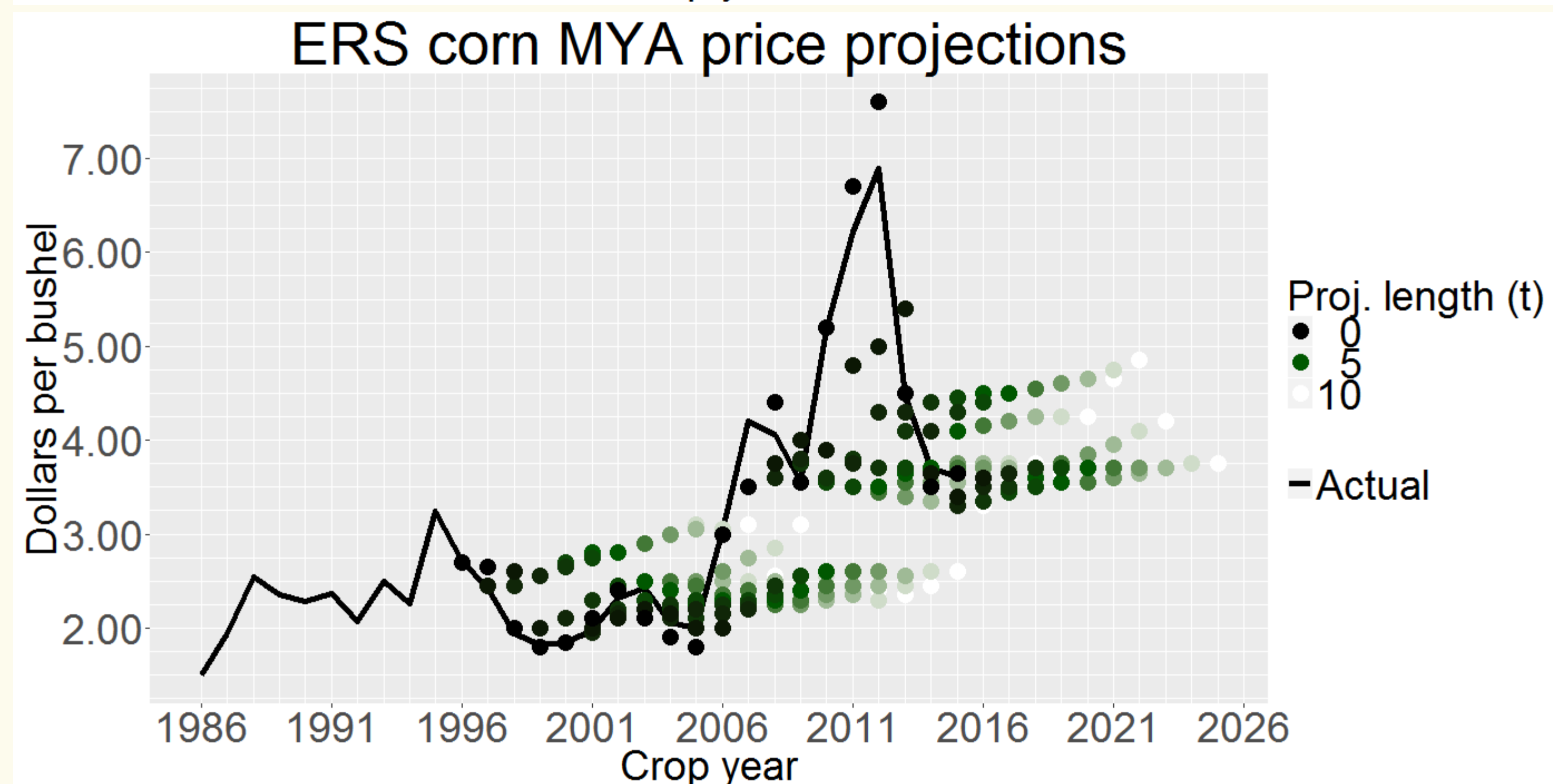
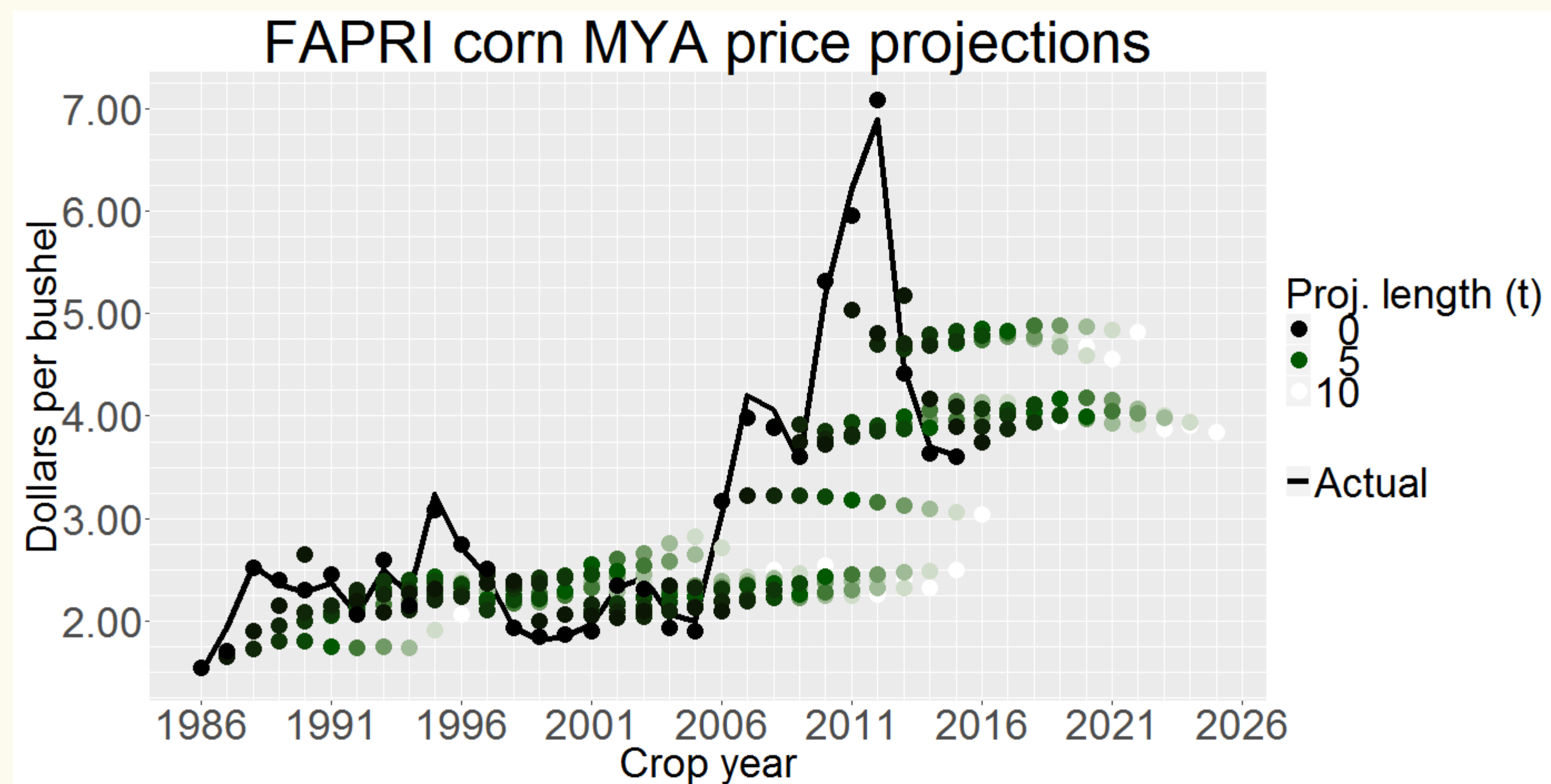
# Evaluation of the Performance of Large Scale Economic Models

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## Introduction

Large scale models (LSM's) are used by the USDA Economic Research Service (ERS) and the Food and Agricultural Policy Research Institute (FAPRI) to produce ten year projections. These numbers are meant to serve as a baseline for analysis of scenarios. However, their performance as forecasts has largely escaped evaluation, despite the large monetary value of decisions made with these numbers.



Note: The projection length is the marketing year for which the price is projected minus the marketing year of the projection (FAPRI releases its projections in March and the ERS generally has in February). Projection length of one is the Feb./Mar. forecast of the crop harvested that fall since the corn marketing year starts in September.

## Objectives

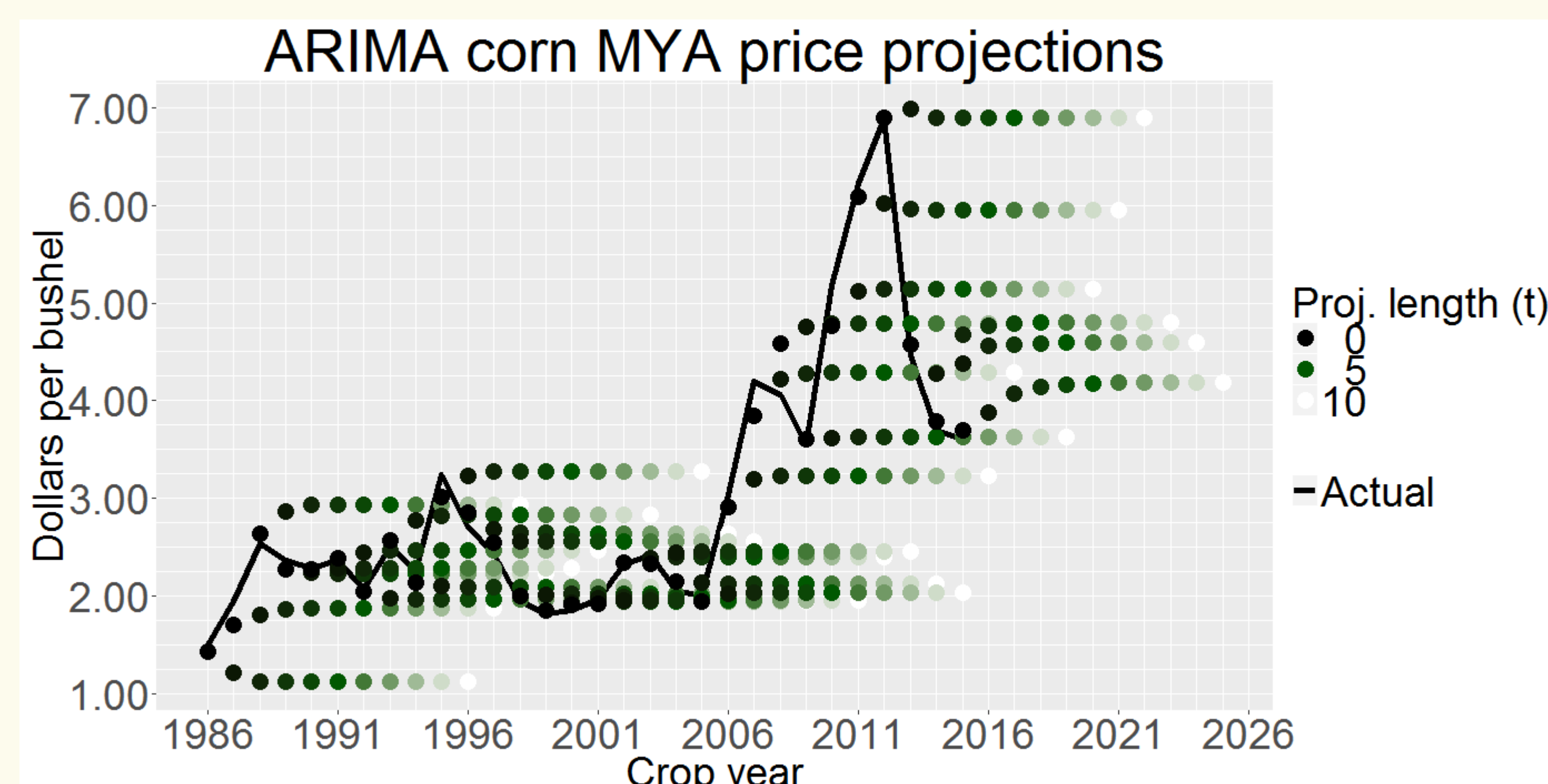
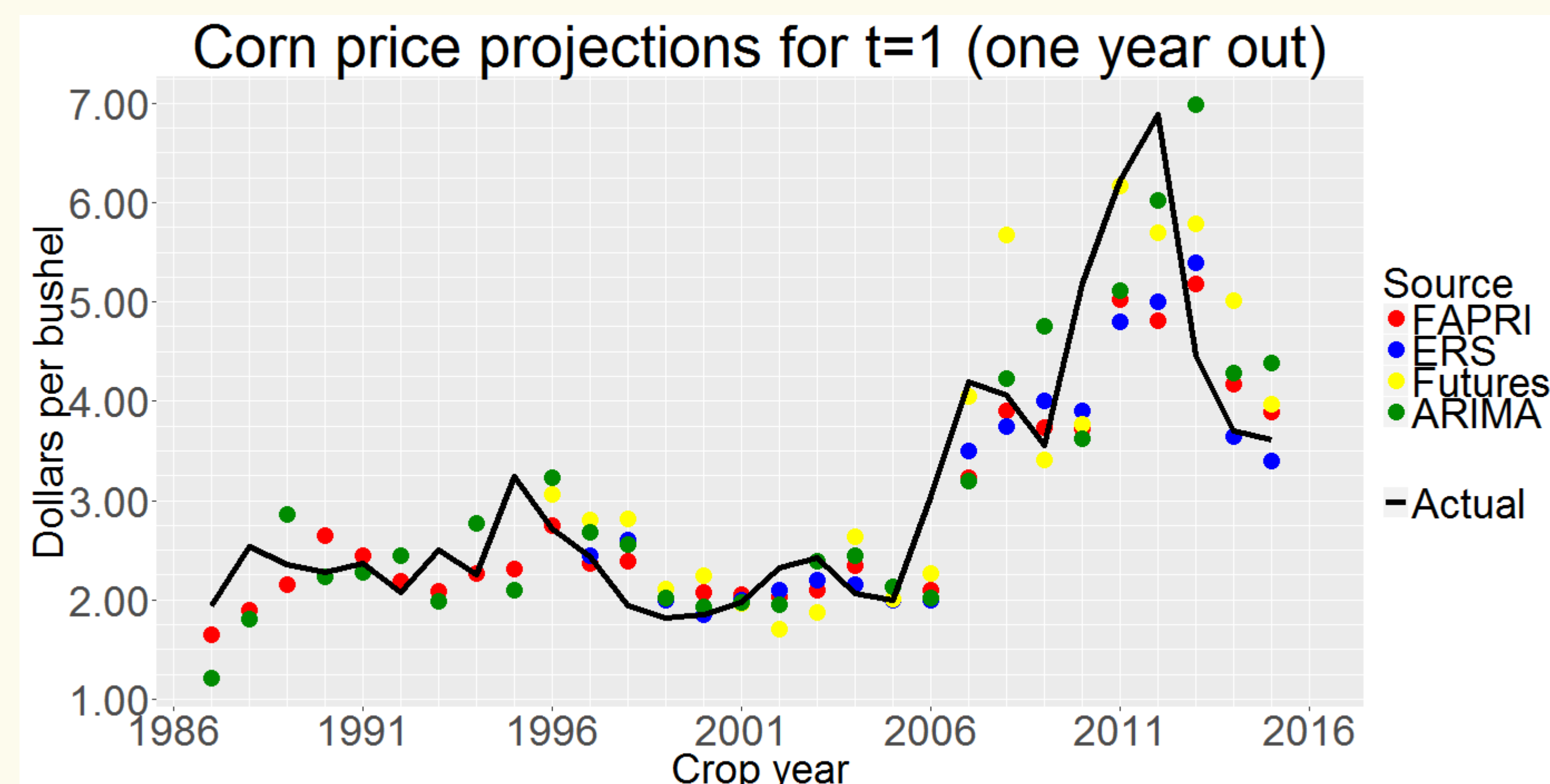
This study intends to determine if the LSM's provide useful forecast information for predicting the Marketing Year Average (MYA) corn price. Specifically, does the futures market or a simple time series model outperform ERS and FAPRI projections? The MYA price is chosen for the comparison as it is the price projected by FAPRI and the ERS and is used in many government programs. It represents the average price received by farmers during the crop year.

## Methods

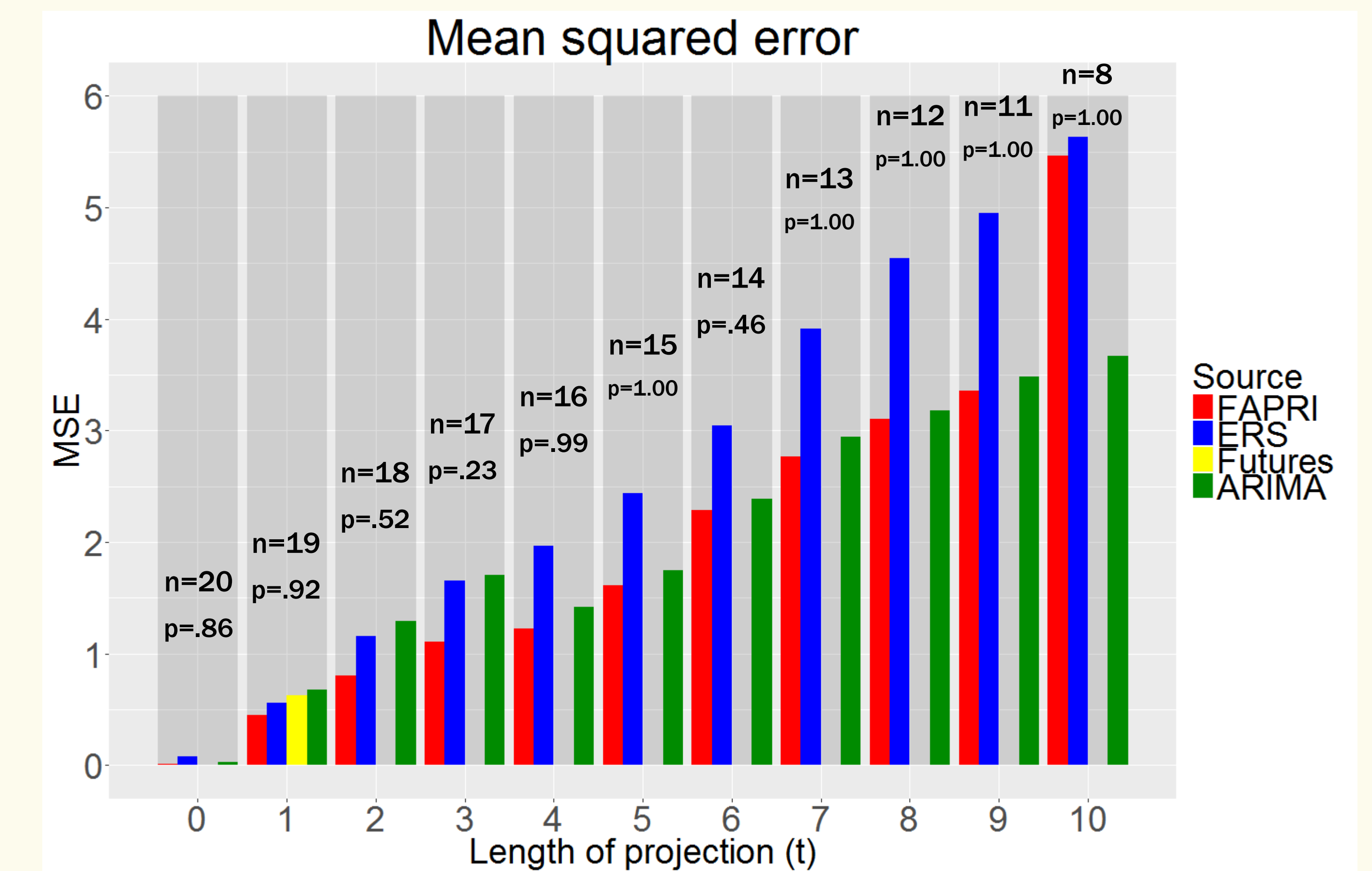
Two alternative forecasts were constructed. FAPRI releases its baseline in March and the ERS in February. Therefore, the alternative forecasts were constructed with information available on March 1st of that year. The first is a futures equivalent MYA price. This is done by converting each contract in the marketing year to a cash price by using a rolling average five year basis for the month. A rolling five year average of the monthly marketing weights is used to aggregate these cash prices to an annual average. Futures equivalents were only constructed for one year out given the lack of trading beyond that.

The second forecast is an Autoregressive Integrated Moving Average (ARIMA). The best ARIMA model is determined by AICC every year and new parameters estimated for the monthly farm prices. These are aggregated to a MYA by using the average marketing weights of the past five years.

A Modified Diebold-Mariono (MDM) test was performed for each projection horizon to test the hypothesis that all forecasts have the same mean squared error (MSE) at that horizon. In other words, it is a test of performance equivalence for all forecasts.



## Results



Note: n is the sample size for each projection horizon. An observation was only used if all forecasts made the projection in that year for the marketing year (this only applies to the futures forecast in t=1). p is p-value of the MDM test.

In the short term, FAPRI and the ERS tend to have lower MSE than ARIMA and futures. This advantage can probably be attributed to short-term information about the crop markets available to the LSM's. However, the LSM's advantage in terms of MSE disappears which is consistent with less market information available as the projection horizon increases. However, none of the differences in MSE has any statistical significance. The MDM tests are hampered by small sample sizes.

## Conclusions

The results provide evidence that LSM's may provide useful forecast information for predicting the MYA corn price. The conclusion is not definitive due to small sample sizes. Even so, there does appear to be some value to incorporating current information into the forecast as opposed to a time series method that ignores it. These results are only for corn prices and may not hold for other commodities or variables.

## Bibliography

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