Do Analysts Forecast the Ending Stocks or the USDA Forecasts?

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Overview

Both USDA and private analysts provide monthly crop ending stocks forecasts.

- **Previous studies on agricultural forecasts make different assumptions on forecast target.**
  - Private analysts compete with government agency in forecasting the target outcome. (*e.g.* Egelkraut *et al.*, 2003)
  - Private forecasts are targeting government forecasts. (*e.g.* McKenzie, 2008)
- **Does that matter to find out the true forecast target of private analysts?**
  - In other fixed-event forecasts where the forecast horizons are short, it is overlooked because of not much difference.
  - But there are 17 forecasts in a marketing year for corn and soybean, difference could be large.
  - Xiao *et al.* (2014) find that both USDA and analysts are inefficient in forecasting the ending stocks. It is possible that analysts are actually forecasting USDA forecasts.

Objective

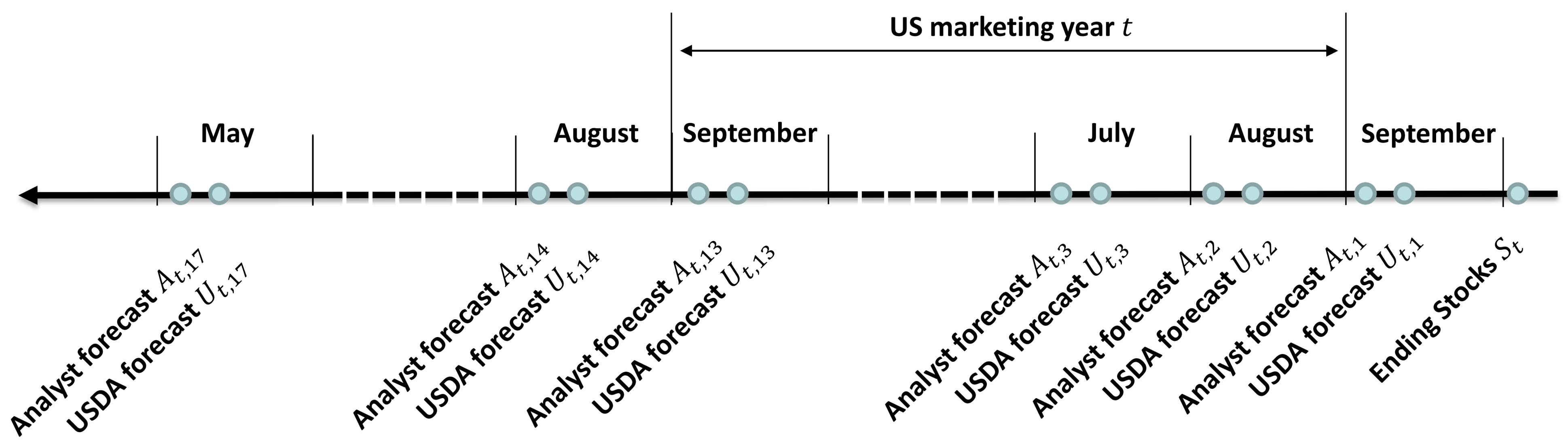
Analyze forecast structure, test for efficiency when the two types of forecasts are treated as forecasting each other, and investigate whether they are Forecasts of Forecasts (FoF)

Data

Panels of forecasts of US ending stocks for corn & soybean from marketing years 2003/04 through 2013/14

- Monthly USDA forecasts (source: WASDE Reports)
- Combined analysts' forecasts: Average and median

Alternating US Ending Stocks Forecast Structure for Corn & Soybean



Model

We focus on forecast revisions and build a model based on Clements *et al.* (2007) to jointly test the efficiency of USDA forecasts ($\{U_{t,n}\}$) and representative analyst's forecasts ($\{V_{t,n}\}$), where t represents the marketing year, n represents the forecast horizon, *i.e.* the number of months between the forecast and the ending stocks.

The null hypotheses are

H_0: $U_{t,n}$ are efficient forecasts of $V_{t,n-1}$

H_0: $V_{t,n}$ are efficient forecasts of $U_{t,n}$

The parameters are estimated in the following system

$$\begin{cases} S_t - U_{t,1} = \alpha_A + \beta_{1A}(U_{t,1} - V_{t,1}) + \beta_{2A}(V_{t,1} - U_{t,2}) + k_{t,1,A} + \varepsilon_{t,1,A} \\ U_{t,1} - V_{t,1} = \alpha_B + \beta_{1B}(V_{t,1} - U_{t,2}) + \beta_{2B}(U_{t,2} - V_{t,2}) + k_{t,1,B} - \varepsilon_{t,1,A} + \varepsilon_{t,1,B} \\ \vdots \\ V_{t,N-2} - U_{t,N-1} = \alpha_A + \beta_{1A}(U_{t,N-1} - V_{t,N-1}) + \beta_{2A}(V_{t,N-1} - U_{t,N-2}) + k_{t,N-1,A} - \varepsilon_{t,N-2,B} + \varepsilon_{t,N-1,A} \\ U_{t,N-1} - V_{t,N-1} = \alpha_B + \beta_{1B}(V_{t,N-1} - U_{t,N-2}) + \beta_{2B}(U_{t,N-2} - V_{t,N-2}) + k_{t,N-1,B} - \varepsilon_{t,N-1,A} + \varepsilon_{t,N-1,B} \end{cases}$$

If $\alpha_A = \beta_{1A} = \beta_{2A} = 0$, then $U_{t,n}$ are efficient forecasts of $V_{t,n-1}$. If $\alpha_B = \beta_{1B} = \beta_{2B} = 0$. then $V_{t,n}$ are efficient forecasts of $U_{t,n}$.

- α_A and α_B are coefficients of the constant terms. They measure whether forecast revisions are biased in one direction.
- β_{1A} and β_{1B} are coefficients representing the relationship of dependent forecast revisions and their immediately preceding forecast revisions. They can be interpreted as conditional forecast encompassing tests.
- β_{2A} and β_{2B} are coefficients representing the relationship of dependent forecast revisions and their own past forecast revisions. They measure whether forecast revisions immediately incorporate all new information or adjust slowly.
- k's are monthly shocks, which represent errors outside of forecaster's control, *i.e.* unforecastable. The variances of $k_{t,n,A}$ and $k_{t,n,B}$ are assumed to be different based on the alternating forecast structure.
- ε's are forecaster's idiosyncratic errors. The variances of $\varepsilon_{t,n,A}$ and $\varepsilon_{t,n,B}$ are assumed to be different.

Advantages of the model:

- Proposed an estimation framework where forecast revisions are linked.
- Introduced a detailed error covariance matrix allowing both heteroskedasticity and auto-correlations.
- Designed MCMC methods to estimate the system and parameters are fully explained by the data.

Estimation

	Corn Mean (St. dev.)	Soybean Mean (St. dev.)
Coefficients		
α_A	0.0013 (0.0026)	-0.0242 (0.0066)**
β_{1A}	0.0360 (0.0435)	0.6359 (0.1346)**
β_{2A}	0.1924 (0.0498)**	0.4165 (0.0765)**
α_B	0.0010 (0.0043)	0.0071 (0.0065)
β_{1B}	-0.0631 (0.0691)	0.0618 (0.0694)
β_{2B}	0.1631 (0.0568)**	0.0682 (0.0582)
Shock (range)		
σ_{kA}	0.0094 – 0.2725	0.0198 – 0.3103
σ_{kB}	0.0208 – 0.1356	0.0263 – 0.1573
Idiosyncratic		
σ_A	0.0166 (0.0001)**	0.0577 (0.0006)**
σ_B	0.0065 (0.00004)**	0.0108 (0.0001)**

Research to Date Findings

- For corn, USDA forecasts are FoF of next analysts' forecasts, but are inefficient.
- For corn, analysts' forecasts are FoF of next USDA forecasts, but are inefficient.
- For soybean, USDA forecasts are directly targeting ending stocks, but are inefficient.
- For soybean, analysts' forecasts are FoF of next USDA forecasts and they are efficient forecasts.

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