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Consistent price scenarios for models of various regional scales - an exploration of options

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MACSUR TradeM workshop

24 Sept 2014

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One price?

■ What will the wheat price be?

OECD – FAO Agricultural Outlook:

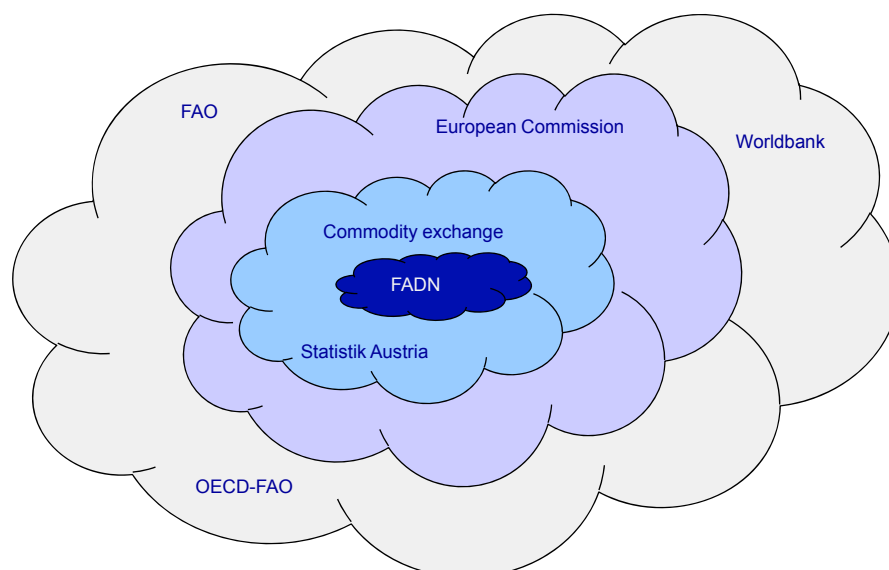
2013	2014	2015	2016
307 \$/t	284 \$/t	268 \$/t	267 \$/t

■ Probably only if you can put it on the right scale

- This presentation is about different scales of prices

Scales of prices :

- **Prices of different commodities** (producer, consumer, quality)
- **Frequency** (yearly, monthly, daily)
- **Geographic extent** (int. commodity markets, EU average, national)



■ International

- OECD-FAO Agri. Outlook
- FAO
- **Worldbank**

USA: Wheat, no. 1, **hard red winter**, ordinary protein, export price delivered at the US Gulf port for prompt or 30 days shipment;
USA: Wheat, no. 2, **soft red winter**, export price delivered at the US Gulf port for prompt or 30 days shipment;

■ International

- OECD-FAO Agri. Outlook
- FAO
- Worldbank

■ Europe

- **European Commission**

EU + member countries:
Feed wheat;
Breadmaking common wheat;
Durum wheat;

- International
 - OECD-FAO Agri. Outlook
 - FAO
 - Worldbank
- Europe
 - European Commission
- National
 - Commodity exchange
 - Statistik Austria
 - FADN

Austria Producer Prices (average):
Soft wheat
Durum wheat

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- How do these prices relate?
- Quality scale:
 - Substitutability
- Regional Scale: Price spreads & time lags due to
 - Transportation costs
 - Transaction costs, imperfect information

Magnitudes mainly an empirical question

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- Nature of price relation
 - Correlated?
 - Unit Root?
 - Cointegrated?
 - Granger Causality?
- If Unit Root&Cointegrated - > VECM -> V
- VECM&VAR assumptions
 - Normality
 - Homoscedasticity
 - No serial correlation



- How can I find out how **forecast** prices relate to regional observed prices?
- Forecast is **predetermined**: Forecast does not react to prices:

 Singel equation regression sufficient

■ Example Austria:

- **EU prices exogeneous for Austria** (use instead of predictions)

Regression without AR-terms:

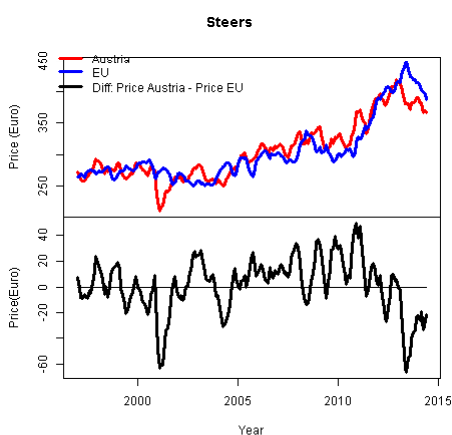
$$P_{AT} = c + b_1 * P_{EU} + D_{month} + u$$

Regression with AR-term(s)

$$P_{AT} = c + b_1 * P_{EU} + D_{month} + \sum_i b_i * P_{AT-i} + u$$

Use log prices scaled to 1 in 2004, determine number of lags with AIC

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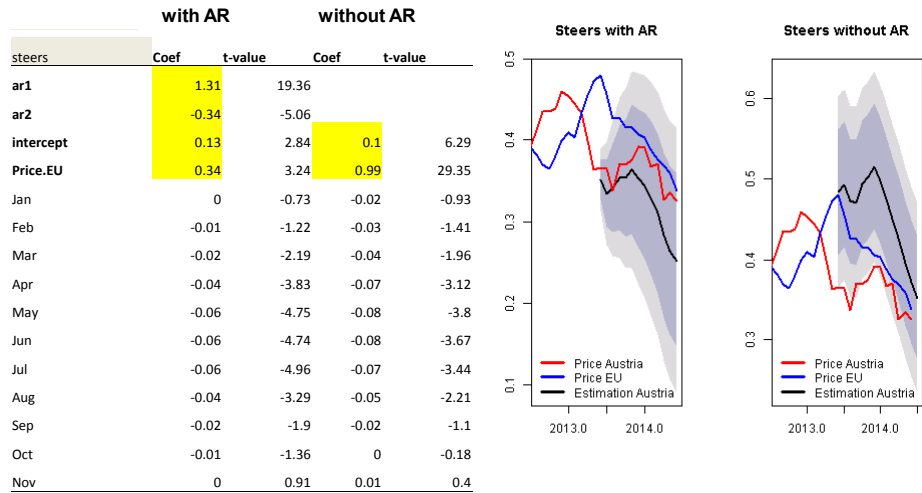


y Price Monitoring

7- June 2014

1 of scaling estimation

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Scaling-errors for the period 06/13-06/14

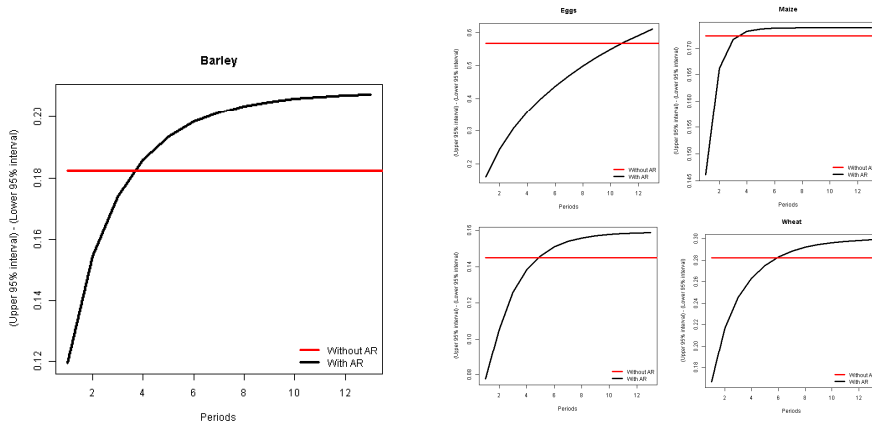
	RMSE with AR - RMSE without AR
Wheat	-0.05
Young Bulls	0.01
Barley	0.04
Cows	0.00
Eggs	-0.06
Heifers	-0.13
Maize	0.01
Oats	0.01
Steers	-0.10

RMSE = Root Mean Squared Error

Negative: with AR has less errors

Positive: without AR has less errors

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Monthly and yearly prices:

- Predictions are predetermined -> single equation regression sufficient for down-scaling (might add more explanatory variables)

Monthly prices:

- Including AR terms:
 - reduces RMSE (in the near future)
 - narrow CI for near future
 - widen CI for longer term

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■ **Outlook:**

- Use **ex-post forecast, historic simulation** or **backcasting values** and run regressions with regional prices or commodities of various qualities
- **Down-scale from yearly to monthly data** (compare Mixed Data Sampling (MiDaS) regression methods (Gyhsels et al. 2007))

- **Correlation:** Between 84% (eggs) and 98% (barley, maize, YoungBulls); all significant
- **Unit Root:**
 - ADF no UR: Wheat.AT, Wheat.EU, Oats.EU, YoungBulls.EU
 - KPSS no UR: Eggs.EU, Oats.EU
- **Granger Causality:**
 - **not EU->AT:** Eggs, Heifers, Oats, Steers, Young Bulls.
 - **AT->EU:** Oats
- **Not Cointegrated:** Eggs, Maize, steers
- **Tests weak (#obs&assumptions). Eyeball-Test&Theory suggest integration.**