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Price Variations of Cattle Grades: How Are Quality Attributes Related?

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Price Variations of Cattle Grades: How Are Quality Attributes Related?

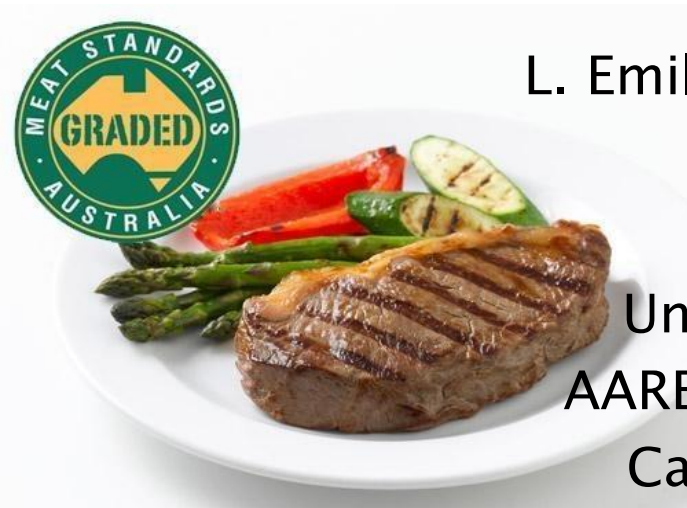
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AARES 60th Annual Conference

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Source: <http://www.beefandlamb.com.au> (2016).

Quality Differentiation

- Quality differentiation in agro-food markets has increased → More consumers are willing to pay premiums for high-quality products.
- Differentiation is based on **a specific or combination of attributes** → **Increase the chances** the product being selected by consumers (Gracia *et al.*, 2014).
- **Premiums** should be equivalent to the **additional cost of producing high quality** (Lapan and Moshini, 2007).
- But, consumers' willingness to pay for quality attributes varies and **might not be enough to offset the additional costs!!** (Frank, 2006; Gracia *et al.*, 2014; Viegas *et al.*, 2014).

What Does Determine the Price of a Product?

- Hedonic model → Price is a **function of attributes** or features of each product. $\Delta+$ Attributes $\rightarrow \Delta+\$$
- But, research has found **substitution effects of attributes on consumers' willingness to pay** (Beranrd and Bernard, 2009; Gracia et al., 2014; Bronnmann and Asche, 2015).
- Prices vary due to:
 - Attributes and types of products (different grades).
 - Differentiation.
 - Consumer preferences.
 - What about price transmission between quality grades?
- Tomek and Kaiser (2014) suggested **that variations in prices of different grades are correlated.**

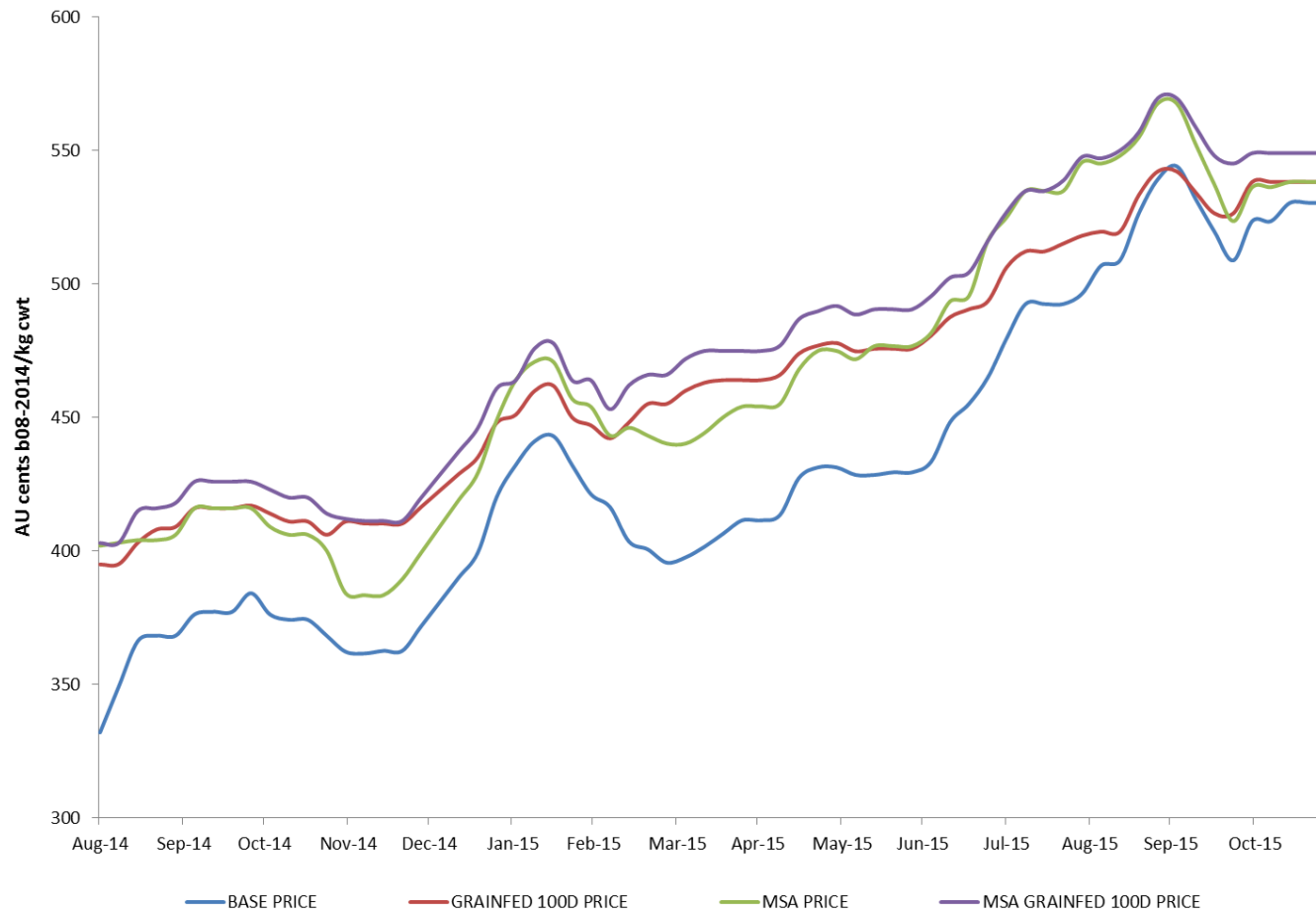
The Study

- This study aims to analyse the impact of **variations on prices of a specific quality grade on other grades.**
- Our empirical case study is cattle markets in **Queensland, Australia.**
- The Australian beef sector is a highly competitive industry
→ **It provides an ideal case study.**
- This research tests the price relationships between: **i) Base Grade, ii) Meat Standards Australia (MSA), iii) Grain-Fed 100 days, and iv) MSA-Grain-Fed 100 days.**

Data

- **Weekly average prices of cattle** sold in Over The Hooks sales in QLD South (August 2014 to November 2015).
- Prices in Australian cents per kilogram of carcass weight (AU cents/kg cwt) **of 260-280 kilograms steers.**
- **Prices of Base-grade, Grain-Fed 100 days, MSA-Grade and MSA-Grain-Fed 100 days cattle.**

Cattle Prices in Queensland, Australia (August 2014 to November 2015)



Price Transmission SVAR Dynamic Model

- Fackler and Goodwin (2001) and Enders (2014):

$$A_0 \text{Ln}P_t = C_0 + \sum_{s=1}^{S < T} C_s \text{Ln}P_{t-s} + u_t$$

$$\text{Ln}P_t = A_0^{-1}C_0 + \sum_{s=1}^{S < T} A_0^{-1}C_s \text{Ln}P_{t-s} + A_0^{-1}u_t$$

$$\Delta \text{Ln}P_t = A_0^{-1}C_0 + \sum_{s=1}^{S < T} A_0^{-1}C_s \Delta \text{Ln}P_{t-s} + A_0^{-1}u_t$$

where:

P_t = **vector of prices** at time t .

$A^{-1}u_t$ = **random stochastic residuals matrix** e_t estimated from the residuals u_t .

Ng and Perron Unit Root Tests

Ng and Perron (2001) Unit Root Test Results of Price Series

	MZ α test statistic with variables in levels	MZ α test statistic with variables in first differences
Natural Logarithm of Base Grade Cattle Prices (AU cents b08-2014/kg cwt)	-16.4440*	-18.3068**
Natural Logarithm of Grain-Fed 100 Days Grade Cattle Prices (AU cents b08-2014/kg cwt)	-13.6411	-20.4619**
Natural Logarithm of MSA Cattle Prices (AU cents b08-2014/kg cwt)	-14.9725	-20.4312**
Natural Logarithm of MSA-Grain-Fed 100 Days Grade Cattle Prices (AU cents b08-2014/kg cwt)	-33.6255***	-19.6546**

Null hypothesis: Series has unit root.

(***), (**) and (*) indicate that the parameter is significant at the 1%, 5% and 10% levels, respectively.

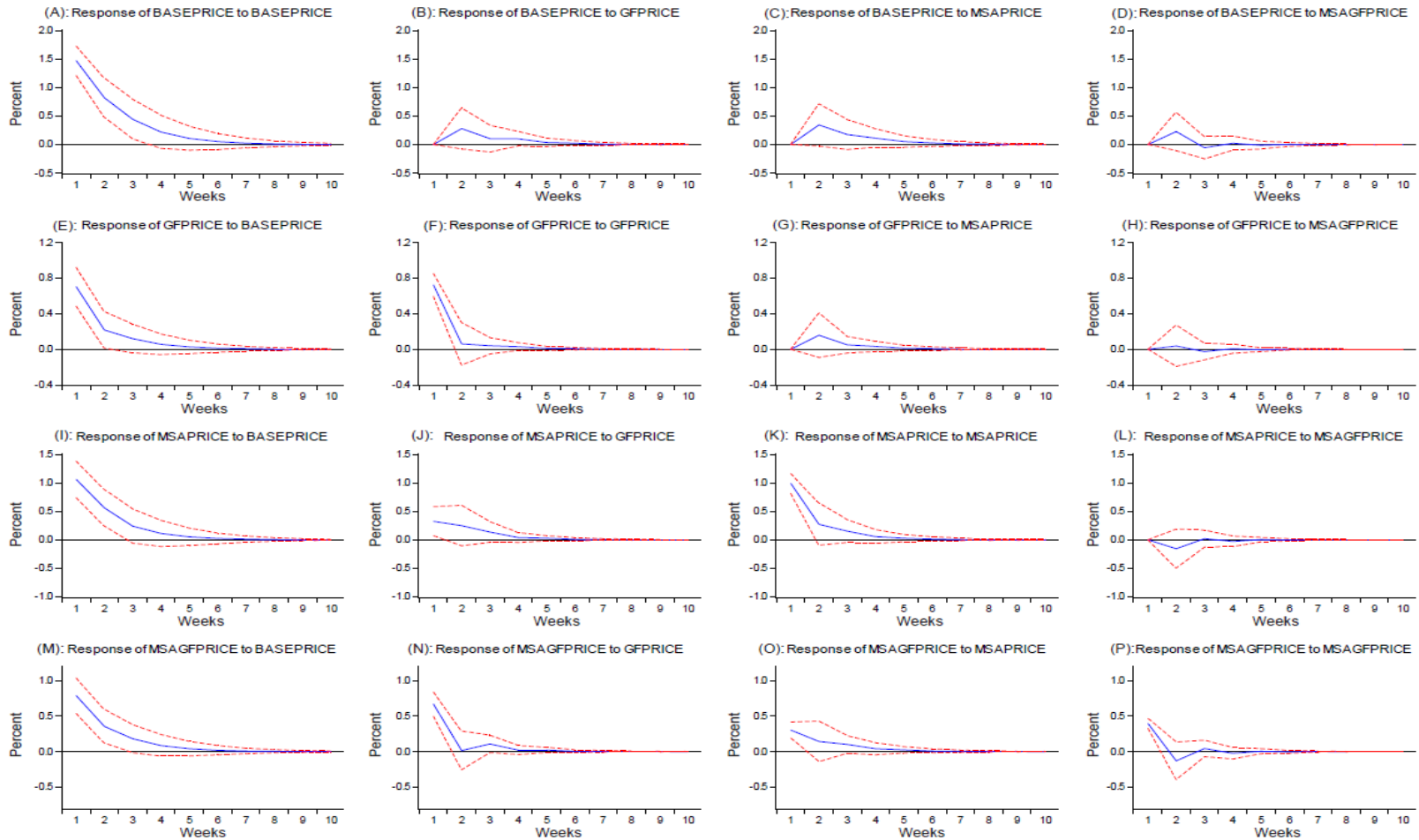
Reduced-Form VAR or SVAR?

- Contemporaneous effects can be tested through Cholesky decomposition.

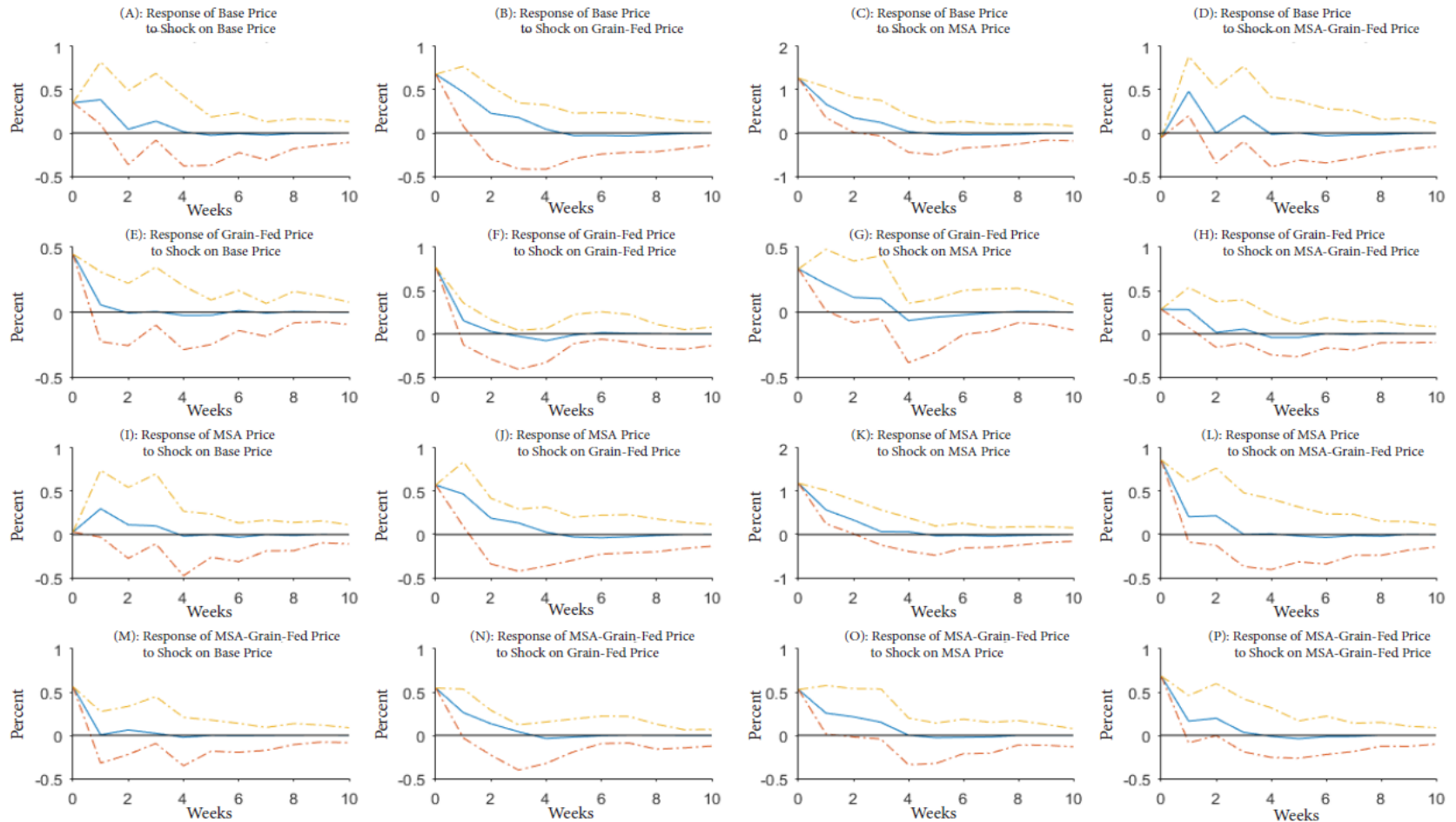
	Coefficients Matrix A_0^{-1}			
	DLNBGP	DLNGFP	DLNMSAP	DLNMSAGFP
First Difference of Natural Logarithm of Base Grade Cattle Prices (DLNBGP) (AU cents b08-2014/kg cwt)	0.014756***	0	0	0
First Difference of Natural Logarithm of Grain-Fed 100 Days Grade Cattle Prices (DLNGFP) (AU cents b08-2014/kg cwt)	0.007064***	0.007265***	0	0
First Difference of Natural Logarithm of MSA Cattle Prices (DLNMSAP) (AU cents b08-2014/kg cwt)	0.01064***	0.003279***	0.009960***	0
First Difference of Natural Logarithm of MSA-Grain-Fed 100 Days Grade Cattle Prices (DLNMSAGFP) (AU cents b08-2014/kg cwt)	0.007895	0.006705***	0.003040***	0.003991***

(*), (**) and (***) indicate that the parameter is significant at the 1%, 5% and 10% levels, respectively.

Ranges for Impulse Response to Shocks on Cattle Prices Using Cholesky Decompositions



Ranges for Impulse Response to Shocks on Cattle Prices Using Sign Restriction Identification



Conclusions

- Cattle quality grades are integrated in Queensland, Australia, **although imperfectly.**
- **Price shocks are partially contemporaneously transmitted** and the transmission **occurs within a month.**
- Future studies:
 - Should analyse the **price transmission between substitutes and complementary products.**
 - Should study **how price variations in quality grades are vertically transmitted throughout value chains and how they affect producers' welfare.**

Thank You Very Much!!

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Comments? / Questions?



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