

Transparency of Food Pricing

Work Package 3:

Price Transmission-New Insights

Overall Objective

Assess how prices for different agricultural commodities are transmitted along the food marketing chain in different EU member states.

Outline

1. Data.
2. Methodology.
3. Results.
4. Concluding remarks.

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Data

Monthly producer and consumer prices observed from January 2000 to December 2011 are used. Data were obtained from different national statistical sources.

Commodity/ country	Austria	Belgium	France	Germany	Hungary	Italy	Slovakia	Slovenia	Spain	UK
Beef	X	X	X	X		X	X		X	X
Eggs		X			X					X
Milk-Butter		X		X	X	X				
Milk-Cheese		X		X	X	X		X		
Milk-Milk	X	X	X	X	X	X	X	X	X	X
Pork		X	X	X	X	X	X			X
Poultry	X	X	X	X	X	X		X	X	X
Wheat-Bread		X		X	X		X	X		
Wheat-Flour	X	X			X			X	X	

Data

- Other variables (production and export specialization ratio, proportion of country production over the total EU production, country and commodity dummies) have been considered and used as explanatory variables in order to explain the differences and/or similarities that exist between different agricultural commodities and in different EU member states.

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Methodology

- Standard unit root and cointegration tests are conducted in order to determine whether price series are stationary and whether they are cointegrated, respectively.
- A linear vector error correction model (VECM) assessing how prices are transmitted along the food marketing chain is then estimated for the different food commodities and different EU countries.
- To explain the differences in the adjustments across different countries and commodities, Tobit models are estimated one with the producer price adjustment to long-run disequilibrium as dependent variable and another one, showing the same adjustment but for the consumer price.
- The variables that we select as explanatory variables in the Tobit model are restricted by data availability.

Methodology / The linear ECM

Error Correction Model (ECM)

$$\Delta P_t^P = \alpha_1 + \alpha^P (\alpha + P_{t-1}^P - \beta P_{t-1}^C) + \sum_{i=1}^n \alpha_{11}^{(i)} \Delta P_{t-i}^P + \sum_{i=1}^n \alpha_{12}^{(i)} \Delta P_{t-i}^C + \varepsilon_{P_t^P}$$

$$\Delta P_t^C = \alpha_2 + \alpha^C (\alpha + P_{t-1}^P - \beta P_{t-1}^C) + \sum_{i=1}^n \alpha_{21}^{(i)} \Delta P_{t-i}^P + \sum_{i=1}^n \alpha_{22}^{(i)} \Delta P_{t-i}^C + \varepsilon_{P_t^C}$$

where: P^P and P^C are the producer and consumer prices being analyzed

$\alpha_1, \alpha_2, \alpha_{11}^{(i)}, \alpha_{12}^{(i)}, \alpha_{21}^{(i)}, \alpha_{22}^{(i)}$ show short-run dynamics

α^P, α^C the speed of adjustment to disequilibrium from the long-run relationship.

Methodology / Tobit model

$$P_i^p = \beta^p + \beta_1^p PSR_i + \beta_2^p ESR_i + \beta_3^p PW_i + \beta_4^p AUS_i + \beta_5^p FRA_i + \beta_6^p GER_i + \beta_7^p UK_i + \beta_8^p CHI_i + \beta_9^p EGG_i \\ + \beta_{10}^p POR_i + \beta_{11}^p MIL_i + \beta_{12}^p BUT_i + \beta_{13}^p CHE_i + \beta_{14}^p BRE_i + \beta_{15}^p FLO_i + u_i^p$$

$$P_i^c = \beta^c + \beta_1^c PSR_i + \beta_2^c ESR_i + \beta_3^c PW_i + \beta_4^c AUS_i + \beta_5^c FRA_i + \beta_6^c GER_i + \beta_7^c UK_i + \beta_8^c CHI_i + \beta_9^c EGG_i \\ + \beta_{10}^c POR_i + \beta_{11}^c MIL_i + \beta_{12}^c BUT_i + \beta_{13}^c CHE_i + \beta_{14}^c BRE_i + \beta_{15}^c FLO_i + u_i^c$$

Where P_i^p and P_i^c are the producer and consumer price speed of adjustments.

PSR is the production specialization ratio.

ESR presents the export specialization ratio.

PW is the proportion of country production of a specific product over the total EU production for the same product.

AUS_i, FRA_i, GER_i and UK_i are country dummy variables for Austria, France, Germany and UK, respectively.

CHI_i to FLO_i are the commodity dummies.

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Results / Unit root & Cointegration

- ADF and KPSS tests are used. Unit root tests suggest that most prices are nonstationary.
- Engle and Granger cointegration test is applied and suggests that the hypothesis of no cointegration can be rejected.

Results / The linear ECM

Estimation of the VECM: adjustment of producer and consumer prices to long-run disequilibrium

Commodity/ country	Austria		Belgium		France		
	Independent variable	Producer equation	Consumer equation	Producer equation	Consumer equation	Producer equation	Consumer equation
Beef	ECT_{t-1}	-0.144**	0.021*	-0.084**	0.012*	-0.080	0.089
Eggs	ECT_{t-1}			-0.293**	0.013**		
Milk-Butter	ECT_{t-1}			-0.092**	0.007		
Milk-Cheese	ECT_{t-1}			-0.072**	0.013**		
Milk-Milk	ECT_{t-1}	-0.063**	-0.009	-0.082**	0.005	-0.246**	0.023**
Pork	ECT_{t-1}			-0.258**	0.015**	-0.201**	0.046
Poultry	ECT_{t-1}	-0.106**	0.381**	-0.315**	0.025**	-0.020	0.194**
Wheat-Bread	ECT_{t-1}			-0.042	0.009**		
Wheat-Flour	ECT_{t-1}	-0.062*	0.030**	0.002	0.031**		

Results / The linear ECM

Estimation of the VECM: adjustment of producer and consumer prices to long-run disequilibrium

Commodity/ country	Independent variable	Germany		Hungary		Italy	
		Producer equation	Consumer equation	Producer equation	Consumer equation	Producer equation	Consumer equation
Beef	ECT_{t-1}	-0.130**	0.034**			-0.131**	0.055**
Eggs	ECT_{t-1}			-0.437**	-0.042		
Milk-Butter	ECT_{t-1}	-0.083**	0.026	-0.062**	0.046**	-0.089**	0.011
Milk-Cheese	ECT_{t-1}	-0.040**	0.068**	-0.103**	0.071*	-0.044	0.039**
Milk-Milk	ECT_{t-1}	-0.057**	0.074**	-0.074**	0.026	-0.048	0.024*
Pork	ECT_{t-1}	-0.064	0.091**	-0.165**	-0.006	-0.277**	0.007
Poultry	ECT_{t-1}	-0.026	0.101**	-0.140**	-0.033	-0.469**	-0.020
Wheat-Bread	ECT_{t-1}	-0.054	0.003	-0.089**	0.013**		
Wheat-Flour	ECT_{t-1}			-0.121**	0.045**		

Results / The linear ECM

Estimation of the VECM: adjustment of producer and consumer prices to long-run disequilibrium

Commodity/ country	Independent variable	Slovakia		Slovenia		Spain		UK	
		Producer equation	Consumer equation	Producer equation	Consumer equation	Producer equation	Consumer equation	Producer equation	Consumer equation
Beef	ECT_{t-1}	-0.041	0.014			-0.118**	0.002	0.010	0.103**
Eggs	ECT_{t-1}							-0.124**	0.016
Milk-Butter	ECT_{t-1}								
Milk-Cheese	ECT_{t-1}			-0.066**	0.031				
Milk-Milk	ECT_{t-1}	-0.035**	0.035**	-0.065**	0.056**	-0.057**	0.031**	-0.157**	0.008
Pork	ECT_{t-1}	-0.317**	0.005					-0.136**	0.026
Poultry	ECT_{t-1}			0.011	0.031**	-0.236**	-0.005	0.000	0.139**
Wheat-Bread	ECT_{t-1}	-0.084**	0.011**	-0.123**	0.008				
Wheat-Flour	ECT_{t-1}			-0.169**	0.050**	0.009	0.019**		

Results / Tobit model

Tobit results: parameter estimates.

Independent variable	Producer equation	Consumer equation
Production specialization ratio	-0.482** (0.141)	0.119 (0.102)
Export specialization ratio	-0.912** (0.232)	0.357** (0.172)
Production weight within the EU	1.366** (0.357)	-0.495* (0.288)
Austria	-0.040 (0.048)	0.102** (0.039)
France	-0.172** (0.061)	0.070 (0.049)
Germany	-0.193** (0.063)	0.085* (0.049)
UK	-0.215** (0.058)	0.047 (0.044)
Poultry	0.085* (0.046)	0.070* (0.035)
Eggs	0.202** (0.061)	-0.016 (0.055)
Pork	0.308** (0.065)	-0.075 (0.054)
Milk	0.062 (0.045)	-0.007 (0.035)
Butter	-0.126* (0.064)	0.004 (0.056)
Cheese	-0.095* (0.055)	0.055 (0.045)
Bread	0.081 (0.061)	-0.034 (0.050)
Flour	0.040 (0.057)	0.008 (0.044)
Constant	0.190** (0.047)	-0.046 (0.038)
Number of observations	56	56
P-value	0.000	0.045

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Concluding remarks

- A bivariate VECM for 9 different commodities in 10 EU member states is estimated.
- An increase in the industry and export specialization ration reduces the need for producer price adjustments.
- National consumer prices adjust more quickly within a specialized sector.
- An increased national production weight within the EU implies faster producer adjustments. On the other hand, an important supply of commodities may be beneficial to consumers.
- The analysis suggests different price adjustment in different commodities and different EU countries.

Concluding remarks / limitations

- The variables that have been selected as explanatory variables in the tobit model are restricted by data availability, since we need them to be available for different EU countries and for different agrofood sectors.
- The scarcity of data meeting these requirements, such as concentration ratios, makes the need to make further efforts at collecting EU data pressing if we want to better understand price behavior within the EU.

Any suggestions about other variables!!!

Concluding remarks

- An asymmetric VECM for all data, 9 different commodities in 10 EU member states, is estimated. The results suggest that most price adjustments are not characterized by asymmetries.
- More sophisticated models are also applied for some specific products and countries.

Concluding remarks

- A paper entitled “Price linkages and patterns of transmission among producer and consumer markets for apple in Slovenia” has been elaborated. A parametric TVECM and non-parametric approach are applied.
- Another paper aims to study price volatility in Slovenian wheat markets will be done. A MGARCH model will be used.

THANK YOU FOR YOUR ATTENTION