Presentation to the 2nd COMPETE WORKSHOP: The competitiveness of the European agri-food chain

Pricing to Market in EU Wheat Exports

Philip Dawson, Matthew Gorton, Lionel Hubbard and Carmen Hubbard

Introduction

Pricing to market (PTM) – "destination-specific adjustment of mark-ups in response to exchange-rate changes".

Implies that currency changes are not fully transmitted into export prices i.e. divergent movements in different markets.

Theme: Is trade characterised by a lack of convergence in market prices across export markets?

Paper Aim

- Investigate the existence of PTM behaviour in EU wheat exports for the period 2000-2013.
- Estimate the relationship between the export unit value and the exchange rate using (quarterly) panel data from 11 countries for the years 2000 to 2013.
- The 11 countries represent the largest importers of wheat from the EU (measured by value) for which there are data.
- As far as we are aware, this paper is the first empirical investigation of PTM behaviour for EU wheat exports.

Structure

1. The EU and Wheat Exports
2. Review of the PTM Literature
3. Empirical Method
4. Data and Results
5. Conclusions

EU and Wheat Exports

- EU accounts for around 20% of global wheat production.
- In EU, wheat accounts for around 50% of cereals output.
- Largest producers are France and Germany.
- Around 15% of EU wheat production exported each year.
- Main EU markets – North Africa, Middle East, Peripheral European Countries.
- Exports require an export license but not subsidised.
- Imports much more tightly controlled.

Review of the PTM Literature

If PTM, an exporter with power in multiple markets adopts price-discriminating behaviour. It can either maintain or increase their export prices when the exchange rate rises. The profit, π, of an exporter selling to *i*=1,…,*N* export markets is:

$$\pi(p_1, \cdots, p_n) = \sum_{i=1}^{n} p_i\, q_i(ER_i p_i; S_i) = C\left(\sum_{i=1}^{n} q_i\,(ER_i p_i; S_i), W\right)$$

where p_i is the price for country in the exporter's currency, q_i is quantity demanded which is determined by the price in the buyer's currency, ER_i, and a demand shifter S_i, and $C(q,w)$ is the cost function where w denotes input prices.

Review of the PTM Literature (2)

The first-order profit-maximising conditions show that the price to each export market is the product of the common marginal cost, C_q, and a destination-specific markup:

$$p_i = C_q\left(\frac{\eta_i}{\eta_i - 1}\right) \qquad i=1,\ldots,N$$

where η_i is the absolute value of the elasticity of demand in the export market i. The firm equates the marginal revenue from sales in each export market with the common marginal cost, and the ability to adopt price-discriminating behaviour depends on the elasticity of demand in the export market and marginal cost.

Review of the PTM Literature (3)

The empirical counterpart of (2) with t=1,…,T observations is derived by taking natural logarithms and totally differentiating:

$$\Delta lnp_{it} = \theta_t + \beta_i \Delta lnER_{it} + \varepsilon_{it} \qquad i=1,\ldots,N,\ t=1,\ldots,T \qquad (3)$$

where ε_{it} is an error term with the usual properties. Knetter (1993) notes that (3) can be rewritten in levels:

$$lnp_{it} = \theta_t + \lambda_i + \beta_i lnER_{it} + \varepsilon_{it} \qquad (4)$$

where θ_t are common time-specific effects, λ_i are country-specific effects, and β_i are the PTM-coefficients or the elasticities of the export price with respect to exchange rates.

Review of the PTM Literature (4)

λ	β	Market scenario
Not significant	Not significant	Perfect competition, imperfect competition with common mark-up
Significant	Not significant	Constant elasticity of demand > constant markup, which can differ across countries
Not significant / significant	Significant	Varying elasticity of demand > varying markup, which can differ across countries
	Positive	Amplification of exchange rate effects
	Negative	Local currency price stability (LCPS)

Source: Pall et al. 2013 (p.181).

Review of the PTM Literature

- **Previous studies largely focus on wheat exports by USA and Canada. Evidence of PTM albeit only in some markets.**

- **Russian wheat exports - results show evidence of PTM for five countries (Algeria, Azerbaijan, Cyprus, India and Mongolia) and attribute this to Russia's large share of wheat imports and/or lack of major competitors for these export markets.**

- **Criticisms: some previous studies use annual data (e.g. Carew and Florkowski, 2003; Jin 2008). Second, only Carew and Florkowski (2003) and Pall *et al.* (2013) examine the time series properties of the panel data (both find that export unit values and the nominal exchange rate are stationary).**

Empirical Method

- **Equation (4) is a two-way fixed effects (or least squares dummy variable) model with both individual country and time effects and most studies of PTM estimate it by OLS.**

- **However, need to test for non-stationarity in a panel (i.e. Im *et al.* 2003; Hadri 2000).**

- **A number of panel tests for non-cointegration have been developed and we use the ADF-type t-statistic of Pedroni (1999, 2004) to test for non-cointegration in (4).**

Empirical Method (2)

- **If cointegration exists between $ln\ p_{it}$ and $ln\ ER_{it}$ in the panel, their long-run relationship can be estimated.**
- **Pedroni (2002) considers two panel estimators: (non-parametric) fully modified ordinary least squares (FMOLS) and (parametric) dynamic ordinary least squares (DOLS).**
- **Both FMOLS and DOLS correct for OLS bias induced by endogeneity, and both can be used to provide within- or between-group (group mean) estimates.**
- **Alternative is a panel extension of Engle and Granger (1987) whereby the long-run relationship in (4) is embedded in an error-correction model (ECM). Estimate the long-run PTM-coefficient and the speed of adjustment towards long-run equilibrium following a shock to the system.**

Data and Results (1)

- The data consist of export unit value (€/tonne of wheat, f.o.b. prices) and the exchange rate expressed as units of the importer's currency per unit of the exporter's currency.
- Monthly data from 11 of the main EU wheat export destinations for 2000(1)-2013(11) contain missing observations. Both series are therefore converted into quarterly data.
- The final balanced panel dataset consist of 56 observations for 2000(1)-2013(4) for Norway, Switzerland, Albania, Belarus, the Democratic Republic of Congo, Mauritania, Tunisia, Egypt, Morocco, Algeria and Iceland.
- We estimate the relationship between the export unit values and exchange rates, and throughout both series are in logarithms.

Data and Results (2)

- The fixed effects model in (4) is estimated with White's robust estimator to correct for unknown heteroscedasticity.
- The null hypothesis that the individual *β*-effects are not significant is rejected.
- 7 countries have a positive PTM-coefficient which implies the amplification of exchange rate fluctuations by the EU but only those for Switzerland and Belarus are significant.
- 4 countries with negative PTM-coefficients which indicates local currency price stabilization but only those for Algeria and Iceland are significant.

Data and Results (3)

- The results from the fixed effects model in (4) may be spurious if one or both series are non-stationary, and we test for unit roots.
- Evidence of trends in some of the individual series, and they are included in both IPS and Hadri unit roots test equations.
- Panel unit root tests tend to draw different conclusions but overall they cast doubt on whether the fixed effect results are meaningful.
- Proceed on the basis that both series are non-stationary, and we examine the existence of a cointegrating relationship between them.

Data and Results (4)

- **Estimating (4) using FMOLS and DOLS, there is some evidence that optimal mark-ups vary across export markets.**

- **FMOLS results show that only Belarus has a significant negative long-run PTM-coefficient. Negative PTM-coefficients from DOLS estimates are significant only for Belarus and Iceland.**

- **Otherwise, there is little evidence of differential mark-ups between export markets.**

Data and Results (5)

- **Since the individual equations for Belarus and Iceland yield significant DOLS PTM-coefficients, we construct a sub-sample panel dataset for these two countries.**
- **We use the panel method of Pesaran *et al.* (1999) to estimate the (common) long-run PTM-coefficient, β, and the speed of adjustment, which is the mean of φ_i, in the ECM in (5) which also includes a trend.**
- **The estimate of the speed of adjustment is relatively quick.**
- **33% of the adjustment to long-run equilibrium takes place in the first year following a shock to the system, almost 70% of full adjustment takes place by the third year, and full adjustment takes around 10 years.**

Conclusions

Initial PTM research criticized for being based on insufficient disaggregation of product categories and for failing adequately to examine the time-series properties of data.

Criticisms addressed here by estimating the PTM-panel parameters using FMOLS and DOLS and focusing on a single unbranded commodity (wheat).

There is little evidence of differential mark-ups between export markets although those from Belarus (from FMOLS estimates) and Belarus and Iceland (from DOLS estimates) are significant.

In general wheat export markets are integrated.

Limitations

Study focuses on export unit values and does not consider how these affect wheat, flour and bread prices in the importing country (i.e. price transmission).

It may be that price discrimination is limited in export markets (as measured in fob prices) but importing countries are characterised by an absence of market integration, or of complete pass-through of price changes along the supply chain.

Commodity price integration in the EU

Work package 7

Zoltán Bakucs, Imre Fertö, Zsifia Bededek

Centre for Economic and Regional Research, Hungarian Academy of Sciences

Presentation to the 2nd COMPETE WORKSHOP: The competitiveness of the European agri-food chain

1. Background

- The Law of One Price (LOP):
- Temporal dimension:
- P_f-P_c=S, where
  - P_f: expected future price
  - P_c: current cash price
  - S: cost of storage between time periods
- Current and expected future price perfectly linked by storage costs

- Spatial dimension – for the rest of the presentation LOP will implicitly refer to the spatial dimension

1. Background

- Law of One Price: a good must sell for the same price in all locations – market actors eliminate possible price differences by arbitrage. Example: if prices in two geographically distant locations with no trade barriers or transport costs differ, supply would move to higher price whilst demand to lower price location equaling prices.
- Some consequences: purchase power parity
- Caveats:
  - Does not apply intertemporally
  - Does not apply to not tradable goods
  - Need not apply if information flow is less than perfect

1.1. Importance

- Assume two prices of the same good in different locations, and K_t being transaction costs (transport, handling etc.):

  $P_{1t} = P_{2t} + K_t$

- Trade between the two markets occurs only if

  $|P_{1t} - P_{2t}| > K_t$.

- Now back to the EU: one of the prime targets of CAP is to facilitate the spatial integration of agricultural markets
- On an integrated market price information should be freely transmitted between member states
- Perfectly integrated markets are usually assumed to be efficient
- If however they are not, it is an interesting and important question to see why?

1.2. Literature review

- Sexton at al. 1991 – spatial market separation of special importance for agr. goods (bulk, perishability, transport costs)
- Goodwin and Schroeder 1991 - Imperfectly integrated markets: wrong price information signals (producers, mkt. agents)
- Fackler and Goodwin 2001 – overview of horizontal integration studies (US between states, USA – Canada relationship
- Serra et al. 2006 – non-parametric and threshold regressions on European pork market (note: the topic is a 'playground' for new the econometric tools)
- Brosig et al. 2011, Dawson et al. 2006, Bakucs et al. (2011) – European cereal market integration
- Bakucs et al. 2014 – Slovenian – Hungarian wheat market integration - GP tool
- Mengel and von Cramon-Taubadel (2014) – MR techniques

1.3. Setting the scene

- Agricultural trade in the EU
- Choice of sectors for analysis (importance, trade volume, value, employment, CAP, pollution etc. considerates
- Largest exporters, importers, characteristics of consumption
  - Pork: 152 mil pigs, 23 mil T carcass/year, 110% selfsufficiency. Biggest producers: DE, ES, NL, PL, IT
  - Milk: 23 mil cows, 152 mil T/year, all member states produce. Biggest producers: DE, FR. UK, NL, IT
- Market description: raw milk (quota system, production 2013:116,069 tho T; 2014: 118,478 tho T), pork
- Period analyzed from policy and macroeconomic perspective

2. Scope of the study

- Research on the spatial integration of agricultural markets is often used to test the efficiency of agricultural markets. Perfectly integrated markets are usually assumed to be efficient. Tomek and Robinson (2003) define the two axioms of the international price differences theory:
- 1. The price difference in any two international markets involved in trade with each other equals the transfer costs.
- 2. The price difference between any two international markets not involved in trade with each other is smaller than the transfer costs.
- Transfer costs are equal to transportation costs between markets and various other handling costs.

3. Hypothesis to be tested

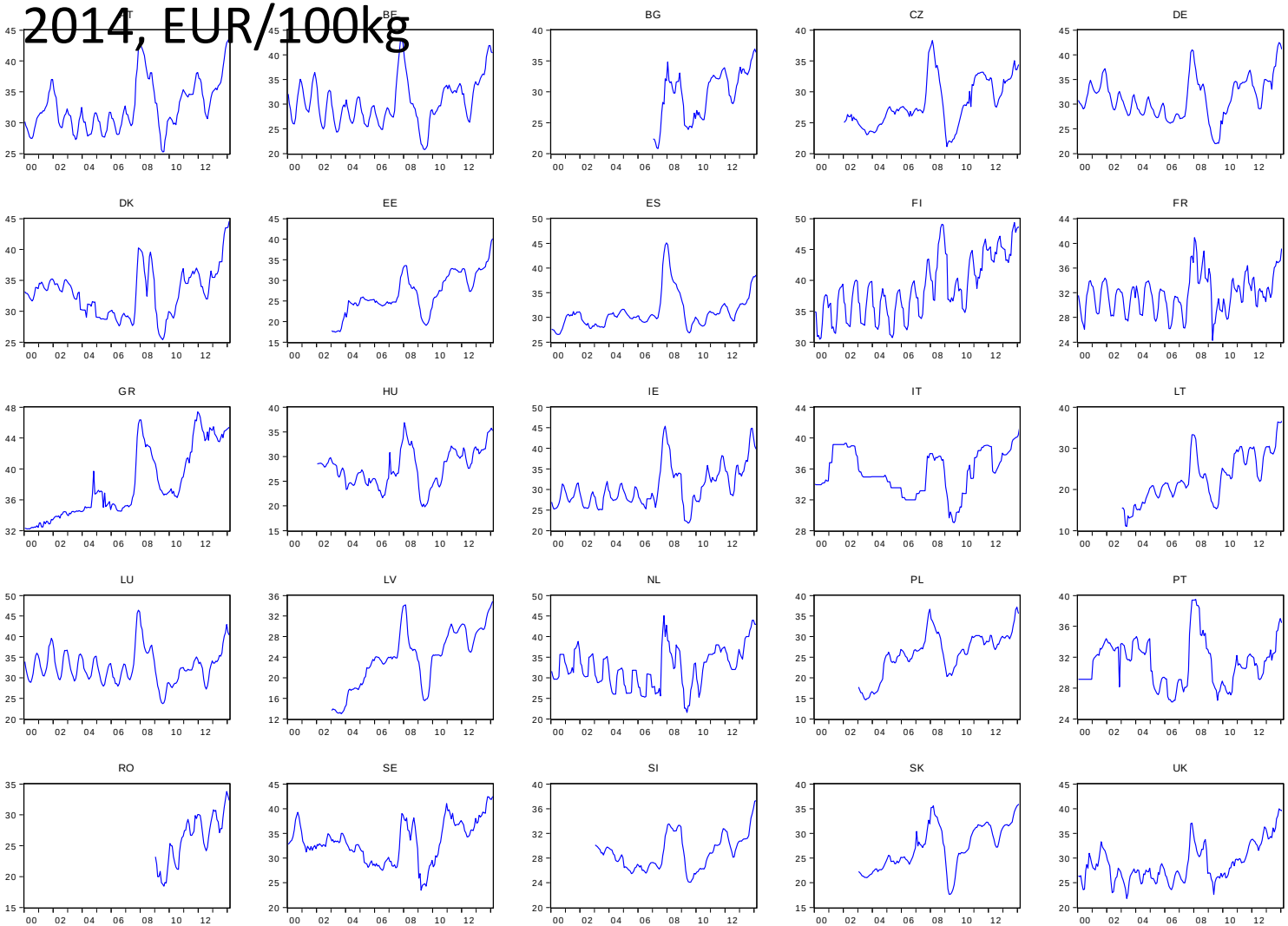
- back to the econometric model of the spatial price relationship
- $lnP_{1t} = \beta_0 + \beta_1 lnP_{2t} + \varepsilon_t$
  - Significance of beta coefficients
  - Model specification and diagnostics (such as autocorrelation, unit root, cointegration)

  - Economic theory: strong (1) and weak (2) versions of LOP - elaborate
  - (1) H_0: $\beta_0 = 0$ and $\beta_1 = 1$ against H_1: $\beta_0 \neq 0$ or $\beta_1 \neq 1$
  - (2) H_0: $\beta_1 = 1$ against H_1: $\beta_1 \neq 1$
  - Implications: perfect or imperfect price transmission

  - Go further: can we explain the underlying determinants of why the LOP does or does not hold?

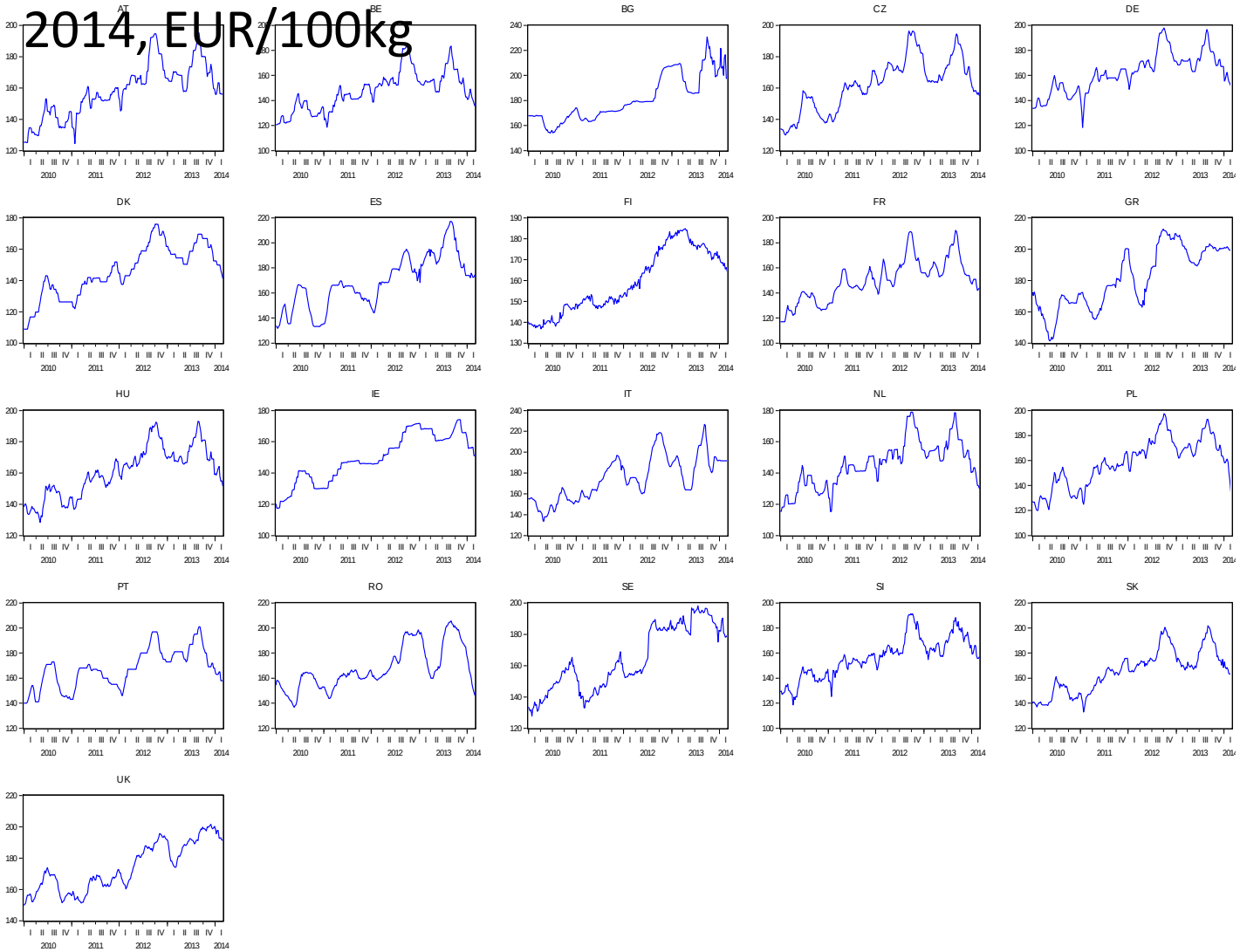
4. Data: Milk - monthly data

Graph of EU raw milk prices, monthly 2000-2014, EUR/100kg



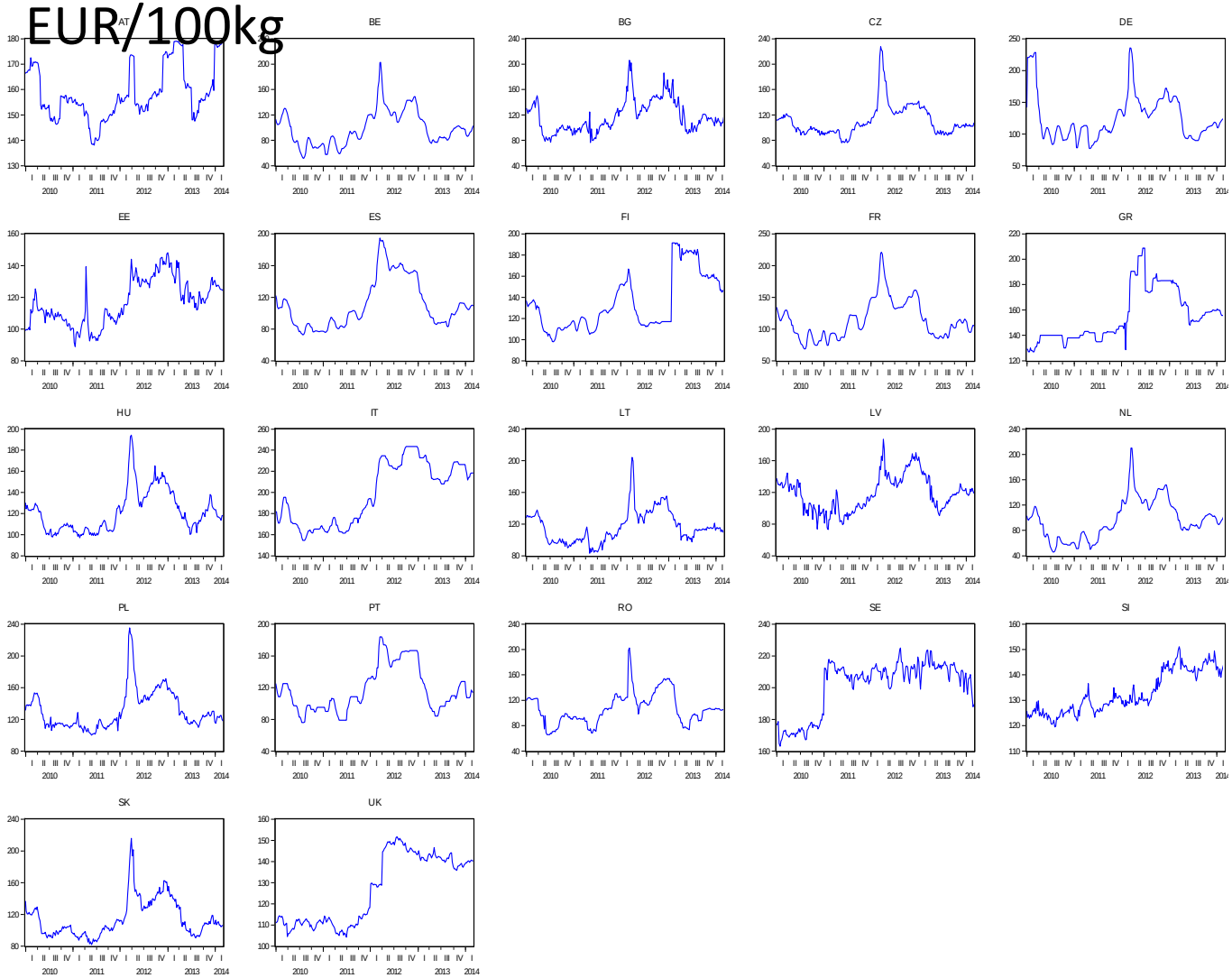
4. Data: Pork - weekly data

Graph of EU class S pork prices, weekly 2000-2014, EUR/100kg



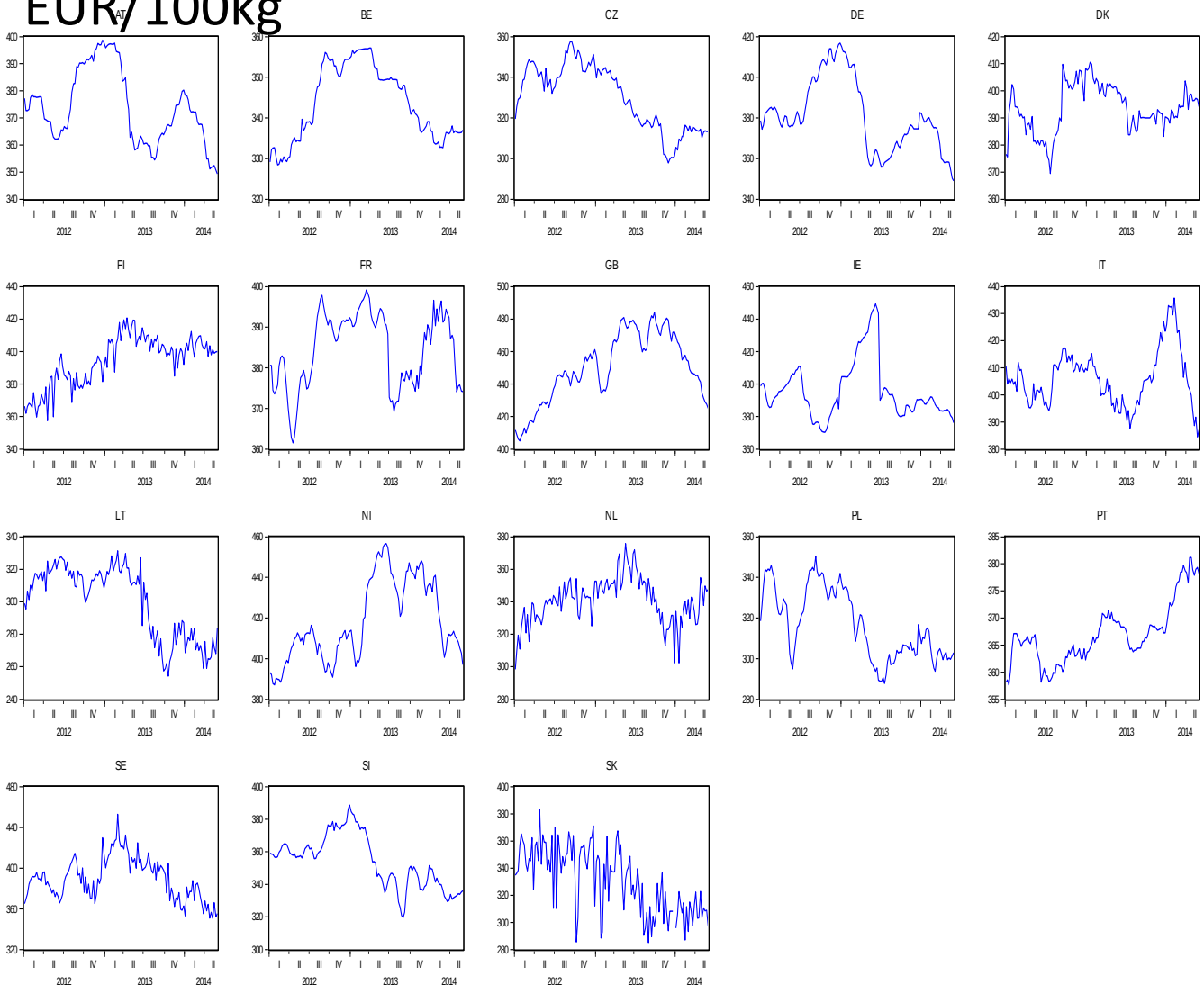
4. Data: Eggs - weekly data

Graph of egg prices, weekly 2000-2014, EUR/100kg



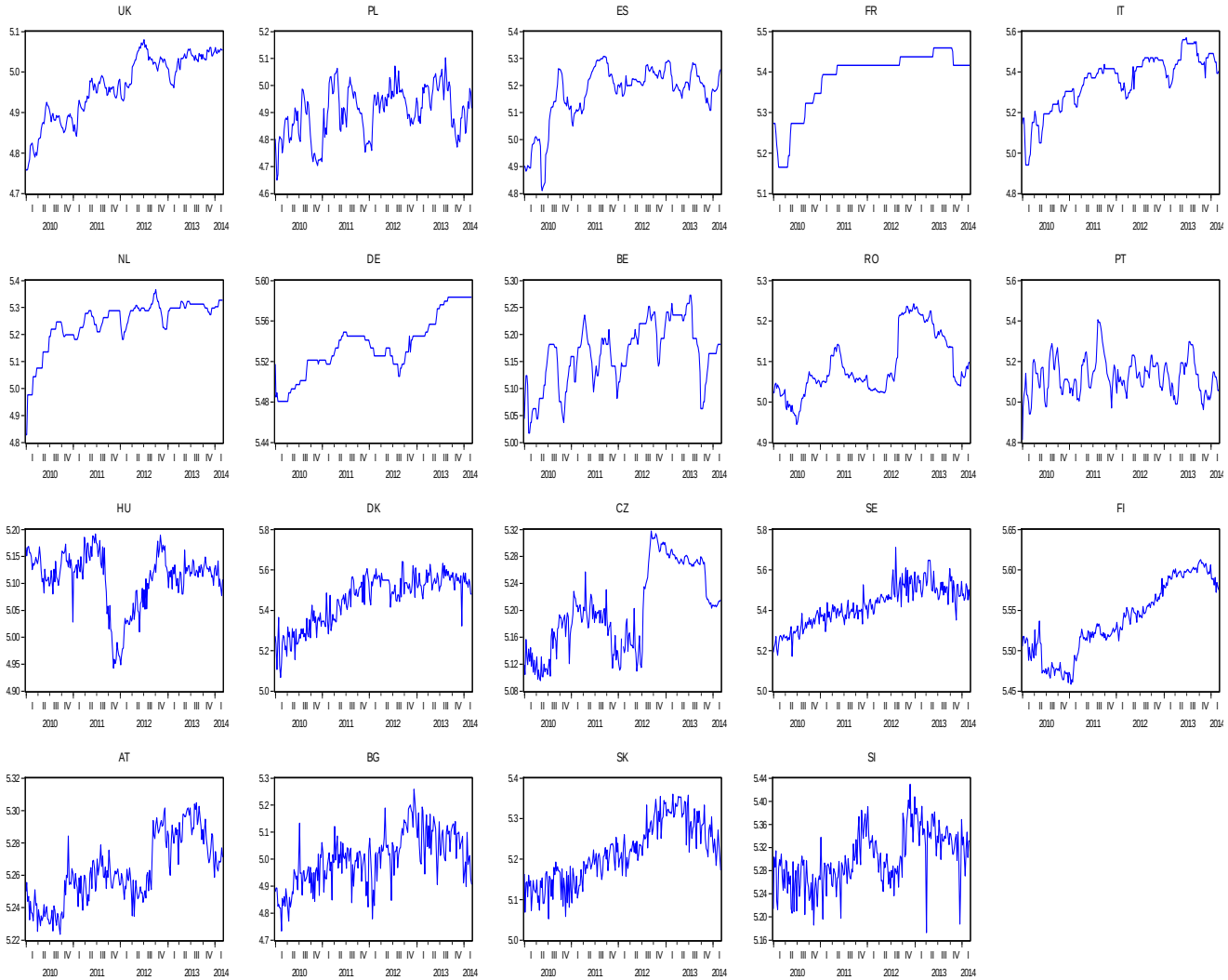
4. Data: Beef - weekly data

Graph of U+R+O EU category beef prices, weekly 2000-2014, EUR/100kg



4. Data: Poultry - weekly data

Graph of Poultry (broiler) prices in the EU (EUR/100kg carcass)



4. Data: Sheep (heavy and light lamb)- weekly data

Graph of heavy and light lamb prices in the EU (EUR/100kg carcass)

5. Methodology (LOP)

- Time series econometrics:
  - The logarithm of country specific price data is tested for *stationarity* (not differentiated time series data are most often non-stationary. Tool: unit root tests
  - If data is non-stationary OLS and subsequent inference (hypothesis testing) should not be applied. Tool: cointegration tests
  - If two price pairs (P_i and P_j) are cointegrated, than we may proceed to test:
    - (1) H_0: $\beta_0 = 0$ and $\beta_1 = 1$ against H_1: $\beta_0 \neq 0$ or $\beta_1 \neq 1$
    - (2) H_0: $\beta_1 = 1$ against H_1: $\beta_1 \neq 1$
  - Code the result into a bivariate variable that takes 1 if the (weak) LOP holds and 0 otherwise
  - Repeat the procedure for all possible price pairs (both as dependent and independent variables)

5. Methodology (LOP, cont)

- This study is about EU as a block (600 possible milk price and 420 pork price pairs) – as opposed to an in-depth analysis of just few (or most often 2) geographically separated market prices (e.g. 2 countries)
- Simple statistics (%) of how many price pairs fulfill the LOP is informative (or which, or are there more integrated countries with respect to others?)
- But the LOP variables (0/1) are also used as a dependent variable regressed on a set of explanatories possibly explaining why LOP holds is some cases and not in others. Tool: discreet dependent variable models
- Many such exist (logit, probit, SNP).

5. Methodology (LOP, cont)

set of second stage variables:

- Lndistance is the logarithm of absolute difference between trading partners capital city measured in kilometres
- Border is a dummy variable takes 1 if partners are neighbouring countries, otherwise zero
- Common language is a dummy variable takes 1, if partner countries have common language, otherwise zero
- lnexport is a log of export value between countries in 1000 dollars
- lnexportq is a log of export quantity between countries in tonnes OMS dummy takes value 1 if both countries are old member states, otherwise zero
- NMS dummy takes value 1 if both countries are new member states, otherwise zero
- NMSOMS takes value 1 if reporter country is new member states and partner country is old member states, otherwise zero
- Euro takes value 1 if both countries are member of Eurozone

6. Results

LOP statistics (milk, pork and several other markets)

Market	no. reg.	ADF<0.06	b_1=1 (10%)	b_1=1 (5%)	b_1=1 & b_0=0 (10%)	b_1=1 & b_0=0 (5%)
milk	600	545	135	116	112	96
pig	420	409	100	81	91	72
egg	462	408	73	62	65	60
beef	306	197	14	9	13	7
poultry	342	291	39	34	35	28
sheep_H	156	156	15	12	15	12
sheep_L	30	29	0	0	0	0

	% cointegrated	%weak LOP (10%)	%weak LOP (5%)	%strong LOP (10%)	%strong LOP (5%)
milk	0.91	0.23	0.19	0.19	0.16
pig	0.97	0.24	0.19	0.22	0.17
egg	0.88	0.16	0.13	0.14	0.13
beef	0.64	0.05	0.03	0.04	0.02
poultry	0.85	0.11	0.10	0.10	0.08
sheep_H	1.00	0.10	0.08	0.10	0.08
sheep_L	0.97	0.00	0.00	0.00	0.00

6. Results

Milk- Semi non-parametric estimation results (dep. var.: LOP)

	Model 1	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**
lndistance	-0.234***	-0.383***	-0.286***	-0.264*	-0.385***	-0.412***
border	-0.847	-1.232*	0.140	0.160	-0.063	0.078
common language	1.251	0.660	0.817	0.755	1.620	2.026
lnexport (value)	0.207***		0.025		0.036	
lnexportq (quantity)		0.215***		0.020		0.050
OMS			2.421***	2.452***	2.161***	2.195***
NMS			2.034**	2.039**	1.942**	1.880**
NMSOMS			3.302**	3.264**	3.597**	4.127**

6. Results

Pork- Semi non-parametric estimation results (dep. var.: LOP)

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
lndistance	-1.098***	-1.234**	0.401	0.397	0.260	0.355**
border	-14.045***	-1.680**	-4.627***	-4.617***	-7.601***	-8.247***
common language	9.518***	2.396**	4.958**	4.955**	9.214***	9.851***
lnexport (value)	0.922***		0.001		0.063	
lnexportq (quantity)		0.210***		-0.003		0.098**
OMS			-5.202***	-5.197***	-5.919***	-6.312***
NMS			-	-	-	-

6. Results

Egg- Semi non-parametric estimation results (dep. var.: LOP)

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
lndistance	0.284***	0.221***	0.208***	0.230***	0.245***	0.262***
border	1.963***	1.893***	1.885***	1.889***	1.993***	1.946***
common language	-1.906**	-2.108*	-1.417	-1.404	-1.284	-1.289
export (value)	-0.000**		-0.000		-0.000	
exportq (quantity)		-0.000*		-0.000		-0.000
OMS			-0.948	-1.144*	-0.944*	-1.101**
NMS			0.011	-0.105	-0.302	-0.367
NMSOMS			-1.168*	-1.288*	-1.385**	-1.460***

7. Discussion (policy implications)

- non-integration of prices and price/inflation rate divergence can be translated as proxies for inherent internal market inefficiencies
- our overall results suggest markets are less efficient than expected in a single market.
- Whilst producer prices co-moved in pork meat and raw milk markets (that proved to be more horizontally integrated than beef, eggs poultry and sheep prices) for 97% and 91% of the cases (number of bivariate regressions run), even the weak version of LOP only hold for 24% and 23% of the cases respectively.
- the validity of LOP is negatively affected by the distance between markets and positively by the trade (both measured as value or quantity).
- Country specific dummy variables are mostly significant in milk and pork market estimations. Whilst we do not expect specific sign in this respect, coefficients for milk (pork) show higher (lower) integration if trade is between two Old Member States compared to trade between two New Member States
- second stage regressions resulted fairly inconsistent results across sectors analysed, thus except that trade value and quantity positively affects the degree of integration, conclusions on further covariates should be considered with care

8. Further issues, follow-up research

- Data availability, comparability
- Rather simple methodology
- In-depth analysis of several country prices (vs. all or most)
- Country specific shocks could not be modelled with this approach
- Country specific co-variates could not be included in second stage regression

Czech University of Life Sciences Prague
Faculty of Economics and Management

iamo

Do the EU food processors abuse Oligopsony/Oligoply market power?

Lukáš Čechura
Heinrich Hockmann

COMPETE
International comparison of product supply chains in the agro-food sector

Structure

1) Motivation
2) Research Questions
3) Methodology – mark-down and mark-up models
4) Data
5) Results - relative mark-down
   - relative mark-up
   - developments
6) Conclusions

Motivation

- Market efficiency - price transmission
- Transfer efficiency of CAP

RESEARCH QUESTIONS

- The first question relates to market imperfections in the input food processing market. The aim is to identify the degree of non-competitive behaviour of the food processors with respect to farmers.
- The second question concerns market imperfections in the output food processing market. The aim is to identify the degree of oligopolistic market power.
- The last question relates to the country specifics, especially whether the input and output processing markets differ significantly among countries, and whether the EU processing market is becoming increasingly competitive or whether an idiosyncratic development of market power can be observed.

ESTIMATION STRATEGY

1. Estimation of the derived mark-down and mark-up model using the stochastic frontier approach (Kumbhakar et al., 2012) – Fixed management model – and the data from WP 6 (Del 6.2) + static vs. dynamic setting.
2. Calculation of relative mark-down and relative mark-up and their developments.
3. Comparison of the market imperfections among the EU member countries

Mark-down and mark-up model

- Conjectural variation approach (Bresnahan (1982 and 1989) and Muth, Wohlgenant (1999)

$$w_x \frac{x}{R} < MRP_x \frac{x}{R} = \frac{\partial \mathrm{R}}{\partial \mathrm{x}} \frac{x}{R} = \frac{\partial \ln R}{\partial \ln x} = \frac{\partial \ln D^o}{\partial \ln x}$$

$$\frac{p \cdot y}{C} \geq \frac{\partial C(\mathbf{w}, y_i, t)}{\partial y_i} \cdot \frac{y}{C} = \frac{\partial \ln C}{\partial \ln y} = \frac{\partial \ln D^I}{\partial \ln y}$$

- One-sided error term – stochastic frontier approach

$$\frac{w_x x}{R} = ß_x + ß_{xt} t + ß_{xx} \ln x + \mathbf{ß}_{zx}' \ln \mathbf{z} - u + v$$

$$\frac{p \cdot y}{C} = \alpha_0 + \alpha_t t + \alpha_y \ln y + \boldsymbol{\alpha}_x' \ln \tilde{\mathbf{x}} + u + v$$

$$\sigma = \frac{MRP_x - \mathrm{w}_x}{\mathrm{MRP}_x}$$

$$\varphi = \frac{p - MC}{MC}$$

- Relative mark-down and relative mark-up

$$\hat{\sigma} = \frac{\hat{u}}{ß_x + ß_{xt} t + ß_{xx} \ln x + \mathbf{ß}_{zx}' \ln z}$$

$$\hat{\varphi} = \frac{\hat{u}}{\alpha_0 + \alpha_t t + \alpha_y \ln y + \boldsymbol{\alpha}_x' \ln \tilde{\mathbf{x}}}$$

DATA

- Amadues database.
- 24 EU member countries (Cyprus, Croatia, Malta and Luxemburg are missing).
- Period from 2003 to 2012 (8,110 companies; 52,682 observations).
- Variables:
  - *Mark-down model*: Cost share = Material costs/Revenue, Material, Capital and Labour.
  - *Mark-up model*: Revenue share = Revenue/Costs, Output, normalized Material and Labour.

Results – parameter estimates

Slaughtering							
Means for random parameters				Coefficient on unobservable fixed management			
Variable	**Coeff.**	**SE**	**P [|z|>Z*]**	**Variable**	**Coeff.**	**SE**	**P [|z|>Z*]**
Const.	0.5317	0.0030	0.0000	**Alpha_m**	0.5963	0.0033	0.0000
Time	-0.0012	0.0001	0.0000	**Time**	-0.0003	0.0001	0.0267
Capital	-0.0209	0.0003	0.0000	**Capital**	0.0043	0.0004	0.0000
Labour	-0.0417	0.0004	0.0000	**Labour**	0.0395	0.0005	0.0000
Material	0.0791	0.0004	0.0000	**Material**	-0.0750	0.0004	0.0000
				Alpha_mm	-0.3635	0.0011	0.0000
Sigma	0.0707	0.0002	0.0000	**Lambda**	2.2733	0.0288	0.0000

Fruits and vegetables							
Means for random parameters				Coefficient on unobservable fixed management			
Variable	**Coeff.**	**SE**	**P [|z|>Z*]**	**Variable**	**Coeff.**	**SE**	**P [|z|>Z*]**
Const.	0.3520	0.0057	0.0000	**Alpha_m**	-0.6157	0.0058	0.0000
Time	-0.0002	0.0002	0.4384	**Time**	-0.0004	0.0002	0.0483
Capital	-0.0211	0.0005	0.0000	**Capital**	-0.0060	0.0006	0.0000
Labour	-0.0227	0.0006	0.0000	**Labour**	0.0012	0.0008	0.1173
Material	0.0853	0.0007	0.0000	**Material**	0.0653	0.0006	0.0000
				Alpha_mm	-0.3737	0.0019	0.0000
Sigma	0.0610	0.0006	0.0000	**Lambda**	0.9308	0.0387	0.0000

Dairy							
Means for random parameters				Coefficient on unobservable fixed management			
Variable	**Coeff.**	**SE**	**P [|z|>Z*]**	**Variable**	**Coeff.**	**SE**	**P [|z|>Z*]**
Const.	0.3779	0.0044	0.0000	**Alpha_m**	0.3264	0.0050	0.0000
Time	-0.0018	0.0002	0.0000	**Time**	-0.0012	0.0002	0.0000
Capital	-0.0193	0.0004	0.0000	**Capital**	0.0016	0.0004	0.0000
Labour	-0.0439	0.0005	0.0000	**Labour**	0.0207	0.0006	0.0000
Material	0.0782	0.0005	0.0000	**Material**	-0.0293	0.0006	0.0000
				Alpha_mm	-0.0475	0.0010	0.0000
Sigma	0.0702	0.0004	0.0000	**Lambda**	1.9872	0.0434	0.0000

Milling							
Means for random parameters				Coefficient on unobservable fixed management			
Variable	**Coeff.**	**SE**	**P [|z|>Z*]**	**Variable**	**Coeff.**	**SE**	**P [|z|>Z*]**
Const.	0.3092	0.0076	0.0000	**Alpha_m**	-0.1886	0.0074	0.0000
Time	0.0008	0.0002	0.0023	**Time**	0.0017	0.0003	0.0000
Capital	-0.0232	0.0007	0.0000	**Capital**	0.0041	0.0007	0.0000
Labour	-0.0498	0.0009	0.0000	**Labour**	-0.0216	0.0009	0.0000
Material	0.0885	0.0010	0.0000	**Material**	0.0128	0.0008	0.0000
				Alpha_mm	-0.0290	0.0014	0.0000
Sigma	0.0729	0.0007	0.0000	**Lambda**	2.0917	0.0720	0.0000

Slaughtering

Country	Statistical characteristics of relative mark-down								
	Mean	**Std.Dev**	**Min.**	**Max.**	**1st Decile**	**9th Decile**	**1st Quartile**	**3rd Quartile**	**Cases**
Total	0.1578	0.1069	0.0067	0.9787	0.0483	0.2874	0.0840	0.2028	11715
Austria	0.2202	0.0582	0.0671	0.3435	0.1420	0.2885	0.1806	0.2541	57
Belgium	0.1969	0.0929	0.0253	0.6564	0.0920	0.3171	0.1419	0.2400	503
Bulgaria	0.1353	0.1401	0.0067	0.8924	0.0231	0.3054	0.0468	0.1657	174
Czech Republic	0.1127	0.0674	0.0169	0.5524	0.0437	0.1770	0.0732	0.1342	377
Germany	0.2321	0.0988	0.0173	0.9778	0.1426	0.3268	0.1661	0.2887	344
Denmark	0.1157	0.0675	0.0205	0.3696	0.0359	0.1879	0.0618	0.1406	40
Estonia	0.1086	0.0543	0.0124	0.2296	0.0360	0.1813	0.0709	0.1556	58
Spain	0.1551	0.1042	0.0072	0.9605	0.0617	0.2703	0.0965	0.1886	1956
Finland	0.2729	0.1516	0.0194	0.8447	0.1047	0.4077	0.1711	0.3419	158
France	0.2100	0.0982	0.0215	0.9787	0.1128	0.3171	0.1555	0.2442	1735
Great Britain	0.0990	0.0460	0.0127	0.2906	0.0471	0.1621	0.0655	0.1300	834
Greece	0.0851	0.0543	0.0080	0.2754	0.0258	0.1604	0.0502	0.1113	215
Hungary	0.1607	0.1245	0.0152	0.7343	0.0602	0.2792	0.0931	0.1825	191
Italy	0.1862	0.0950	0.0223	0.9629	0.0832	0.3129	0.1210	0.2385	2143
Ireland	0.0909	0.0433	0.0174	0.2095	0.0361	0.1385	0.0616	0.1228	68
Latvia	0.0547	0.0368	0.0085	0.1975	0.0158	0.1003	0.0260	0.0739	58
Lithuania	0.0560	0.0441	0.0097	0.2363	0.0139	0.1104	0.0195	0.0833	123
Netherlands	0.1487	0.0871	0.0236	0.3062	0.0412	0.2606	0.0551	0.2292	47
Poland	0.0931	0.0795	0.0071	0.6695	0.0288	0.1534	0.0493	0.1121	1171
Portugal	0.1344	0.0962	0.0218	0.9664	0.0671	0.1910	0.0882	0.1589	268
Romania	0.1386	0.1573	0.0068	0.9062	0.0183	0.3918	0.0299	0.1970	652
Sweden	0.1638	0.0792	0.0157	0.4298	0.0643	0.2660	0.1143	0.2007	392
Slovenia	0.1324	0.0396	0.0455	0.2176	0.0783	0.1786	0.1052	0.1584	64
Slovakia	0.0914	0.0666	0.0107	0.4910	0.0413	0.1373	0.0539	0.1140	87

Fruit and vegetables

Country	Statistical characteristics of relative mark-down								
	Mean	**Std.Dev**	**Min.**	**Max.**	**1st Decile**	**9th Decile**	**1st Quartile**	**3rd Quartile**	**Cases**
EU	0.1054	0.0726	0.0102	0.9434	0.0366	0.1862	0.0558	0.1385	5337
Austria	0.1441	0.0353	0.0718	0.1988	0.0900	0.1808	0.1287	0.1743	29
Belgium	0.1681	0.0980	0.0217	0.8630	0.0804	0.2374	0.1071	0.2022	290
Bulgaria	0.0906	0.0656	0.0162	0.3299	0.0221	0.1796	0.0440	0.1207	59
Czech Republic	0.1182	0.0424	0.0420	0.2284	0.0737	0.1963	0.0914	0.1352	68
Germany	0.1299	0.0491	0.0409	0.2479	0.0624	0.1939	0.0899	0.1653	176
Denmark	0.1113	0.0443	0.0297	0.1915	0.0459	0.1777	0.0799	0.1371	31
Estonia	0.0447	0.0238	0.0171	0.1017	0.0248	0.0745	0.0320	0.0497	10
Spain	0.1101	0.0872	0.0104	0.9141	0.0416	0.1943	0.0616	0.1316	819
Finland	0.1087	0.0705	0.0205	0.3594	0.0459	0.2149	0.0592	0.1388	51
France	0.1512	0.0752	0.0197	0.9434	0.0788	0.2299	0.1047	0.1816	447
Great Britain	0.0712	0.0382	0.0198	0.2149	0.0324	0.1282	0.0436	0.0880	546
Greece	0.0514	0.0343	0.0132	0.2228	0.0232	0.0882	0.0301	0.0590	453
Hungary	0.0981	0.0431	0.0269	0.2225	0.0450	0.1593	0.0623	0.1284	88
Italy	0.1138	0.0605	0.0127	0.6052	0.0491	0.1807	0.0696	0.1484	1282
Ireland	NA	NA	NA	NA	NA	NA	NA	NA	NA
Latvia	0.0706	0.0345	0.0341	0.1994	0.0464	0.0913	0.0491	0.0787	19
Lithuania	0.0509	0.0116	0.0369	0.0772	0.0386	0.0667	0.0419	0.0576	19
Netherlands	0.1601	0.1515	0.0188	0.6508	0.0316	0.3254	0.0502	0.1964	67
Poland	0.0746	0.0409	0.0133	0.2361	0.0310	0.1257	0.0430	0.0961	519
Portugal	0.1161	0.0610	0.0316	0.4539	0.0496	0.1706	0.0726	0.1486	88
Romania	0.0957	0.1027	0.0102	0.5912	0.0219	0.2518	0.0340	0.1256	95
Sweden	0.1019	0.0412	0.0261	0.2960	0.0618	0.1563	0.0788	0.1104	140
Slovenia	0.1207	0.0380	0.0179	0.1607	0.0634	0.1574	0.1096	0.1509	18
Slovakia	0.0701	0.0219	0.0249	0.1121	0.0435	0.0968	0.0570	0.0839	23

Dairy

Country	Statistical characteristics of relative mark-down								
	Mean	**Std.Dev**	**Min.**	**Max.**	**1st Decile**	**9th Decile**	**1st Quartile**	**3rd Quartile**	**Cases**
EU	0.0663	0.0504	0.0064	0.7219	0.0308	0.1109	0.0406	0.0751	6254
Austria	0.0575	0.0176	0.0285	0.1083	0.0383	0.0842	0.0450	0.0630	37
Belgium	0.0615	0.0315	0.0162	0.3363	0.0379	0.0939	0.0439	0.0691	272
Bulgaria	0.0946	0.0894	0.0069	0.4593	0.0190	0.1936	0.0405	0.1228	79
Czech Republic	0.0811	0.0763	0.0085	0.4726	0.0213	0.1742	0.0345	0.1016	281
Germany	0.0589	0.0433	0.0145	0.4668	0.0322	0.0896	0.0413	0.0640	387
Denmark	0.0626	0.0349	0.0247	0.1683	0.0318	0.0964	0.0438	0.0664	15
Estonia	0.0616	0.0333	0.0095	0.1497	0.0272	0.1042	0.0362	0.0886	42
Spain	0.0695	0.0415	0.0105	0.4050	0.0323	0.1186	0.0431	0.0865	557
Finland	0.0568	0.0233	0.0250	0.1230	0.0326	0.0820	0.0399	0.0678	84
France	0.0748	0.0507	0.0080	0.3488	0.0361	0.1314	0.0446	0.0849	616
Great Britain	0.0546	0.0447	0.0064	0.7219	0.0296	0.0830	0.0370	0.0624	442
Greece	0.0569	0.0306	0.0121	0.2242	0.0279	0.0965	0.0360	0.0690	203
Hungary	0.0630	0.0283	0.0233	0.1665	0.0352	0.1053	0.0401	0.0774	64
Italy	0.0653	0.0450	0.0085	0.5319	0.0335	0.1027	0.0424	0.0737	1665
Ireland	0.0419	0.0182	0.0191	0.0715	0.0201	0.0684	0.0226	0.0587	17
Latvia	0.0591	0.0435	0.0090	0.2617	0.0290	0.0905	0.0375	0.0571	70
Lithuania	0.0564	0.0311	0.0119	0.1504	0.0246	0.0982	0.0340	0.0736	99
Netherlands	0.0621	0.0282	0.0232	0.1793	0.0349	0.0927	0.0432	0.0757	60
Poland	0.0555	0.0303	0.0099	0.2731	0.0291	0.0889	0.0377	0.0649	745
Portugal	0.0781	0.0472	0.0219	0.2342	0.0324	0.1415	0.0481	0.0869	75
Romania	0.1047	0.1052	0.0074	0.5213	0.0211	0.2635	0.0340	0.1384	305
Sweden	0.0620	0.0297	0.0227	0.1464	0.0274	0.0874	0.0395	0.0763	26
Slovenia	0.0571	0.0246	0.0273	0.1173	0.0326	0.0945	0.0381	0.0687	27
Slovakia	0.0575	0.0299	0.0161	0.1598	0.0310	0.0939	0.0353	0.0675	86

Milling

Country	Statistical characteristics of relative mark-down								
	Mean	**Std.Dev**	**Min.**	**Max.**	**1st Decile**	**9th Decile**	**1st Quartile**	**3rd Quartile**	**Cases**
EU	0.0697	0.0511	0.0087	0.6890	0.0302	0.1182	0.0413	0.0817	3224
Austria	NA	NA	NA	NA	NA	NA	NA	NA	NA
Belgium	0.0652	0.0303	0.0169	0.2025	0.0341	0.0996	0.0426	0.0797	166
Bulgaria	0.0840	0.0570	0.0181	0.2226	0.0307	0.1902	0.0444	0.1061	26
Czech Republic	0.0849	0.0542	0.0108	0.2491	0.0255	0.1672	0.0453	0.1151	110
Germany	0.0718	0.0280	0.0158	0.2207	0.0416	0.1013	0.0547	0.0873	110
Denmark	0.0701	0.0612	0.0125	0.2607	0.0278	0.1262	0.0408	0.0675	38
Estonia	0.0567	0.0229	0.0282	0.0847	0.0310	0.0835	0.0347	0.0814	9
Spain	0.0610	0.0332	0.0128	0.3087	0.0302	0.0948	0.0410	0.0699	329
Finland	0.0775	0.0345	0.0342	0.1586	0.0464	0.1380	0.0531	0.0927	31
France	0.0799	0.0445	0.0189	0.2653	0.0386	0.1259	0.0508	0.0955	349
Great Britain	0.0622	0.0473	0.0127	0.2876	0.0275	0.0965	0.0363	0.0678	265
Greece	0.0622	0.0344	0.0127	0.1781	0.0261	0.1103	0.0365	0.0819	117
Hungary	0.0680	0.0355	0.0199	0.1992	0.0329	0.1017	0.0440	0.0759	59
Italy	0.0628	0.0338	0.0089	0.3502	0.0327	0.0981	0.0419	0.0755	859
Ireland	0.0652	0.0314	0.0346	0.1420	0.0352	0.1059	0.0380	0.0859	17
Latvia	0.0566	0.0258	0.0188	0.1145	0.0273	0.0968	0.0398	0.0676	18
Lithuania	0.0678	0.0466	0.0145	0.2382	0.0212	0.1191	0.0369	0.0812	31
Netherlands	0.0821	0.0746	0.0160	0.3448	0.0180	0.1085	0.0403	0.0846	20
Poland	0.0673	0.0486	0.0087	0.3810	0.0301	0.1249	0.0380	0.0774	207
Portugal	0.0655	0.0397	0.0130	0.2280	0.0302	0.1100	0.0402	0.0780	101
Romania	0.1034	0.1224	0.0111	0.6890	0.0220	0.2716	0.0298	0.1301	207
Sweden	0.0777	0.0551	0.0180	0.4017	0.0342	0.1306	0.0473	0.0928	110
Slovenia	0.0741	0.0310	0.0348	0.1426	0.0436	0.1077	0.0566	0.0926	9
Slovakia	0.0636	0.0323	0.0230	0.1691	0.0323	0.0969	0.0409	0.0791	36

CONCLUSIONS

- The estimated mark-down model revealed some degree of non-competitive behaviour in the input food processing market for all analysed sectors.
- The degree of market imperfections differed among the sectors.
  - The EU slaughtering common market is characterised by significantly greater market imperfections as compared to the dairy and milling sectors, in particular.
  - However, the estimated overall means show quite small market imperfections on the EU input food processing markets. This especially holds true for the dairy and milling sectors.
- The distribution of the relative mark-down is relatively narrow in all sectors, and skewed toward smaller values.
- Significant differences between the first and last decile were revealed in slaughtering, indicating low market imperfections for the first 10 % of producers, but a considerable degree of non-competitive behaviour for the last 10 % of slaughtering producers.
- The differences among the producers in fruits and vegetables, and especially in the dairy and milling sectors, are not so pronounced. With respect to the dataset, we can conclude that some large companies may exercise market power on the EU input food processing markets.
- There were revealed significant differences among EU member countries. In slaughtering, Austria, Belgium, Germany, Finland, France and Italy are countries having a mean of the relative mark-down higher than the EU average. Belgium, Finland, France, the Netherlands and Romania are countries with a relatively high degree of market imperfections in fruits and vegetables sector. The differences among EU member states are marginal in the dairy and milling sectors.
- The development of the relative mark-down is characterised by a rather stochastic trend.

CONCLUSIONS

- The results of the fitted mark-up model suggest that market imperfections on the output market are not so pronounced for the slaughtering sector. However, the degree of market imperfections is higher for the output market in the dairy and milling sectors as compared to the input market. The fruits and vegetables sector has almost the same mean for the output as for the input market.
- The distribution of the relative mark-up is again relatively narrow in all sectors and skewed toward smaller values. With respect to the dataset, we can again conclude that some large companies may exercise market power on the EU output food processing markets.
- The overall means of the relative mark-up differ among the individual member states. However, the differences are rather small. In slaughtering, the largest differences among producers can be found in Bulgaria, Hungary, the Netherlands and Romania. In fruits and vegetables, strong market imperfections exist in Bulgaria, Estonia, Romania, Slovenia and Slovakia as compared to other EU countries. The spread between the first and last deciles is more pronounced in the dairy sector as compared to the slaughtering and fruits and vegetables sectors. Greater differences can be found primarily in Bulgaria, Spain, France, Hungary, Italy, Portugal and Romania. The differences in the overall means of the relative mark-up in the milling sector are not so pronounced among the countries.
- The development of the relative mark-up is again rather stochastic, and changes are only marginal in the majority of cases. That is, the results suggest that the producers did not significantly change the degree of non-competitive behaviour during the analysed period on the output market between the years 2003 - 2012.

COMPETE

International comparison of product supply chains in the agro-food sector

Thank you for your attention!

University of Milan
Department of Economics, Management and Quantitative Methods

Import Penetration, Intermediate Inputs and Firms' Productivity in the EU Food Industry

Alessandro Olper, Daniele Curzi and Valentina Raimondi

Università degli Studi di Milano

Compete Meeting and Workshop

Prague, November 26th – 28th 2014

Objective and research questions

- To study the effect of **import competition** on **productivity** exploiting a large micro-dataset of more than 20,000 French and Italian food firms
- We focus on competition at both industry and **upstream** sectors level

Research questions

- Is the role of imports in intermediate inputs a key source of productivity growth ?
- What matter the most between industry and upstream import competition ?
- Is the relationship conditional to the (initial) level of firms' productivity ?

UNIVERSITA' DEGLI STUDI DI MILANO
Department of Economics, Management and Quantitative Methods

Outline

- **Motivation and value added**
- Data and empirical strategy
- Main results
- Conclusions and implications

UNIVERSITA' DEGLI STUDI DI MILANO
Department of Economics, Management and Quantitative Methods

Motivation and value added

Several arguments can justify our focus on imported intermediate inputs

- First, **trade in intermediate** inputs is a key feature of global trade (Hummels et al. 2014)
- Endogenous growth theory → **foreign inputs** enhance **efficiency gains** at the aggregate level (Romer 1987)
- At firm-level productivity gains are realized through (Ethier, 1982; Markusen, 1989; Grossman and Helpman, 1991)
  - better **complementarities** of inputs
  - lower input **prices**
  - access to higher **quality** of inputs
  - access to new **technologies** embodied in the imported varieties

UNIVERSITA' DEGLI STUDI DI MILANO
Department of Economics, Management and Quantitative Methods

Motivation and value added

Micro-level evidence on **developing** countries, confirmed that **imported inputs** lead to

- An increase in firms' **productivity growth** (e.g. Amiti and Konings 2007; Halpern, Koren and Szeidl 2011; Topalova and Khandelwal 2011)
- An increase in the number of **new domestic products** (Goldberg et al. 2010; Colantone and Crinò, 2014)
- An increase in the probability of firms' entry in the **export** market (Bas and Strauss-Kahn 2011; Chevassus et al. 2014).

To date only Chevassus et al. (2014) tested this relationship in the food industry

UNIVERSITA' DEGLI STUDI DI MILANO
Department of Economics, Management and Quantitative Methods

Motivation and value added

Analyzing the effects of imported inputs is complicated by the **lack of** Input-Output tables

- e.g. at the EU level Input-Output tables are disposable at only NACE 2-digit (food industry)
- Information on the **structure of intermediate firms'** consumption is often lacking → **ad hoc solutions**
  - Chevassus et al. (2014) combine trade and firm level data to identify the imported products processed by a firm belonging to each NACE 4-digit industry
  - However this approach presents also limitations:
    - **Intermediate consumption structure** is based on firms' level imports and not on **true I-O** relationship
    - it assumes that all French firms' imports, in a given NACE 4-digit, are truly intermediate inputs used in the same industry

UNIVERSITA' DEGLI STUDI DI MILANO
Department of Economics, Management and Quantitative Methods

Motivation and value added

To overcome this data problems we use the 2007 **US Input-Output** table at 6-digit level

- to measure a consistent index of **upstream (or vertical)** import penetration (Acemoglu et al. 2014; Altomonte et al. 2014)
  - **Key assumption**: comparability between US and EU technology in the food processing industry
- If the assumption hold, this strategy offers a relatively simple and **more consistent** solution than previous ad hoc approaches

UNIVERSITA' DEGLI STUDI DI MILANO
Department of Economics, Management and Quantitative Methods

Motivation and value added

Note that, in our EU context

- The use of **positive indices of trade integration** like import pentration (vs. Δtariffs) offers advantages:
  - We can differentiate foreign competition by **different origin**;
  - We implicitly account also for the NTB;
  - Finally, because in the EU firms are primarily affected by import competition **coming from other EU countries**, using tariffs we would **omit** from the analysis a large piece of reality.

UNIVERSITA' DEGLI STUDI DI MILANO
Department of Economics, Management and Quantitative Methods

Outline

- Motivation and value added
- **Data and empirical strategy**
- Main results
- Conclusions and implications

UNIVERSITA' DEGLI STUDI DI MILANO
Department of Economics, Management and Quantitative Methods

Data and empirical strategy

Data used

- **TFP**: Amadeus data on more than 20,000 French (18,623) and Italian (6,692) food firms, for the period 2004-2012
- **Import penetration (IP)**: Trade and production data from Comext/Prodcom (Eurostat) and FAO (inputs), aggregated to NACE 4-digit from CN 8-digit
  - 33 food products of the manufacturing sector, over the period 2003-2011
- **Vertical IP**: 2007 US Input-Output tables (BEA) at I-O 6-digit class. converted to NACE 4-digit (93 inputs):
  - **Important,** to measure vertical IP we make use of only goods classified as 'intermediate goods' by the BEC product classification

UNIVERSITA' DEGLI STUDI DI MILANO
Department of Economics, Management and Quantitative Methods

Data and empirical strategy

Empirical strategy: **two stages** approach

- **First** we estimated firm-level **TFP**, separately, for French and Italian food firms
- **Second** we regress firm-level TFP on our indicators of **horizontal** and **vertical** import penetration

Firm level TFP estimation

- TFP was estimated using the Levinsohn and Petrin (2003) alghoritm: $\varpi_{it} = y_{it} - \hat{\beta}_k k_{it} - \hat{\beta}_l l_{it} - \hat{\beta}_m m_{it}$
- Where ϖ_{it} is the (log of) TFP of the firm *i*
  - The LP method use a semi-parametric function to account for the correlation between the inputs and productivity shocks, using the material costs (m_{it}) as exogenous source of inputs variation

UNIVERSITA' DEGLI STUDI DI MILANO
Department of Economics, Management and Quantitative Methods

Data and empirical strategy

Table 1. Descriptive Statistics Relative to TFP

	All			Italy			France		
	Obs	Mean	Std. Dev.	Obs	Mean	Std. Dev.	Obs	Mean	Std. Dev.
(ln) TFP	129,454	3.26	0.91	36,050	4.23	0.89	93,404	2.88	0.58
(ln) Output	129,454	6.73	1.41	36,050	7.58	1.19	93,404	6.40	1.35
(ln) L	129,454	5.34	1.14	36,050	5.26	1.06	93,404	5.38	1.17
(ln) K	129,454	5.32	1.51	36,050	6.12	1.43	93,404	5.02	1.43
(ln) Materials	129,454	5.81	1.69	36,050	6.99	1.37	93,404	5.35	1.57

Estimated coefficients for the Italian sample are: **Labor (0.353), Capital (0.062)** and **Material Costs (0.523).** Return to scale equal to 0.94

Estimated coefficients for the French sample are: **Labor** (**0.389**), **Capital** (**0.069**) and **Material Costs** (**0.549**). Return to scale equal to 1.

UNIVERSITA' DEGLI STUDI DI MILANO
Department of Economics, Management and Quantitative Methods

Data and empirical strategy

Horizontal and vertical import penetration

- We measure **horizontal** import penetration in industry *z* from different origins *g* as:

$$h\_imp_{zt}^{g} = \frac{imp_{zt}^{g}}{prod_{zt} + imp_{zt}^{g} - exp_{zt}^{g}}$$

- **Vertical** import penetration measures the **foreign** presence in the industry *z* supplied by input sectors *j*:

$$v\_imp_{zt}^{g} = \sum_{j \in z} d_{jz} h\_imp_{jt}^{g*}$$

  - Where d_{jz} is the I-O weight of inputs *j* used by sector *z*; and $h\_imp_{jt}^{g*}$ is the horizontal import penetration of inputs industry *j*
  - Note that we include only those goods * that are classified as 'intermediate goods' by the BEC classification

UNIVERSITA' DEGLI STUDI DI MILANO
Department of Economics, Management and Quantitative Methods

Data and empirical strategy

	Horizontal Import Penetration					
	Italy			France		
Country groups	Mean	Standard Dev.	Avg Annual Growth	Mean	Standard Dev.	Avg Annual Growth
World	0.324	0.278	0.30%	0.427	0.326	0.84%
EU 15	0.271	0.278	-0.47%	0.349	0.294	0.05%
Emerging Countries	0.085	0.295	4.62%	0.042	0.113	5.18%
OECD	0.032	0.181	-4.59%	0.024	0.049	3.61%
NMS	0.026	0.143	18.83%	0.009	0.026	22.28%
Other Countries	0.026	0.143	-1.03%	0.009	0.026	-2.41%

	Vertical Import Penetration					
	Italy			France		
Country groups	Mean	Standard Dev.	Avg Annual Growth	Mean	Standard Dev.	Avg Annual Growth
World	0.540	0.260	1.88%	0.487	0.229	-1.37%
EU 15	0.425	0.239	1.43%	0.371	0.180	1.56%
Emerging Countries	0.229	0.209	5.75%	0.163	0.153	1.46%
OECD	0.165	0.168	-4.15%	0.322	0.320	0.62%
NMS	0.190	0.182	10.97%	0.115	0.211	3.55%
Other Countries	0.100	0.177	-13.73%	0.048	0.096	-24.66%

UNIVERSITA' DEGLI STUDI DI MILANO
Department of Economics, Management and Quantitative Methods

Data and empirical strategy

TFP and import penetration equation

- We use the following empirical model to relate horizontal and vertical IP to TFP (Altomonte et al. 2014):

$$y_{it} = \beta_0 + \beta_1 \log h\_imp^{g}_{zt-1} + \beta_2 \log v\_imp^{g}_{zt-1} + \alpha_i + \theta_t + \varepsilon_{ijt}$$

- **IP variables** enter the equation lagged one year, … firms needs some time to adapt to the new situation,…
- **5 groups of origin** (World, UE15, OECD, NMS, Emerg., Others)
- **Expectations**:
  1. β_1 and $\beta_2 > 0$;
  2. $\beta_2 > \beta_1$;
  3. β_1 and β_2 increasing to the initial TFP level

UNIVERSITA' DEGLI STUDI DI MILANO
Department of Economics, Management and Quantitative Methods

Outline

- Motivation and value added
- Data and empirical strategy
- **Main results**
- Conclusions and implications

UNIVERSITA' DEGLI STUDI DI MILANO
Department of Economics, Management and Quantitative Methods

Main results

Import penetration and TFP: **baseline** results

Dependent variable: log of TFP	(1) World	(2) EU 15	(3) Emerging Countries	(4) OECD	(5) NMS	(6) Other Countries
Log Horizontal IP (t-1)	0.0073***	0.0233***	0.0142***	0.0238***	-0.0075***	0.0131***
	(0.0027)	(0.0028)	(0.0026)	(0.0030)	(0.0015)	(0.0011)
Log Vertical IP (t-1)	0.213***	0.104***	0.112***	-0.0073**	-0.0096***	0.0165***
	(0.0088)	(0.0068)	(0.0091)	(0.0034)	(0.0016)	(0.0015)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	129454	131025	131011	131014	131021	131000
R-square	0.922	0.921	0.921	0.921	0.921	0.921

The TFP growth effect of vertical IP is **10 times** higher that the one of horizontal IP;

EU15, Emerging and OECD matter the most in term of magnitude of the effects

UNIVERSITA' DEGLI STUDI DI MILANO
Department of Economics, Management and Quantitative Methods

Main results

Results Split by **French** and **Italian** Firms

Dependent variable: log of TFP	(1) World	(2) EU 15	(3) Emerging Countries	(4) OECD	(5) NMS	(6) Other Countries
Log Horizontal IP (t-1) FR	0.0088***	0.0223***	0.0017	0.0474***	-0.0184***	0.0113***
	(0.0026)	(0.0029)	(0.0028)	(0.0033)	(0.0016)	(0.0013)
Log Horizontal IP (t-1) IT	0.0048	0.0213	0.0303***	-0.0061	0.0214***	0.0143***
	(0.0147)	(0.0149)	(0.0049)	(0.0054)	(0.0030)	(0.0020)
Log Vertical IP (t-1) FR	0.234***	0.0934***	0.0170	-0.0098**	-0.0137***	0.0387***
	(0.0107)	(0.0079)	(0.0110)	(0.0044)	(0.0017)	(0.0018)
Log Vertical IP (t-1) IT	0.175***	0.128***	0.216***	-0.0058	0.0792***	-0.0104***
	(0.0209)	(0.0147)	(0.0161)	(0.0047)	(0.0071)	(0.0024)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	129454	131025	131011	131014	131021	131000
R-squared	0.922	0.921	0.921	0.921	0.921	0.921

Relevant effects consistent in the two samples, although some interesting differences emerge

UNIVERSITA' DEGLI STUDI DI MILANO
Department of Economics, Management and Quantitative Methods

Main results

Results Split by **Initial Level** of TFP

Dependent variable: Log of TFP	Horizontal	Vertical
Log IP (t-1) first quartile of TFP	-0.0012	0.128***
	(0.0030)	(0.0142)
Log IP (t-1) second quartile of TFP	0.0133***	0.163***
	(0.0043)	(0.0127)
Log IP (t-1) third quartile of TFP	0.0196***	0.227***
	(0.0062)	(0.0128)
Log IP (t-1) fourth quartile of TFP	0.0209**	0.325***
	(0.0097)	(0.0190)
Firm FE	Yes	
Time FE	Yes	
Observations	98221	
R-squared	0.918	

UNIVERSITA' DEGLI STUDI DI MILANO
Department of Economics, Management and Quantitative Methods

Outline

- Motivation and value added
- Data and empirical strategy
- Main results
- **Conclusions and implications**

UNIVERSITA' DEGLI STUDI DI MILANO
Department of Economics, Management and Quantitative Methods

Conclusions and implications

- We show that **firms' exposure to international trade translates into firms' productivity growth**
  - A view consistent with international trade models with firm heterogeneity (Melitz, 2003; Bernard et al., 2003)
  - and with recent evidence showing that liberalization in intermediate inputs contributes to firm productivity growth (Amiti and Konings 2007; Goldberg et al. 2010, etc.)
- By exploiting the US Input-Output table, we show that the productivity growth effect of upstream trade liberalization holds true for the food industry
- And, importantly, it significantly overcomes a similar effect induced by horizontal import competition

Conclusions and implications

- We find that this effect is largely attributable to imported material inputs from **emerging** and **EU15** countries
- Furthermore, we also showed that the magnitude of the economic effect **is increasing with the initial level of firms' productivity**

These findings may have important implications:

- If the objective of European institutions is to spur productivity in the food industry, further liberalization in the upstream (agricultural) sectors could be a valuable strategy
- Because not all imports affect all firms to the same extent, public policies should be tailored to the real needs of heterogeneous firms

Conclusions and implications

Caveats

- we study the **positive side effect** of trade liberalization, disregarding the adjustment costs related to the possible (un-)employment effects
  - the asymmetric growth effect of trade liberalization calls for a careful investigation of the unemployment effects
- We do not say anything about the underlying channels
  - How does intermediate imports works? Through better complementarities? Lower prices? Or higher quality inputs?
- Extensions in these directions are important to understand the overall impact of globalization on the food industry.

Thank you!

UNIVERSITA' DEGLI STUDI DI MILANO
Department of Economics, Management and Quantitative Methods

COMPETE
International comparison of product supply chains in the agro-food sector

Contract (in)completeness & quality upgrading – evidence from the food industry

Jan Fałkowski

University of Warsaw & CEAPS

Daniele Curzi

University of Milano

Alessandro Olper

University of Milano & LICOS

Outline

- Short introduction & motivation
- Theoretical underpinnings
- Empirical strategy
- First results

- Work in progress – all comments very welcome

Starting point

- We know that institutions matter (*North*, …)
- We also know that they may be an important source of comparative advantage (*Nunn, 2007; Levchenko, 2007; Costinot, 2009, Chor, 2010*)
- Yet, a number of potential channels may transmit this impact
- Moreover, different types of institutions likely to have distinct effects

Why focus on quality upgrading?

- product quality is commonly perceived as a key feature of how countries specialise in production
- quality often seen as a necessary condition for export success and thus for economic development

- If institutions affect trade perhaps it is because institutions drive quality improvement

Our goal

- Contribute to the literature on the relationship between instiutions and trade
  - Better understand the channel through which institutions may promote trade
    - Focus on quality upgrading
  - We concentrate on a particular type of institution
    - We move away from analysing broad cluster of instit.
    - Focus on contracting institutions
      - More specifically, we exploit the variation in the quality of contracting institutions across countries/industries

Our goal (2)

- Quality of a product would be the outcome of technology used in production
- One of the most common form of technological progress involves the introduction of a higher-quality versions of an existing good

- Technology choice is one of the key organisational decision of firms
- => we aim at improving our understanding of the organisational design of agro-food production processes

Our goal (3)

- Previous research on comparative advantage & economic dev. had given pride of place to technology/innovation as the driver of growth and comparative advantage
  - together with physical and human capital accumulation
- We try to reconcile this view with the recent literature emphasising the role of institutions
  - We know that technology drives trade
  - We know that instituions drive trade
  - **Is it the case that institutions drive technology?**

Other related literature

- Our study naturally complements also a broader literature on the relationship between institutions and trade (*Anderson & Marcouiller, 2002; Berkowitz et al., 2006; Ranjan & Lee, 2007*).
- Other papers related to our work are that by *Antras (2003), Antras and Helpman (2008) or Nunn and Trefler (2013)*.

Linking quality upgrading & contracts

- production of higher-quality varieties of a good typically requires the use of higher-quality inputs (e.g. *Essaji & Fujiwara*, 2012)
  - The latter in turn require more customization and relationship-specific investments
- => a country with a better contracting environment will have a comparative advantage in the production of higher-quality varieties of a given good

Theoretical underpinnings

- Our empirical approach builds on the theoretical model developed by *Acemoglu et al.* (2007)
  - more advanced technologies adopted in sectors with better contracting institutions
  - this effect especially in countries/industries characterised by greater technological complementarity between inputs

Technology adoption & quality upgrading

- a common way to model more advanced technologies is to assume that they are based on a geater range of intermediate inputs
- *Fan et al.* (2014) show that product quality improvements are crucially dependent on an improved access to intermediate inputs
- => there is a direct link between technology adoption and quality upgrading

Econometric specification

$$\Delta Q_{c,i,t} = \gamma_i + \gamma_c + \beta Q_{c,i,t-5} + \alpha Q_{c,i,t-5} z_i I_c + \delta X_{c,i,t} + \varepsilon_{c,i,t}$$

- The dependent variable is a 5-year change in product quality (Q)
  - *c, i, t* refer to country, industry and year respectively
- I_c measures the quality of contracting institutions in country *c*
- z_i refers to a measure of the importance of relationship-specific investments (i.e. contract intensity) in industry *i*
- The interaction term between *lagged* Q, I_c, and z_i is included to see whether countries with initial greater technology complementarity (lagged quality), better contracting institutions I_c adopt more advanced technologies (i.e. experience higher ΔQ) precisely in contract intensive industries z_i

Data

- Quality is inferred from trade data using Khandelwal's (2010) approach
- Contract intensity measure (Nunn, 2007)
- Judicial quality (Kaufmann et al., 2003)

- Food industry, quality particularly important
  - Food safety crisis, competition in private standards, public policy: product labelling, … (Curzi et al., 2014)

Results

- lagged quality is negative and statistically significant => convergence in quality
  - This finding is consistent with results obtained by Hallak & Schott (2011); Levchenko & Zhang (2011); Curzi et al., (2014)
- yet, if we focus on countries that have contracting institutions of higher quality, specialise in contract intensive goods we observe that they experience higher quality upgrading in sectors characterised by greater technology complementarities
  - Fully consistent with predictions coming from Acemoglu et al. (2007)
  - Recall: we should observe more advanced technologies especially in sectors characterised by higher quality contracting institutions AND greater technology complementarities

Further steps

- Robustness tests:
  - Additional control variables
  - Different measures of institutional quality
  - Different measures of product quality
  - Instrumental variables estimation

Thank you for your attention

The relationship between innovative and competitive strategies in the European agri-food supply chain

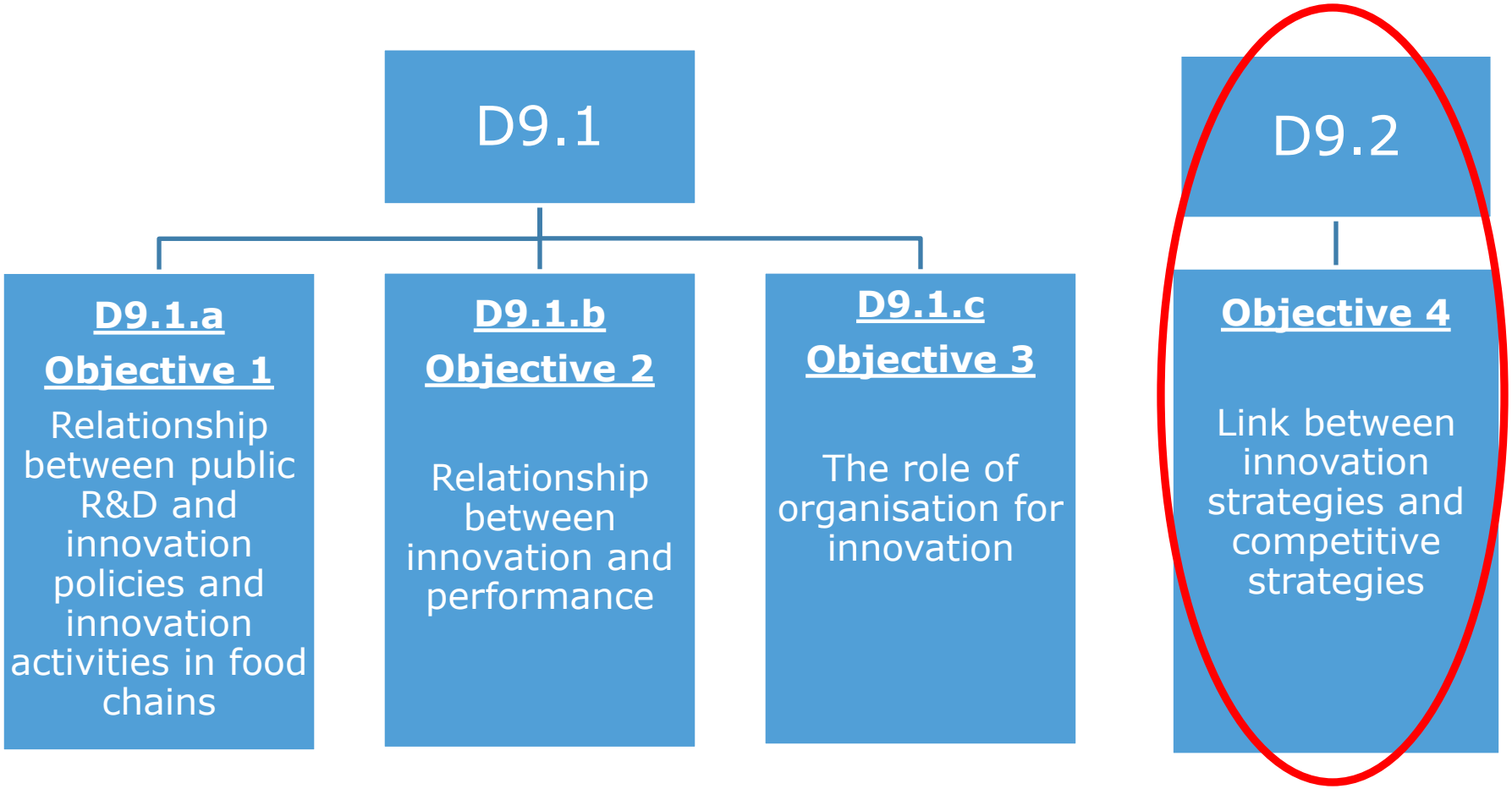
Valentina C. Materia, Liesbeth Dries, Stefano Pascucci (WUR)

COMPETE meeting and Workshop, Prague, 26-28 November 2014

WAGENINGEN UR
For quality of life

COMPETE

Deliverables – objectives (1)



Deliverables – objectives (2)

D1:

- Materia V.C., Dries, L., Pascucci, S. (2013), "Innovation in agro-food supply chains – The EU policy context", FP7 COMPETE project deliverable D9.1a, objective 1, n. 5 March 2014, project website.
- Materia, V.C., Pascucci S., Dries L. (2014). "Are in-house and outsourcing innovation strategies interlinked? Evidence from the European agri-food sector". FP7 COMPETE project deliverable, n. 11 October 2014, project website
- Materia, V.C., Pascucci S., Dries L. (2014). *Are in-house and outsourcing innovation strategies interlinked? Evidence from European agri-food sector*. Technovation (submitted September 2014)

D2:

- The relationship between innovative and competitive strategies
- Case studies

Outline

- The research question
- Theoretical background
- Data and methodology
- Strategy and next steps

The research question

Does the innovation strategy decision of EU agribusinesses have an influence on their performances and competitiveness?

Innovation (OECD/Eurostat, 1997, p. 39):

..all scientific, technological, organizational, financial and commercial activities which lead to, or are intended to lead to, the implementation of technologically new or improved products or services

Innovation strategy (from Materia et al., 2014):

- **IN-HOUSE**: *internal R&D* activities, i.e. firms realized research activities in their laboratories and appropriated the results of their research
- **OUTSOURCING**: R&D resources acquired from outside the firm and investments in external activities developed by other firms

Theoretical background (1)

*Innovation strategies are a **key determinant** of firm performance and competitiveness*

- Firms forced to actively decide on their **organisational boundaries** to innovate, either through **in-house** innovation activities or by **outsourcing** at least part of the innovation process
- In recent years, outsourcing has gained in importance: the increase in **knowledge content** of products has driven firms to utilise external means to innovate
- While innovation strategies are sector-specific, most of these studies have focused on manufacturing and there is little empirical evidence on **innovation strategies in agri-food firms**

Theoretical background (2)

- Countries can achieve higher rates of **growth** and favourable terms of **trade** by specialising in knowledge intensive products with higher added value (OECD/Eurostat, 1997)
- Policy makers across the globe have been struggling to develop policies which would stimulate **spending on R&D activities** and increase the **efficiency** of the innovation process
- The introduction of new technology and human capital, and improvements in the *organization* of production increase a firm's **efficiency** and enable it to **produce at lower costs than its rivals**
- Similarly, the introduction of new products provides consumers with new goods and services which, in turn, leads to the **expansion** of firms in new segments of the market (OECD/Eurostat, 1997, p. 31)

Theoretical background (3)

*Most studies have reported a **positive** relationship between innovation and firm performance*

- Earlier studies typically reported a positive relationship between innovation and measures of firm performance
- R&D expenditure as the principal measure of innovation, however, it suffers from several shortcomings

  → *input; cooperation with external; SME*

- Measures of performance: productivity, sales, export revenues and profits, sometimes financial measures such as the returns on assets
- Two major problems with the econometric specification of this relationship: selectivity bias and simultaneity bias

Data and methodology (1)

- **Bruegel/Unicredit EFIGE AMADEUS** dataset: seven countries (AT, FR, DE, HU, IT, ES, UK), stratified by industry (**1393** obs. for food and beverages), region and firm size structure, cross section (2007-2009)

- Firm data: Proprietary structure; Workforce; Investment, Technological Innovation and R&D; Internationalisation; Finance; Market and Pricing; Balance Sheet; Profit & Loss Account

- **EU food sector**:
  - Small firms (<50 employees), only 8% large firms (>250)
  - 17,3% is part of a group of firms
  - 64% is made of limited liability corporations (bakery, meat)
  - 15% >1 mln € turnover, 38% 2-10 mln €, only 2% >250 mln €
  - 40% declared investments in R&D, some of the remaining invested in plant, machines, equipment, ICT

Data and methodology (2)

Propensity score matching

- Popular approach to estimate *causal* treatment effects
- It applies for all situations where one has a treatment, a group of treated individuals (i.e. innovating firms) and a group of untreated individuals (i.e. not innovating firms)

→ SELECTION BIAS

- Its basic idea is to find in a large group of nonparticipants those individuals who are similar to the participants in all relevant pre-treatment characteristics X
- Differences in outcomes of this well selected and adequate *control* group and of participants can be attributed to the program

Propensity score method

- Run logistic regression and obtain propensity score: predicted probability (p) or $\log[p/(1 - p)]$.
- Check that propensity score is balanced across treatment and comparison groups, and that covariates are balanced across treatment and comparison groups within strata of the propensity score
- Match each participant to one or more nonparticipants on propensity score
- Verify that covariates are balanced across treatment and comparison groups in the matched or weighted sample
- Multivariate analysis based on new sample
- Use analyses appropriate for non-independent matched samples if more than one nonparticipant is matched to each participant

Strategy and next steps

- Literature review: which gaps?
- Defining proper indicators for performances
- Applying PSM and compare results with the main literature
- Possible comparisons:
  - Among sectors
  - Among countries
  - Heterogeneity of actors and sub-sectors
- Submit to scientific journal

Thank you!

valentina.materia@wur.nl

WAGENINGEN UR
For quality of life

Caught between the devil and the deep blue sea? Farmers position in the supply chain: some evidence from Poland

Jan Fałkowski

University of Warsaw

Agata Malak-Rawlikowska

Warsaw University of Life Sciences

Dominika Milczarek-Andrzejewska

Polish Academy of Sciences

COMPETE meeting and Workshop, Prague,
26-27 November 2014

Research questions:

- What are the determinants of farmers' position vis-a-vis downstream sector (dairy industry)?
- What are the determinants of farmers' position vis-a-vis upstream sector (inputs supplier)?

- Are there any differences between them?
- If yes, what differences we observe and why?

- Subjective assessments versus more objective measures

Rationale

- Why looking at farmers' position in the chain?
  - Analysis intelectually interesting in its own right, but also can inform policymakers
    - Farmers' position vis-a-vis other stages of the food chain often on the political agenda
  - Often it is assumed that farmers are at a disadvantage
    - Lack of systematic evidence on this issue

Related literature

- Within agricultural economics, at least two large strands of the literature:
  - Vertical integration (Dries, Swinnen, Gorton, …)
    - Why does vertical integration take place?
    - What forms does it take?
    - What are the consequences of vertical linkages?
  - Price transmission (Bakucs, Ferto, von Cramon, McCorriston, Lloyd, Morgan, …)

Our contribution

- Bargaining power in the centre of attention
  - Papers mentioned earlier rarely treat it as an outcome variable
- Not aware of any paper having both upstream and downstream relations at the same time
  - Farmers-input suppliers relationships very poorly documented
- We try to compare various measures of bargaining power
  - To what extent subjective measures are reliable?

Data

- Household survey, 300 respondents
  - conducted in June 2014
- Mazowieckie region
  - the largest milk producing region in Poland
  - the one, with Warsaw
- Survey meant to be representative at region level w.r.t. farm size
  - meant to cover as much as possible the survey from 2010
  - succeeded in 81% (245 out of 300 obs)

- We start with some descriptive analysis

Subjective assesment of the relationship

- How do you assess your relationship?
  - Farmers assess their relationship with the dairy either as very good (34%) or good (55%)
    - Rarely (11%) as average
    - Never as bad or very bad
  - Farmers assess their relationship with the input supplier either as very good (36%) or good (58%)
    - Rarely (6%) as average
    - Never as bad or very bad
  - No statistically significant difference between these assessments
  - These responses contrast with the common view of farmers being exploited by food industry

Subjective assesment of the relationship

- Do you consider changing your contracting party? (% of responses)

	Dairy	Input supplier
Yes, for a long time	4.3	3.9
From time to time	34.1	35.6

- Again, not many farmers seem desperate to change

- No difference between attitude towards dairy and attitude towards input supplier

Subjective assessment of the relationship

- Do you think you could find a substitute for your current contracting party? (scale from 1 to 5)

	Dairy	Input supplier
Very easy (%)	22.7	64.1
Rather easy (%)	40.1	29.6
Neither easy nor difficult (%)	24.1	4.9
Rather difficult (%)	8.7	0.7
Very difficult (%)	4.3	0.7
Average	**2.30**	**1.44**

- In farmers' opinion: it is easier on average to find a new input supplier than to find a new dairy

A bit more objective look

- How many potential dairies/suppliers you think you can contract with?

	Dairy (D)	Input supplier (IS)
1 (%)	36.7	28.6
2 (%)	36.0	40.4
3 (%)	22.0	24.1
4 (%)	3.4	5.71
5 (%)	1.9	1.2
Average	**1.97**	**2.11**

- Missing values not included (dairy: 36 obs.; suppliers: 56 obs)
- Difference in averages not statistically significant
  - Can we rely on the responses about easiness of finding substitutes? (recall the difference between D & IS)

A bit more objective look

- Please name dairies/input suppliers with which farmers in your neighourhood contract

	Dairy	Input supplier
1 (%)	22.8	20.8
2 (%)	41.4	43.0
3 (%)	24.9	24.3
4 (%)	8	11.1
5 (%)	2.1	0.9
Average	**2.27**	**2.28**

- No difference at all;
- Again, calls the responses about easiness of finding substitutes into question

„Easiness to substitute” – further analysis

- Mokken scale, factor analysis, cluster analysis – consistent results

- Responses to the question „How easy it would be for you to find a substitute” do not form one scale
  - Important result as it is against what we normally assume (that responses to such questions reflect the latent variable measuring e.g. farmers’ bargaining power)

- Suggesting that
  - Either bargaining power vis-a-vis dairies is different from bargaining power vis-a-vis input suppliers
  - Or, that these questions hardly measure what we initially wanted to measure

Bargaining power

- Farmers assess price level being the most important in their relationship with both dairies and input suppliers.

- Therefore:
  - We look at price obtained by farmers from the dairy (PLN/litre)
    - Alternatively relative price: price obtained/averge price paid by the dairy
  - Discount (%) at which farmers buy feed

- Assumption: if prices are the most important, then bargaining power should be used to get favourable conditions regarding prices.

Bargaining power

- More systematic analysis of:
  - What determines (relative) price for milk which farmers are paid?
  - What determines discount which farmers obtain when contrating with feed suppliers?

Relationship with a dairy

Herd size	0.003***
Fat content	0.052
Protein content	0.066**
Growth in deliveries (2013/2004)	-0.0045*
Having a contract	0.049**
Having a credit from a dairy	0.040**
Farm size as average in neighb. (0/1)	-0.005
Farm size smaller than average in neighb. (0/1)	-0.095**
# of dairies contracting with neigh.	-0.151**
Obs	247
R^2	0.69

All regressions include municipality FE & dairy FE

Relationship with dairy cont.

- All regressions include municipality fixed effects & dairy fixed effects
- Positive effect of herd size
  - In addition negative effect if herd size relatively small compared to other farmers in the neighbourhood
- Growth in production (2013/2004) negative at 10%
- Fat content, protein content – positive (though lose significance with more variables)
- Having a contract – positive
- Negative effect – the number of dairies contracting with neighbours (competition effect?)
- Positive effect of credit from a dairy

Relationship with dairy cont.

Other determinants:

- Those considering changing a dairy for a long time have lower prices than the rest (not robust)
- No effect of subjective assessment (how easy I can find a substitue for a current dairy)
- No effect of the number of alternative dairies mentioned by the farmer
- No effect of the frequency of price negotiations
- No effect of knowing mayor, dairy director…

Relationship with input supplier

Herd size	0.0004***
Growth in deliveries (2013/2004)	0.0017***
There are some dairy farms in the neigh.	-0.016*
There are only few dairy farms in the neighborhood	-0.028**
I am the only dairy farm in the neigh	-0.032***
Input supplier has breached contract	-0.048**
I have breached the contract	0.039*
Premiums obtained from the IS	0.018**
Obs	231
R^2	0.635

All regressions included municipality FE and input suppliers' FE
Shouldn't we use Tobit – strange results (all coefficients highly significant)

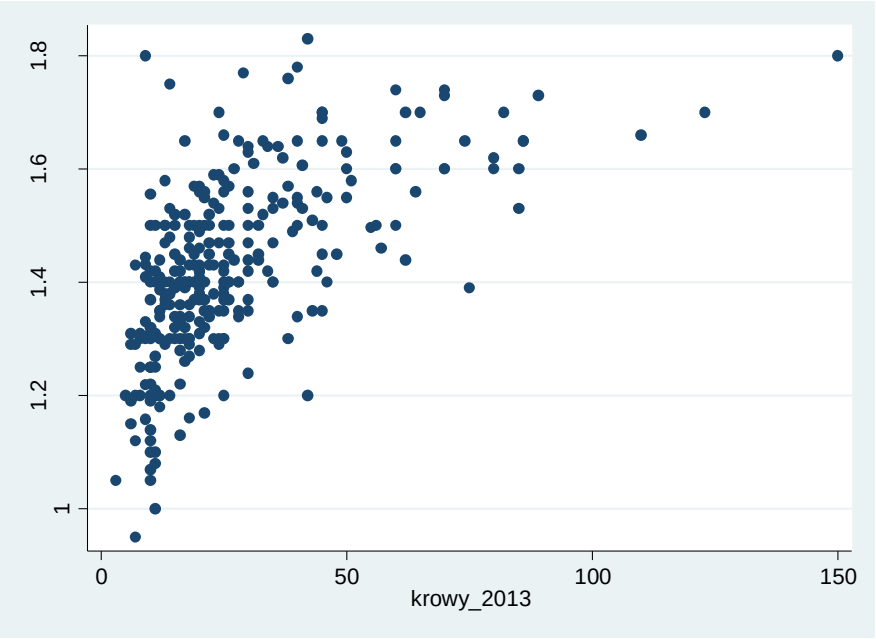
Relationship with input supplier

Other determinants:

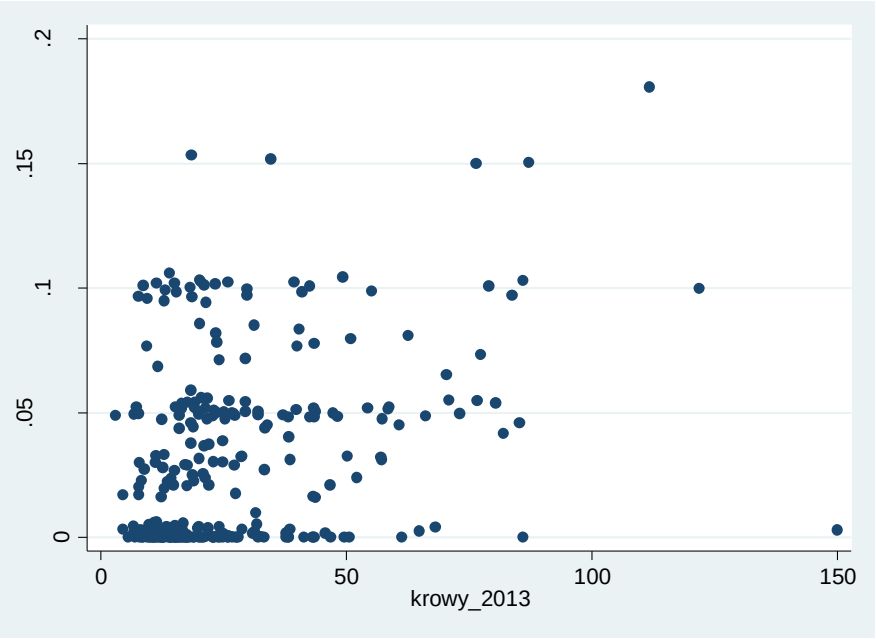
- No effect of the number of potential suppliers
- No effect of producer group membership
- No effect of age, education, sex
- No effect of assistance programmes except for „gifts”
- No effect of subjective assessment (how easy it is for me to change/for him to find a subst. for me)
- No effect of negotiations’ frequency

An obvious determinant: farm size

- Price vs. herd size



Discount vs. herd size



- Strong correlation in both cases
- Are there any differences in the way that farm size affects bargaining with dairies and suppliers?

Farm size cont.

- In the first step we regress milk price (discount) on municipality fixed effects

- In the second step we add herd size and see the effect on (adjusted) R-squared

	Dairy	Input supplier
R^2 in the 1st step	0.15	0.22
R^2 in the 2nd step	0.46	0.31
Adj. R^2 in the 1st step	0.02	0.09
Adj. R^2 in the 2nd step	0.38	0.19

Short conclusions

- Caught between the devil and the deep blue sea?

No, according to subjective opinions of farmers

Relationships with input suppliers and dairy companies determined by different factors

Thank you for your attention

The EU Food Industry Competitiveness and Government Policy: *Exploration of Findings Obtained by In-depth interviews*

Zaklina Stojanovic,
Galjina Ognjanov
Jelena Filipovic

Faculty of Economics, University of Belgrade

Presentation to the 2nd COMPETE WORKSHOP: The competitiveness of the European agri-food chain

The CAP: current orientation

- The EU's Common Agricultural Policy (CAP)
  - Income support to farmers, guaranteeing a safety net for agricultural prices
  - Sustainable agricultural sector development
    - Environmental,
    - Social,
    - Ethical &
    - Economic aspects.
- The CAP aims to achieve:
  - a competitive agricultural sector;
  - production methods that support environmentally-friendly, quality products that the public wants;
  - a fair standard of living and income stability for the agricultural community; diversity in the forms of agriculture, maintaining visual amenities and supporting rural communities;

The CAP: future trends

- A policy framework that supports and encourages producers to address challenges:
  - Economic - food security and globalisation, a declining rate of productivity growth, price volatility, pressures on production costs due to high input prices, position of farmers in the food supply chain, etc.
  - Environmental - resource use and efficiency, resource quality and biodiversity.
  - Territorial – development of rural areas.

Participatory approach

- Participatory/qualitative
  - Strengths:
    - richer definition of problem;
    - more insight into causal processes;
    - more accuracy and depth of information on certain questions.
  - Weaknesses:
    - lack of generalisation;
    - difficulties in verifying information.

The possibility of being “holistic” – that is, looking at a set of relationships

IN-DEPTH INTERVIEWS

- To build the sample, we propose, the following scheme:
  - associations representatives - one covering farms and the other processors;
  - at least one representative from trade sector - retailer, broker, exporter etc.;
  - the other experts could be persons with high expertise in the food chain competitiveness (representatives of a chamber of commerce, researchers, NGOs etc.)

Food chains

- 4 sectors are targeted: Cereals, F&V, Dairy, Meat, 32 In-depth interviews were conducted.

- Food chains by countries:

IAMO GER)	:	Dairy & Meat
IAE (RO)	:	Cereals
WU (NL)	:	F&V
UP (SLO)	:	Dairy
CULS (CZ)	:	Meat
UNEW (UK)	:	Cereals
BEL (SR)	:	Cereals ; F&V

The Questionnaire

1 - Import and Export Regulations

2 - Government policy & food chain competitiveness

3 - Governance structures / Influences and interactions

Food chain competitiveness

1. Based on your experiences, please describe the state in the sector you represent in the last three years:

- Related to technology, productivity & specialization
- Related to innovation and R&D
- Related to vertical/horizontal integration and market performance

Question type: Open.

Food chain competitiveness

- **Knowledge-based and innovation-driven competitiveness:** Innovation addresses both production (productivity and specialization) and organisation (vertical integration and coordination).

- **However, competitiveness could be still improved by efficiency-driven factors in some EU countries.**

An Example: Technology, productivity & specialization – typical answers

- “Investments in new technologies arise mainly from new regulations (animal welfare, energy etc.)” (*Meat producer, Germany*)
- “Environmental standards and energy-efficiency are the most important reasons to invest in new technologies. However, specialisation is important to stay in the competition.” (*Grain processor, Germany*)
- Part of the sector was endowed with breakthrough technologies. However, the high productivity level could not be reached due to the low specialization. (*Food industry association, Romania*)
- Technology is outdated, productivity is below the EU average, the lack of specialization is evident. (*Researcher, Serbia*)

Food chain competitiveness – the main issues

2. According to your opinion, what are three most important issues that negatively influence the sector competitiveness on international markets at the moment? Please, describe the 3 issues in more detail.

Question type: Open.

- Lack of contracts, associations, strategic partnership…
- Lack of funding, low level of price at the international market, different level of subsidies
- …
- Regulations (food labelling, animal-welfare standards, energy saving etc.)

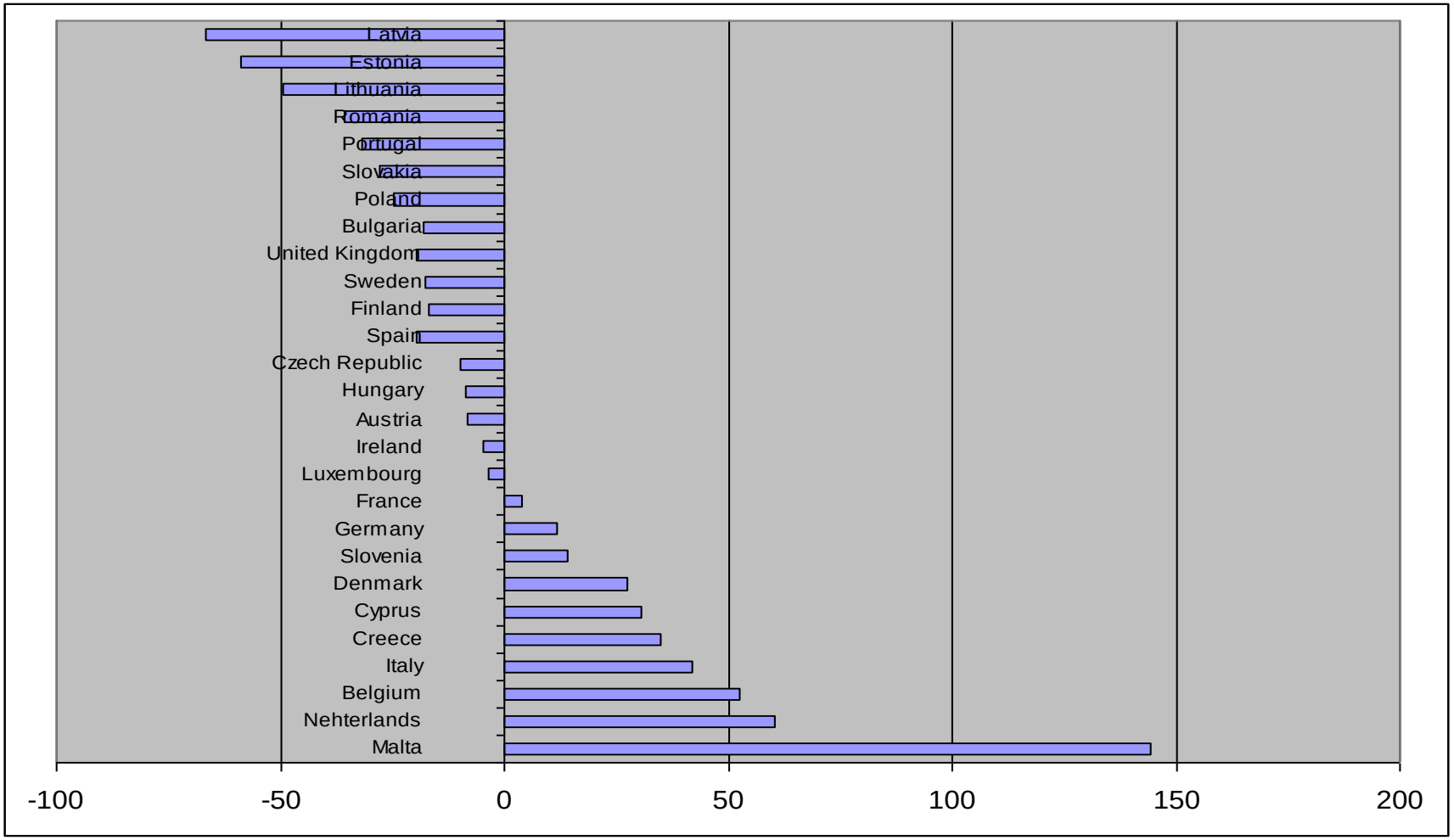
The most important issues – key words

The most important policy measures foreseen by interviewed stakeholders

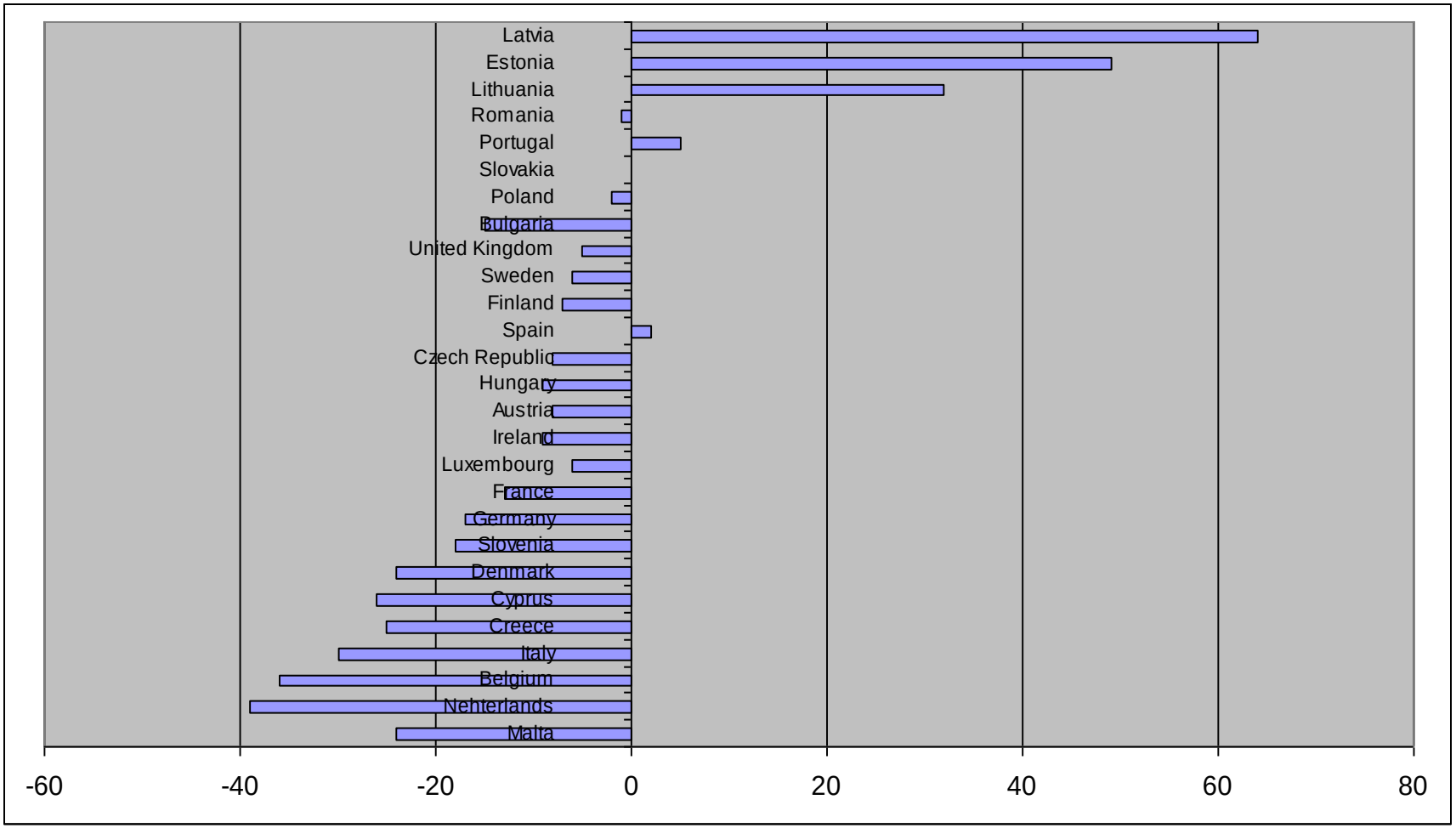
- Financial support, particularly to innovations/technology improvements
  - “Equalizing the financial support at EU level so that the farmers can benefit from the same support. Otherwise, EU favours unfair competition between the farmers from member states.” (*Agricultural Producers’ Association, Romania*)

- Transparent labelling requirements (claims made on food, products origin, GMO etc.) and phytosanitary legislations.
  - “Regulations rather constrain sector's competitiveness than supporting” (*Producer, Germany*)

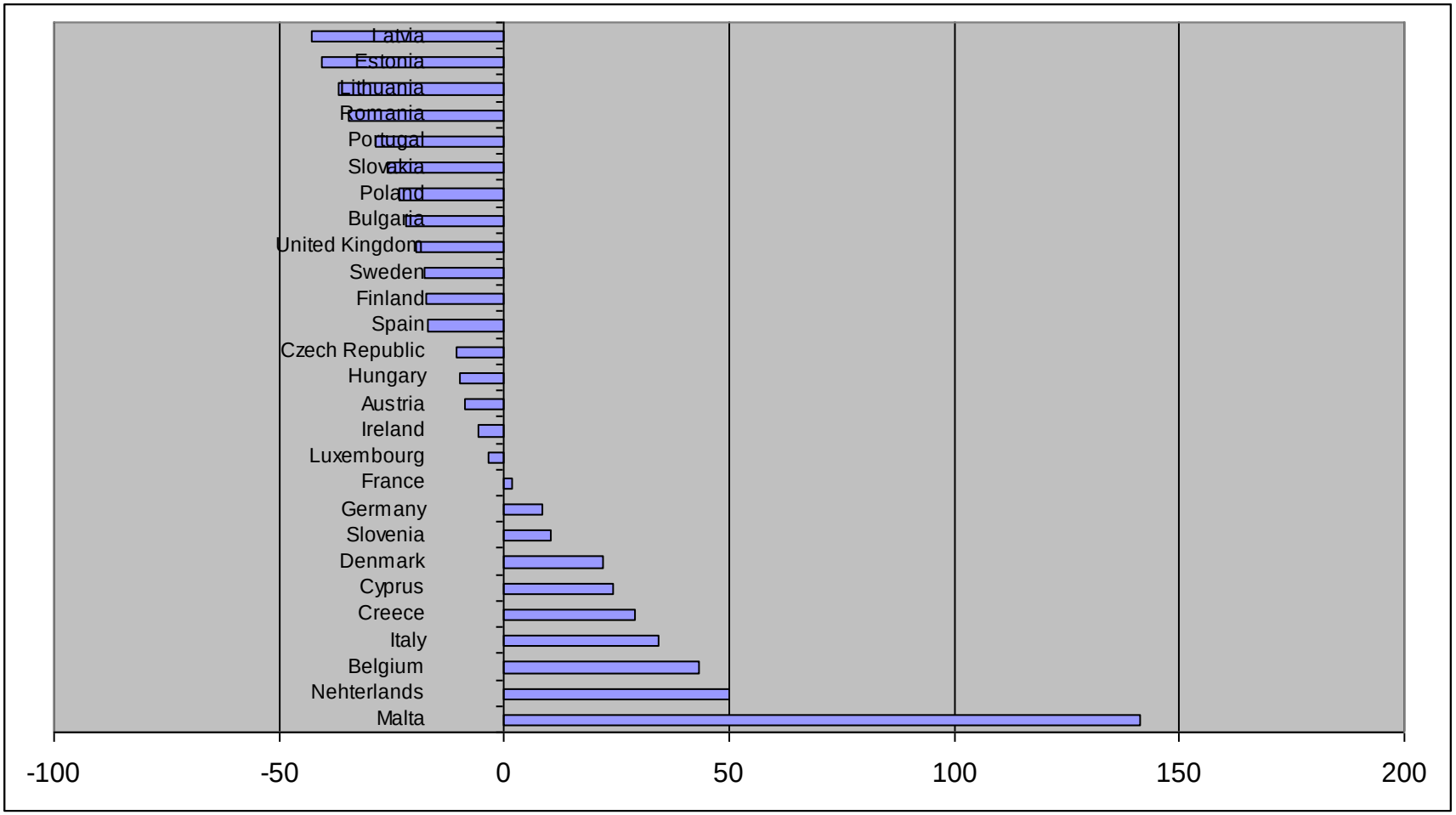
CAP Pillar 1 - Direct Payments, Existing level – EU27-100%



Expected change in direct payments by the EU member state, in EUR/ha



CAP Pillar 1 - Direct Payments, 2014/2020 Per Annum, EU-27=100%



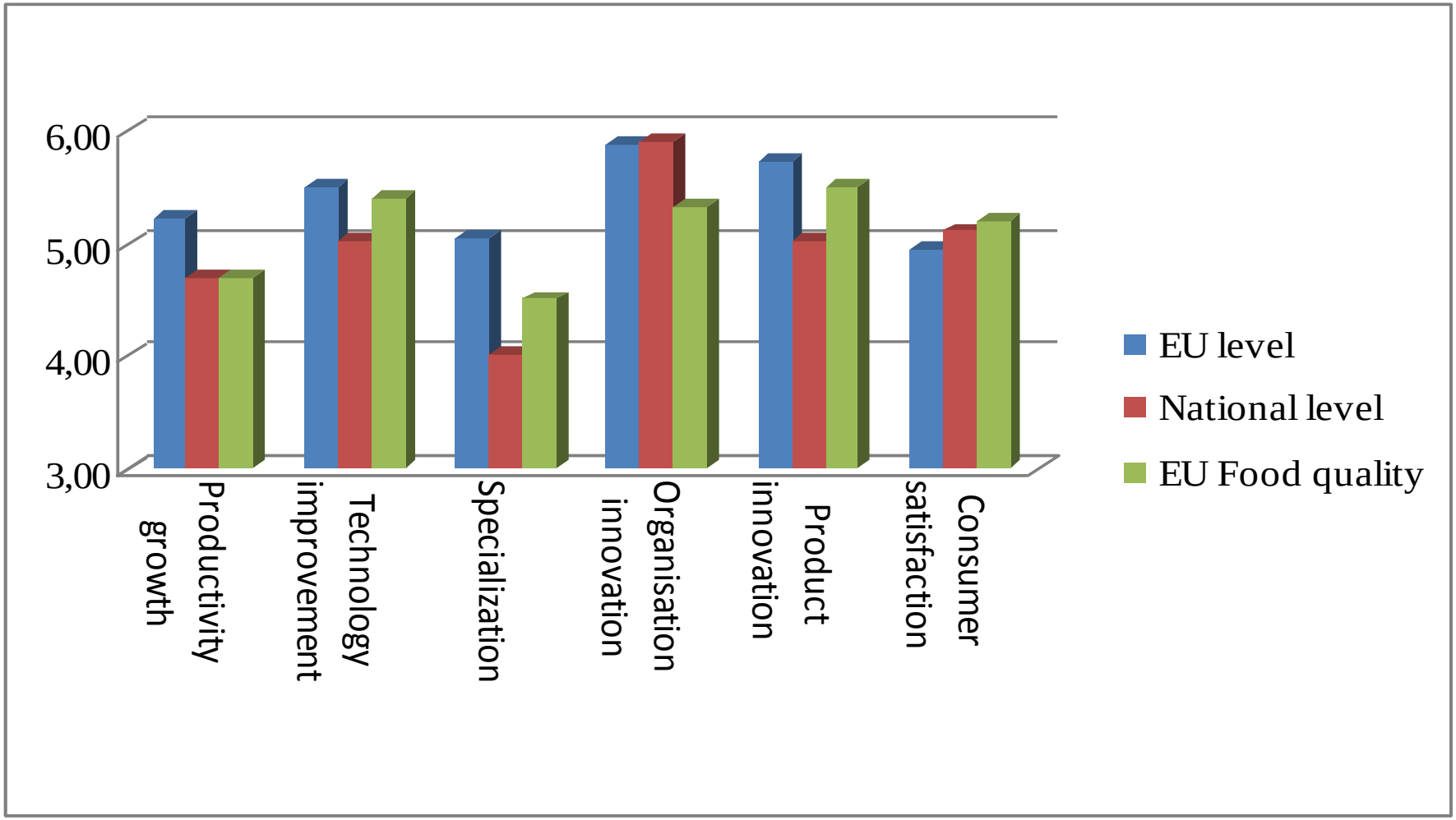
Government policy & competitiveness

- Using a scale from 1-7 (1: no impact at all, 7: very important impact), score the extent to which the above listed measures affect the following goals:

Goal
Productivity growth
Technology improvement
Food chain specialization
Organisation innovation
Product innovation
Consumer satisfaction

- Answers:
  - The EU level
  - The country or national level
  - If the EU food quality policy is concerned

Government policy & competitiveness



Instead of Conclusions

- The EU policy is, according to experts opinion, still oriented toward productivity growth and technology improvement, as well as product innovation and specialization.
- At the national level governemnts take more care about organisation innovation and consumer satisfaction.

- The conclusion is twofold:
  - The obtained results indicate **discourse regarding main drivers of food chain competitiveness at the EU and national level policy**

or

  - It might be an indicator of **progressive orientation toward an integrated food chain approach** at the national level.

An integrated food chain approach

Statement	Yes	No	DK
There is a lack of coordination between different stages within the sector.	21	5	6
Farmers (cooperatives, associations etc.) have to much market power.	5	21	6
Food processors have too much market power in their dealings with farmers.	10	16	6
Food traders (wholesalers & retailers) have too much power over farmers.	13	13	6
Food traders have too much power over food processors.	14	8	10
Food retailers have too much power over consumers.	13	11	8

Food chain:

Various independent businesses or a network of organizations?

The characteristics of a modern food chain:

- initially driven by export sector opportunities,
- supply based consolidation,
- vertical coordination,
- standards implementation throughout the chain, and
- becoming more prevalent in the domestic markets.

Final remarks

- The investments are generated by the quality standards implementation
  - animal welfare,
  - energy efficiency,
  - environment and
  - consumer protection requirements.

- The main competitiveness drivers are obviously generated “outside” the food system (policy makers, traders, consumers..).

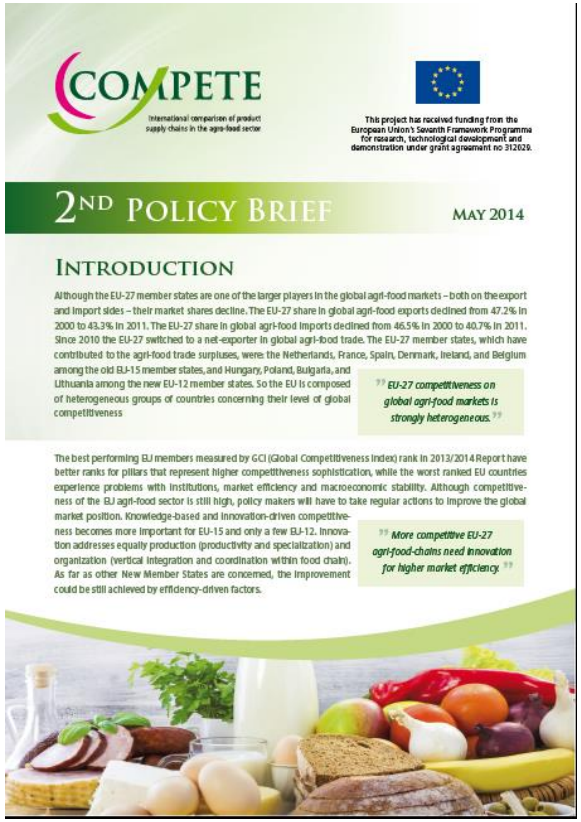
- The EU needs the proactive consumer protection policy, that would facilitate the EU innovation driven competitiveness at the international food market.

Final remarks

- Self-governance is a key word – the role of a government is to set institutions and regulations that lead to the efficient market functioning.

- More attention should be paid to the flexibility of the common policy frame in order to aloud specific adjustments targeting
  - efficiency and
  - innovation driven competitiveness.

Thank you for attention. Q&A



COMPETE

International comparison of product supply chains in the agro-food sector

This project has received funding from the European Union's Seventh Framework Programme for research, technological development and demonstration under grant agreement no 312029.

2ND POLICY BRIEF MAY 2014

INTRODUCTION

Although the EU-27 member states are one of the larger players in the global agri-food markets – both on the export and import sides – their market shares decline. The EU-27 share in global agri-food exports declined from 47.2% in 2000 to 43.3% in 2011. The EU-27 share in global agri-food imports declined from 46.5% in 2000 to 40.7% in 2011. Since 2010 the EU-27 switched to a net-exporter in global agri-food trade. The EU-27 member states, which have contributed to the agri-food trade surpluses, were: the Netherlands, France, Spain, Denmark, Ireland, and Belgium among the old EU-15 member states, and Hungary, Poland, Bulgaria, and Lithuania among the new EU-12 member states. So the EU is composed of heterogeneous groups of countries concerning their level of global competitiveness

"EU-27 competitiveness on global agri-food markets is strongly heterogeneous."

The best performing EU members measured by GCI (Global Competitiveness Index) rank in 2013/2014 Report have better ranks for pillars that represent higher competitiveness sophistication, while the worst ranked EU countries experience problems with institutions, market efficiency and macroeconomic stability. Although competitiveness of the EU agri-food sector is still high, policy makers will have to take regular actions to improve the global market position. Knowledge-based and innovation-driven competitiveness becomes more important for EU-15 and only a few EU-12. Innovation addresses equally production (productivity and specialization) and organization (vertical integration and coordination within food chain). As far as other New Member States are concerned, the improvement could be still achieved by efficiency-driven factors.

"More competitive EU-27 agri-food-chains need innovation for higher market efficiency."

The EU Food Industry Competitiveness and Government Policy:

Exploration of Findings Obtained by In-depth interviews

Zaklina Stojanovic,
Galjina Ognjanov
Jelena Filipovic

Corresponding author:
zaklina@ekof.bg.ac.rs
www.ekof.bg.ac.rs

ROMANIAN CEREAL MARKET COMPETITIVENESS IN THE REGIONAL BLACK SEA COMPETITION CONTEXT CASE STUDY: COMMON WHEAT

Iuliana IONEL
Cornelia ALBOIU
Cecilia ALEXANDRI
Camelia GAVRILESCU
Dan-Marius VOICILAS

PROJECT MEETING, COMPETE WORKSHOP AND COMPETE TRAINING COURSE
Czech University of Life Sciences, Prague
November 26-28, 2014

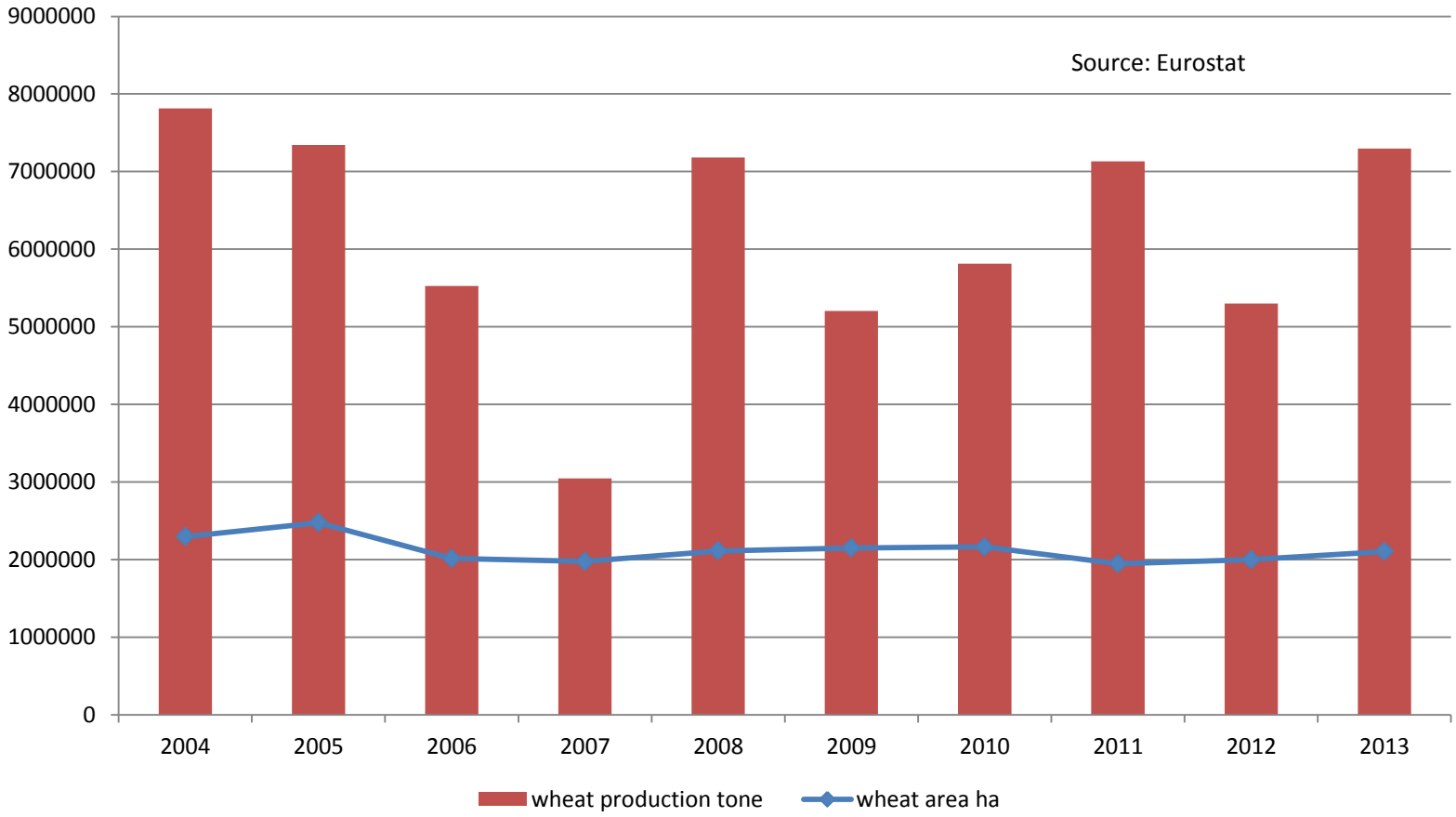
Content

- Background
- Area, production, farm size, operation cost per ha, net economic margin
- Storage facility
- Trade
- Conclusions

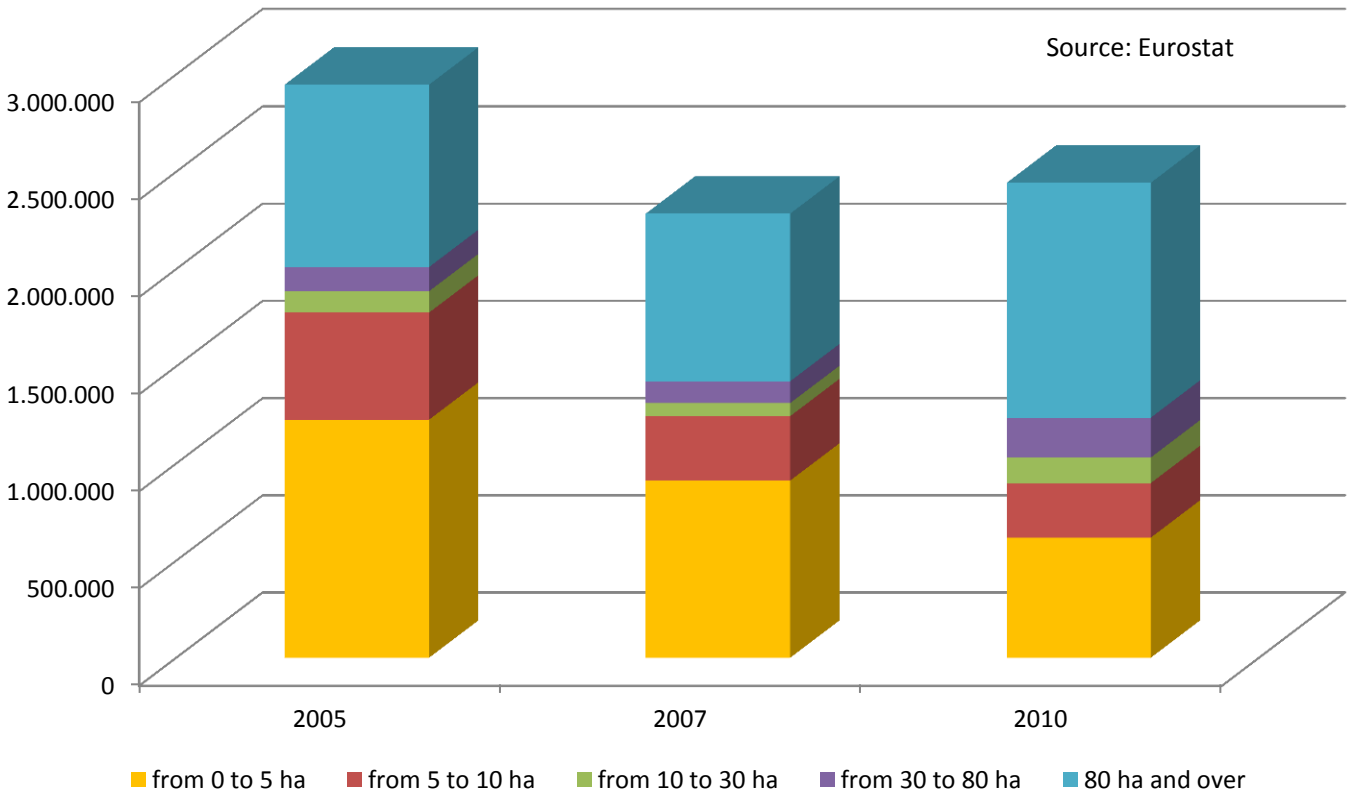
Wheat importance in Romanian agriculture

- It is cultivated on 25% of arable area;
- 50% of wheat is cultivated in farms of over 80 ha size;
- Average yields are unstable;
- The large farms have stable yields due to advanced technology;
- Storage: export increased investments in storage facilities;
- Wheat is one of the main Romanian export commodities;
- Romania tends to become an important wheat exporter from the Black Sea basin for the Mediterranean Sea.

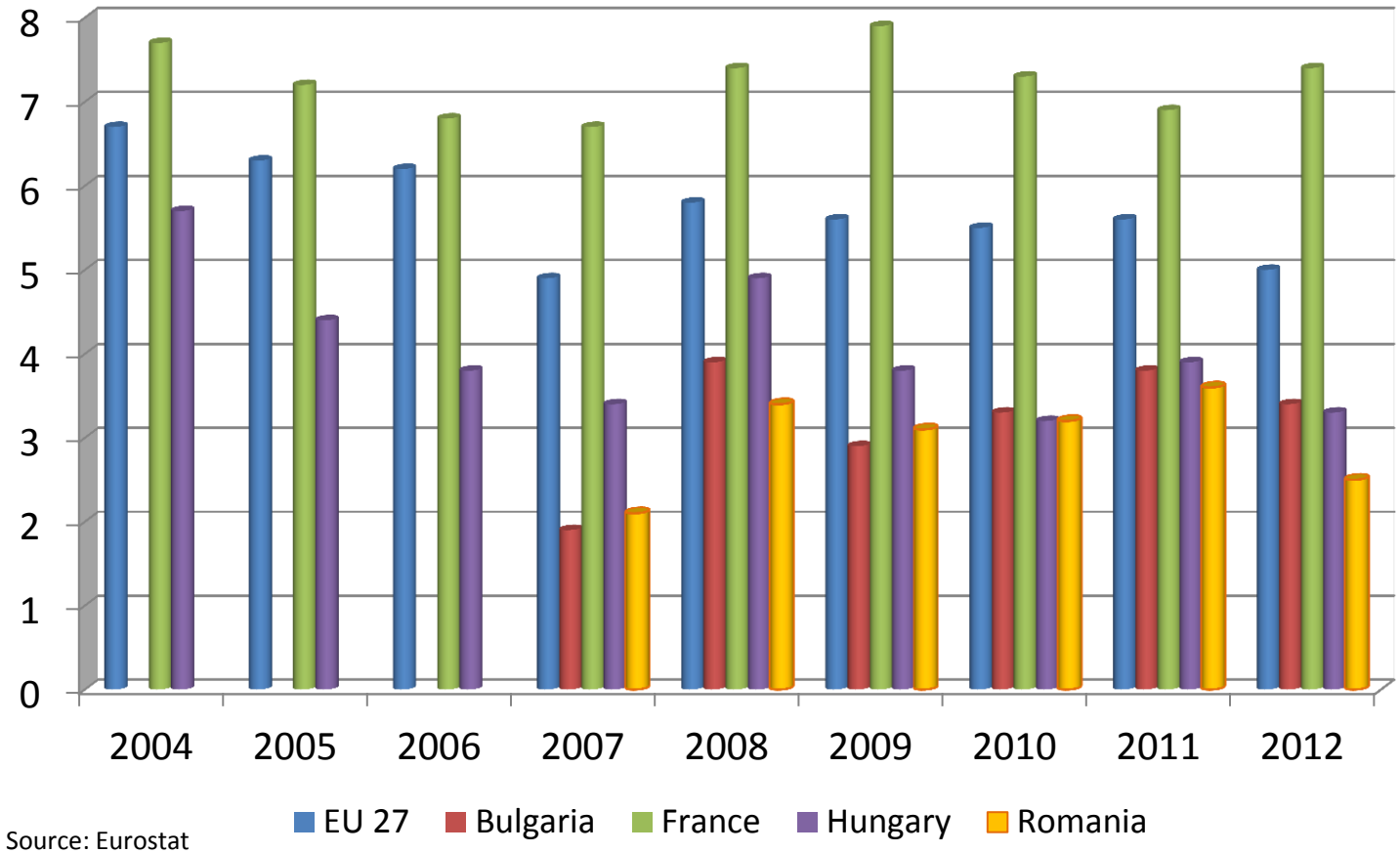
Romania: wheat, area and production



Area cultivated with wheat by farm size

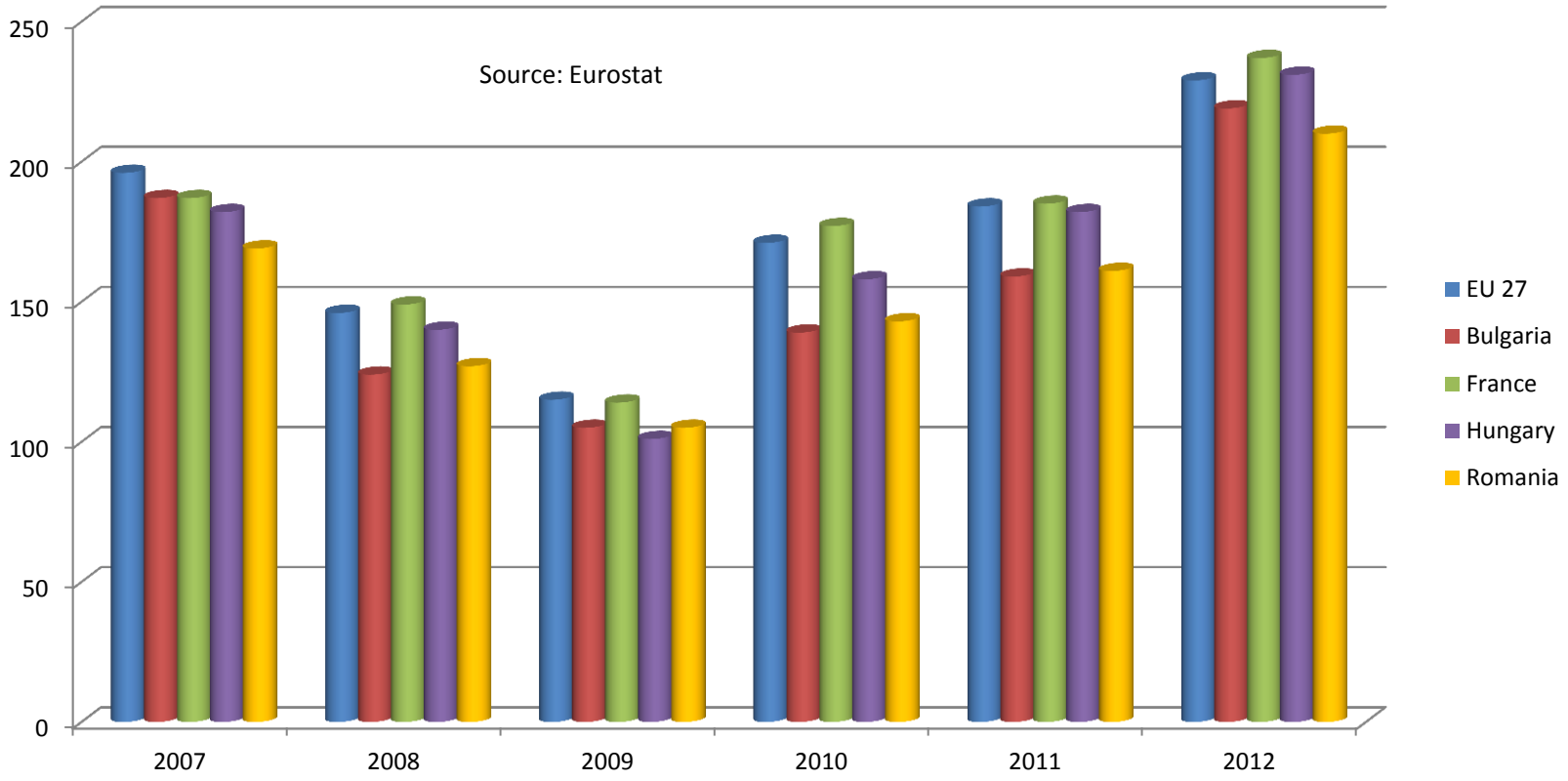


Wheat yields Romania – EU (tone/ha)

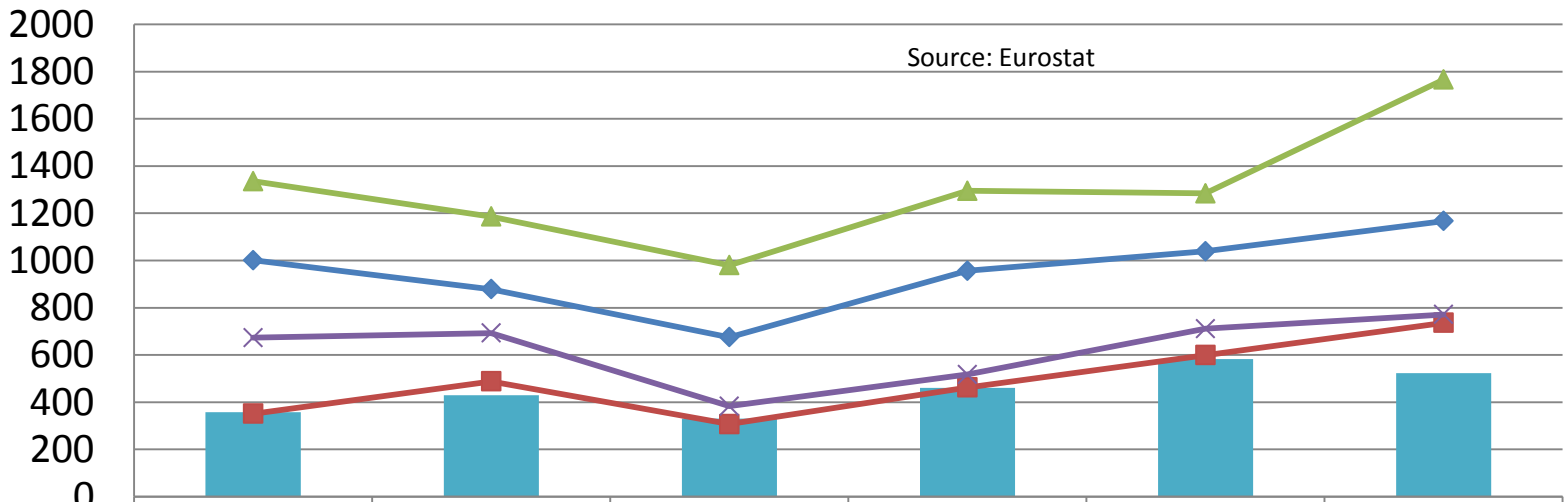


Source: Eurostat

Wheat prices
(euro/tone)

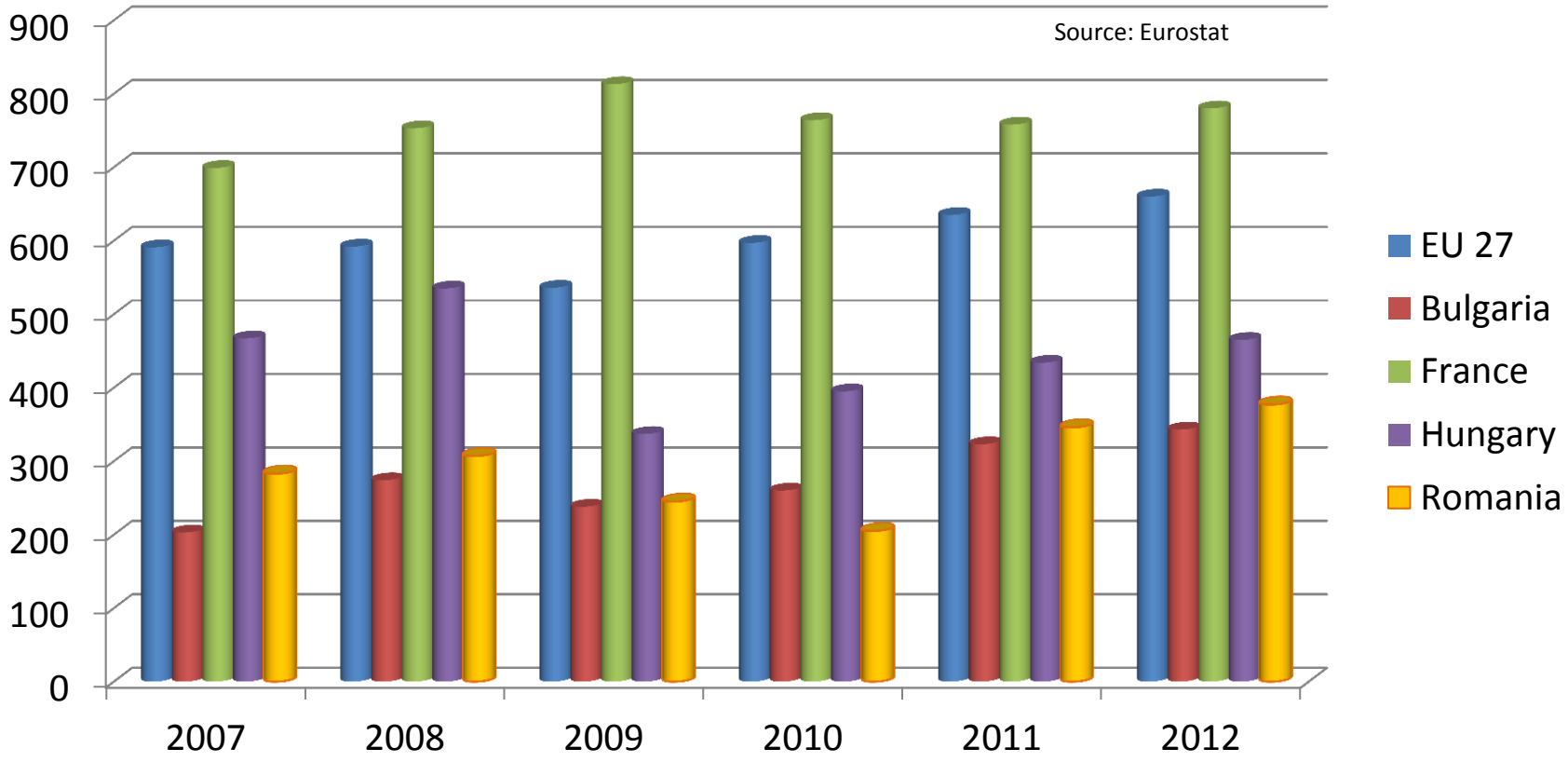


Wheat receipts euro per ha
(average per farm)

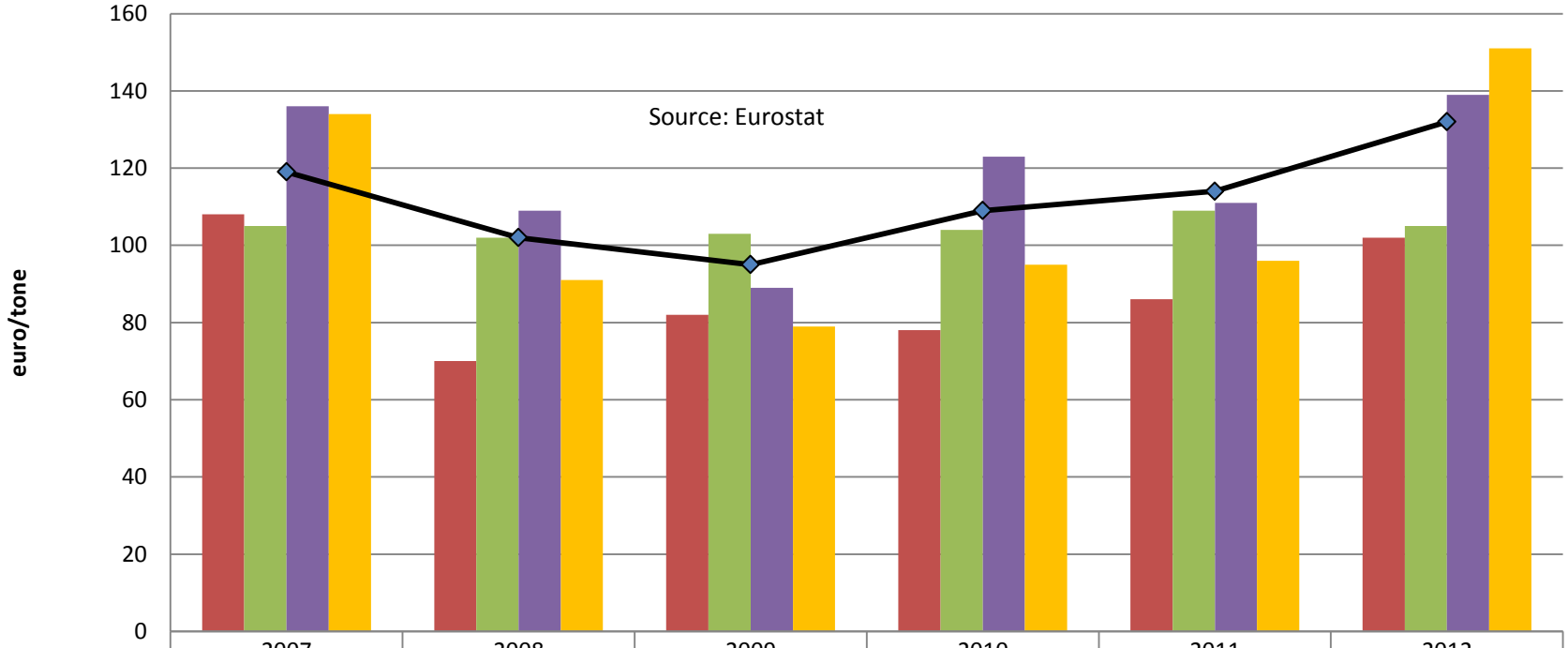


	2007	2008	2009	2010	2011	2012
Romania	358	429	331	461	582	523
EU 27	1001	878	675	956	1039	1167
Bulgaria	351	488	307	462	599	736
France	1336	1186	980	1295	1284	1766
Hungary	673	693	383	517	711	771

Wheat operating cost
(euro per ha)

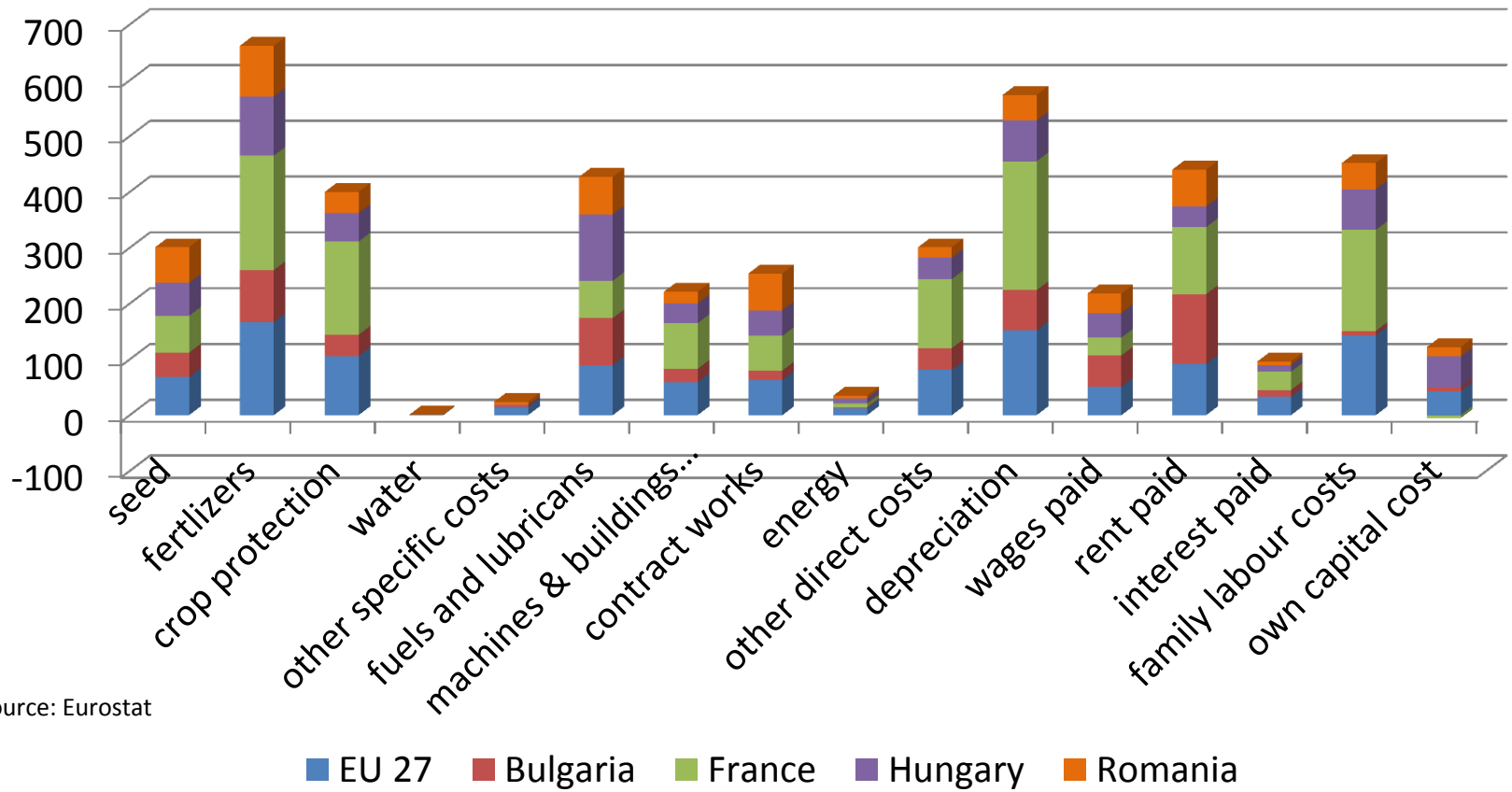


Common wheat production operating costs - euro/tone



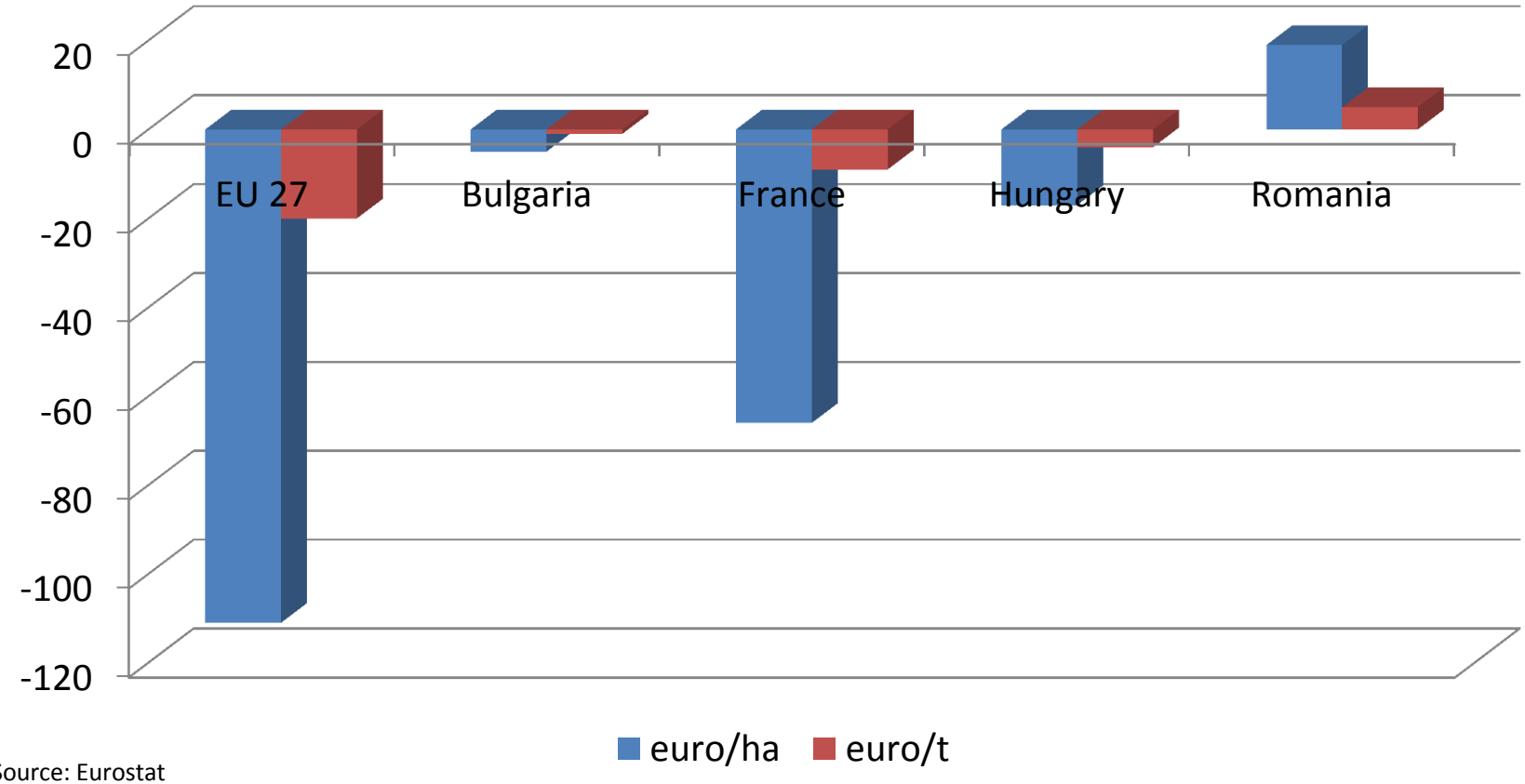
	2007	2008	2009	2010	2011	2012
Bulgaria	108	70	82	78	86	102
France	105	102	103	104	109	105
Hungary	136	109	89	123	111	139
Romania	134	91	79	95	96	151
EU 27	119	102	95	109	114	132

Common wheat production operating costs in 2011 (euro/ha)



Source: Eurostat

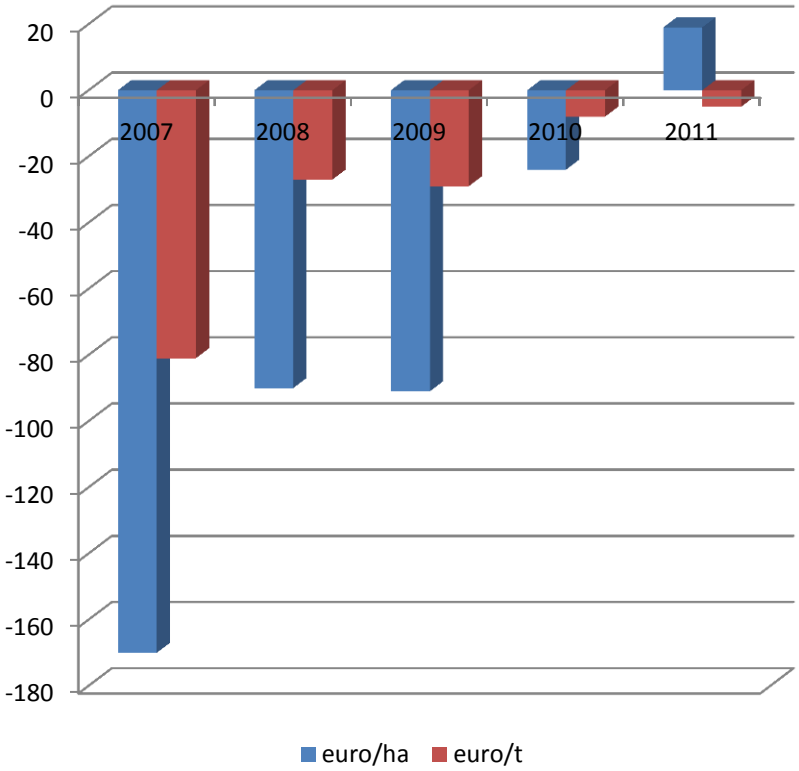
Net economic margin (2011)



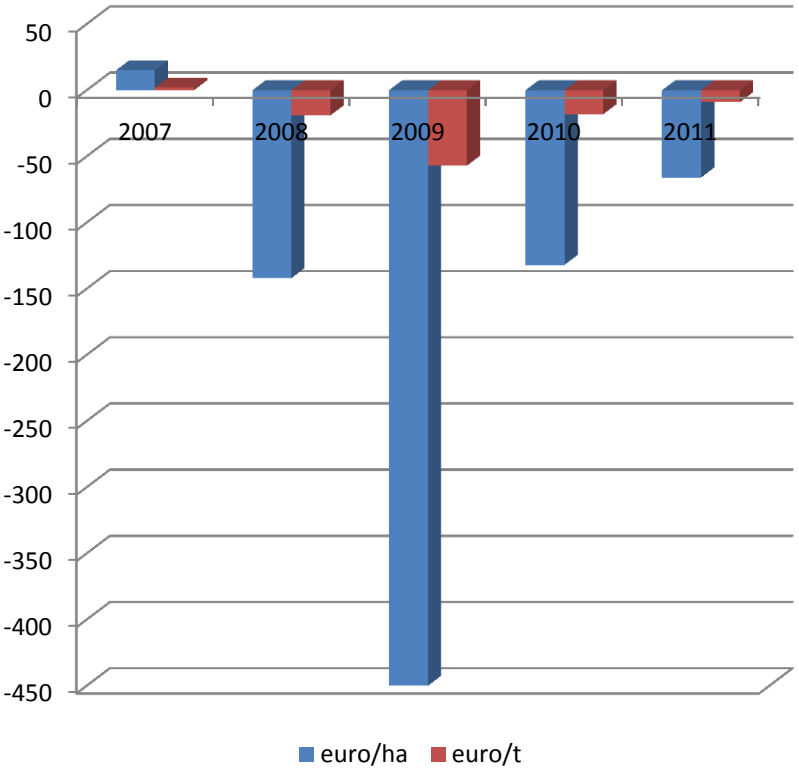
Source: Eurostat

Net economic margin

Romania



France



Source: Eurostat

Cereals storage facilities (1)

- In Romania, an agricultural market where only 1.5 of 10 hectars are irrigated, the warehouses remain one of the few risk management instruments;
- Investment in storage permit farmers to increase results selling at a bigger price outside harvest time;
- In the last four years the storage capacity increased by 17%, at 17,4 million tones;
- Large share of investments was made through NPRD intermediul PNDR (measure 123).

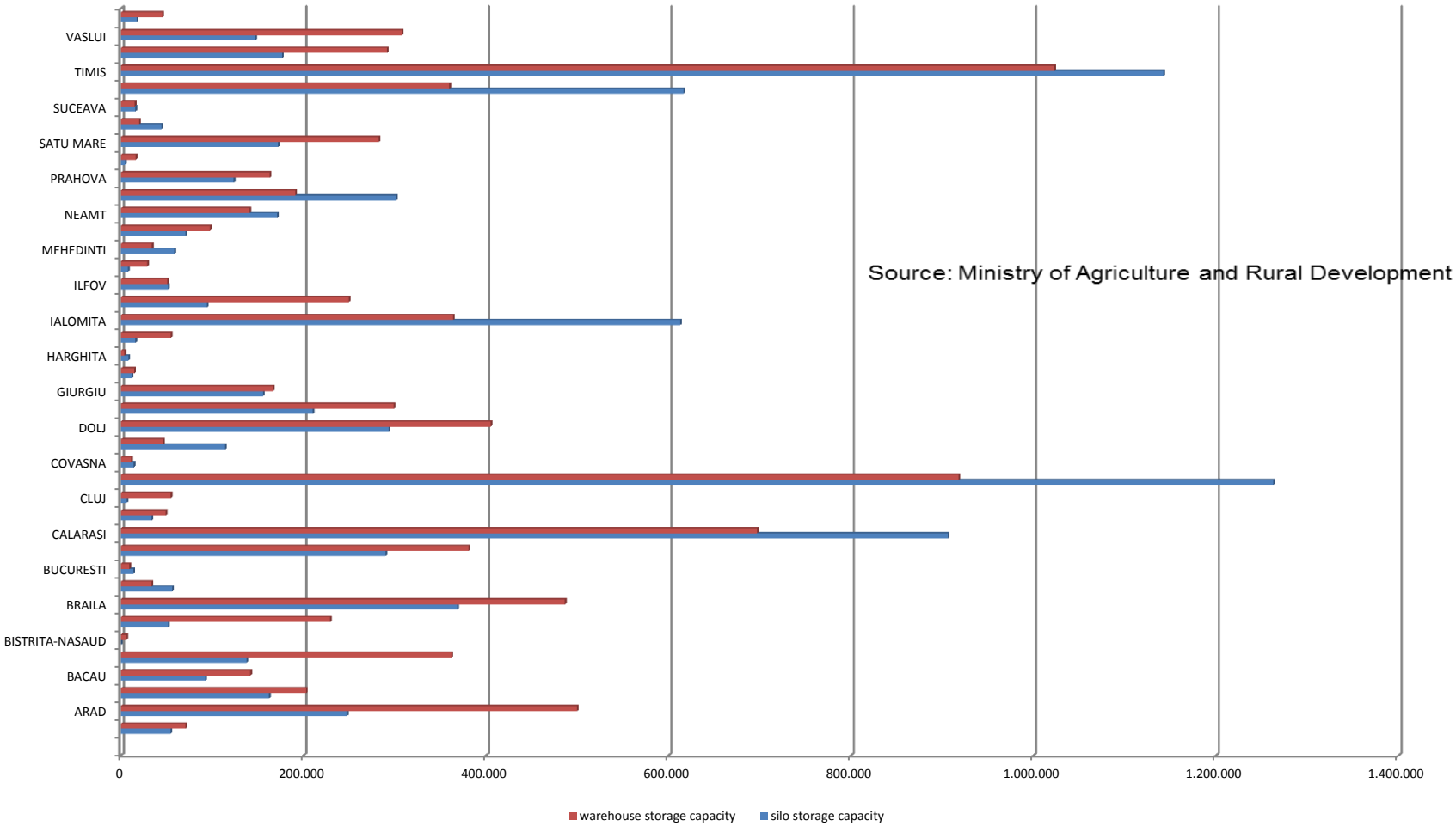
Cereals storage facilities (2)

- According to industry representatives **only 10% of the capacity were used for delivering storage services**;
- The cereals storage facilities were split into **silos for domestic market** (belonging to farmers, mills, bakeries, livestock farmer) and **silos for export market owned by multinational companies**;
- There is a tendency to have **local oligopoly** on storage market because farmers can not transport cereals to the distance, as result they sell cereals to the nearest silo under any conditions and at any price.

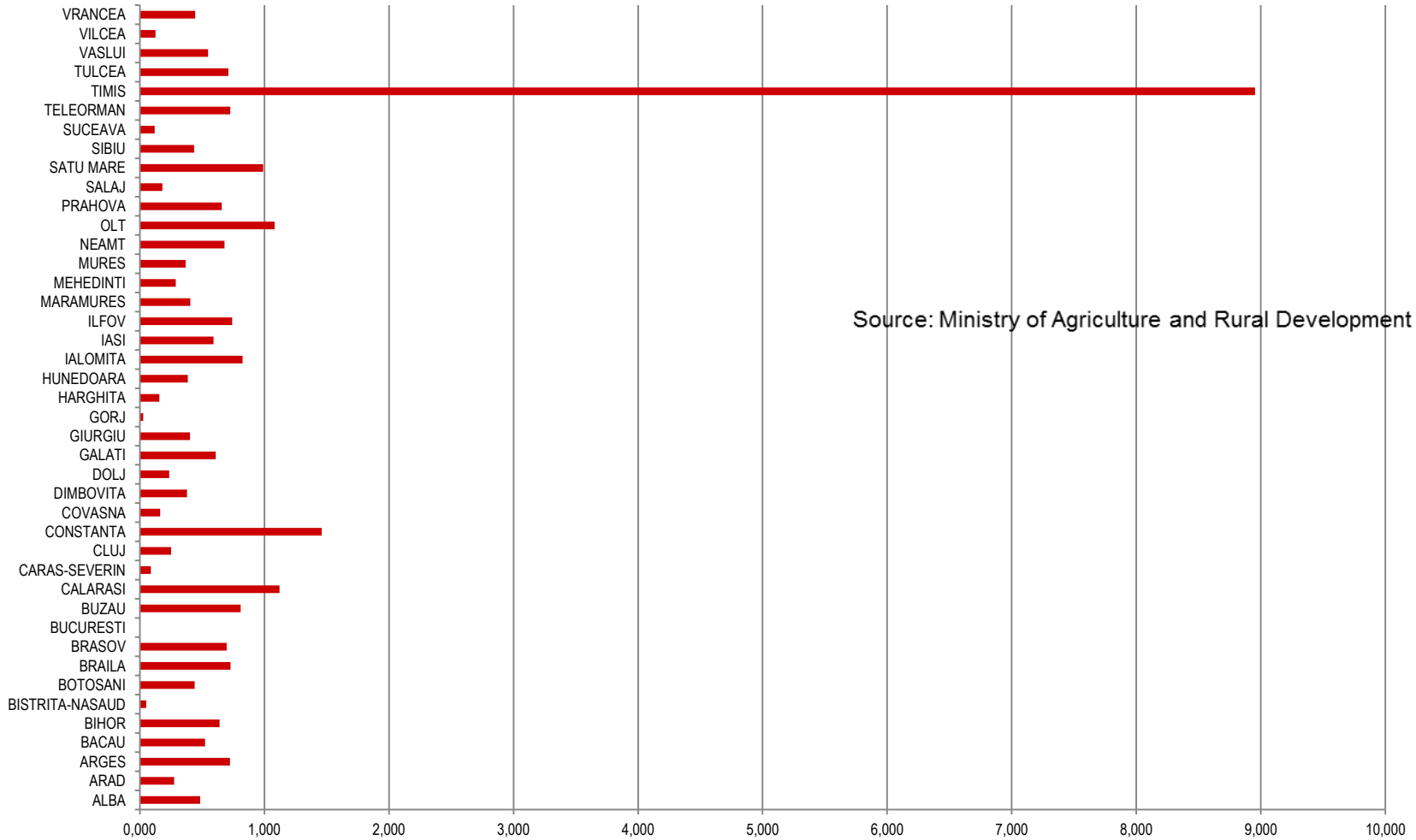
On farm storage

- The use of storage capacities at farm level is made only on time limited base (3-6 months);
- The price for storage of 1 cereal tone/month is 3 times higher in Romania compared with EU member states;
- Farmers are forced to sell the cereals at the harvest time due to lack of farm transport facilities and storage spaces.

Storage capacities by county and type of storage authorized by MARD (tons)



The utilization degree of warehouse capacity (2012-tons)

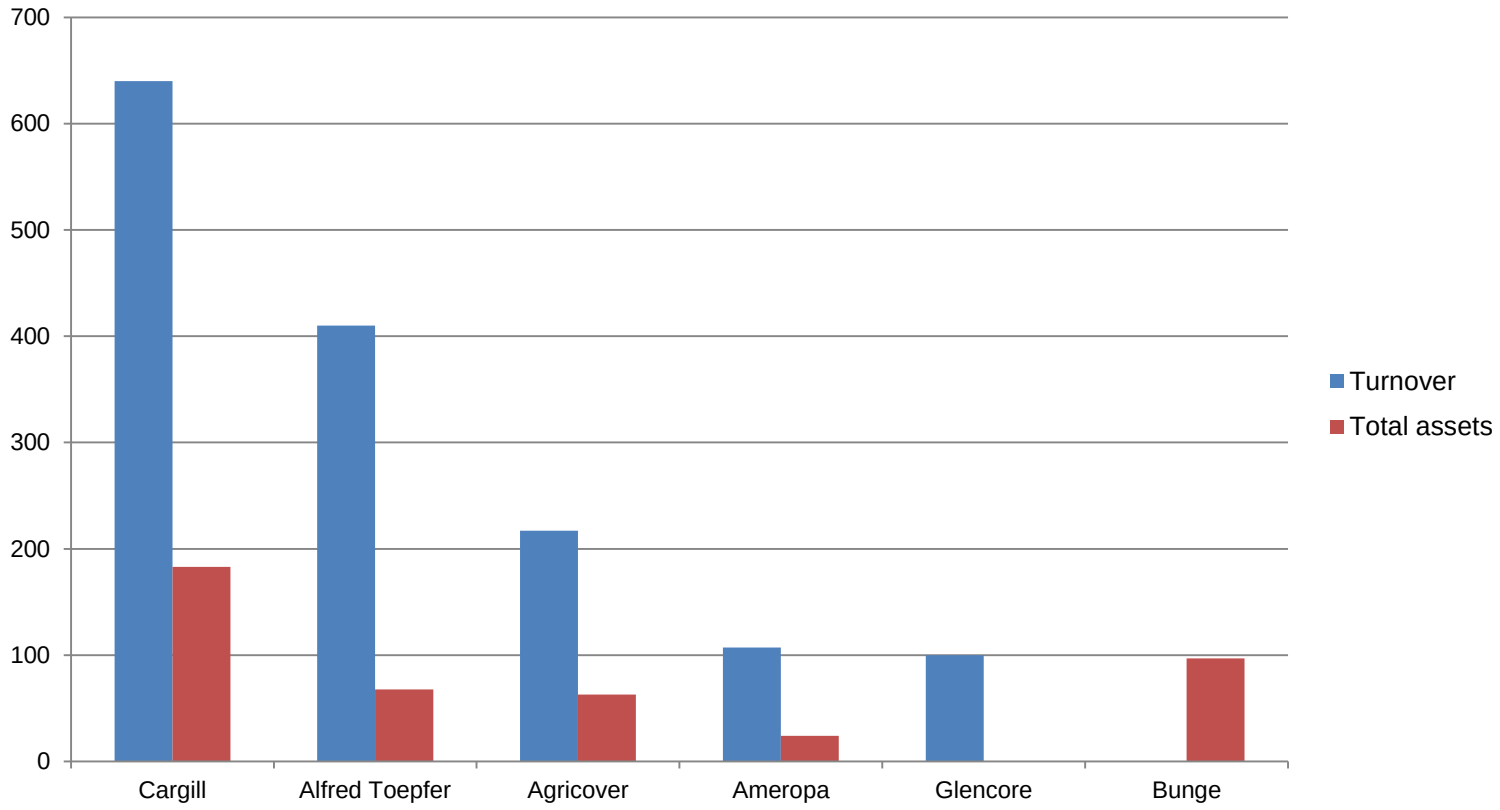


Top 10 counties with the largest storage capacity, 2012 (tons)

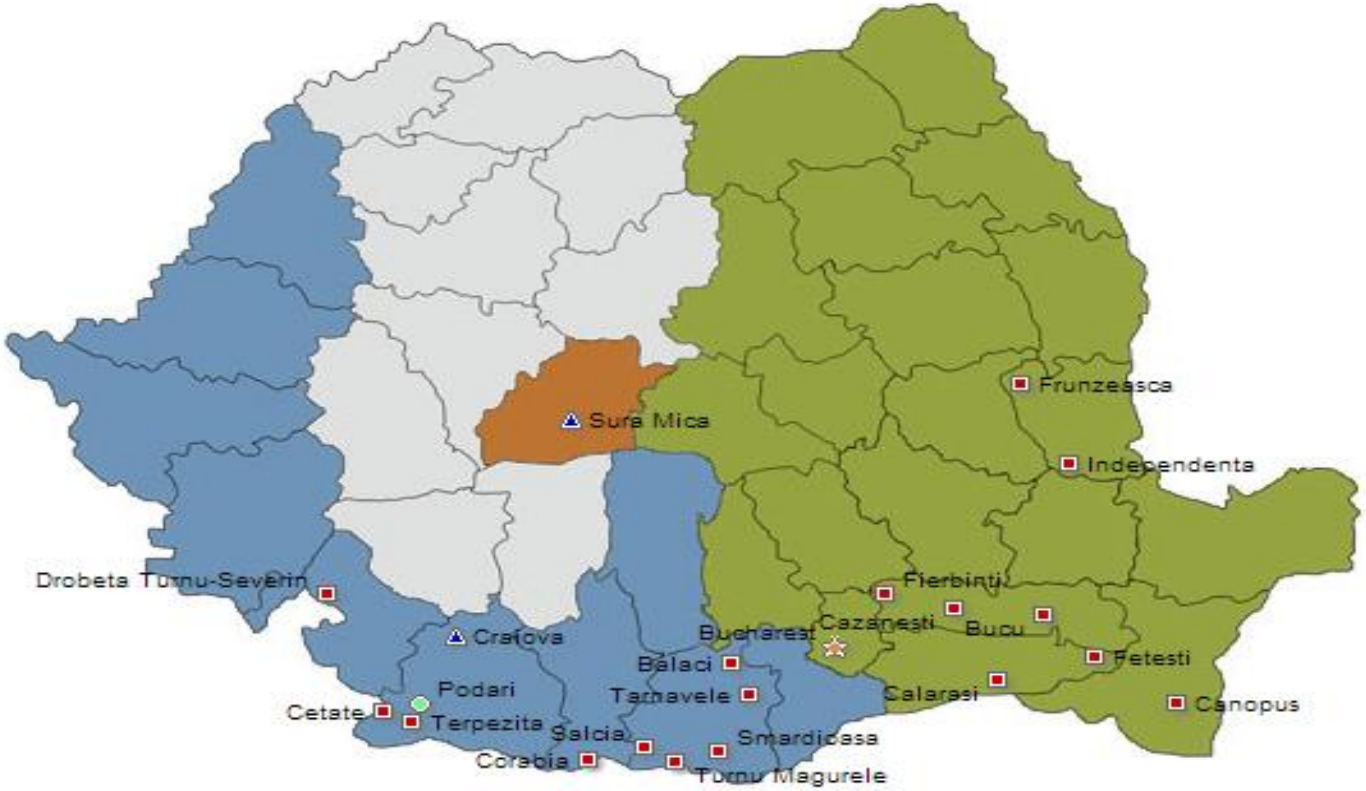
County	Number of authorizations	Total storage capacity authorized	Silo capacity	Warehouse capacity
Total	3,713	17,363,926	8,453,844	8,910,082
CONSTANTA	197	2,181,034	1,262,742	918,292
TIMIS	304	2,166,247	1,142,848	1,023,399
CALARASI	266	1,603,930	906,640	697,290
IALOMITA	125	977,586	613,240	364,346
TELEORMAN	177	976,609	616,555	360,054
BRAILA	123	855,785	369,005	486,780
ARAD	270	747,829	247,785	500,044
DOLJ	161	699,080	293,745	405,335
BUZAU	200	671,250	290,280	380,970
GALATI	125	509,874	210,529	299,345

Source: Ministry of Agriculture and Rural Development

Top storage capacity by companies
thou $

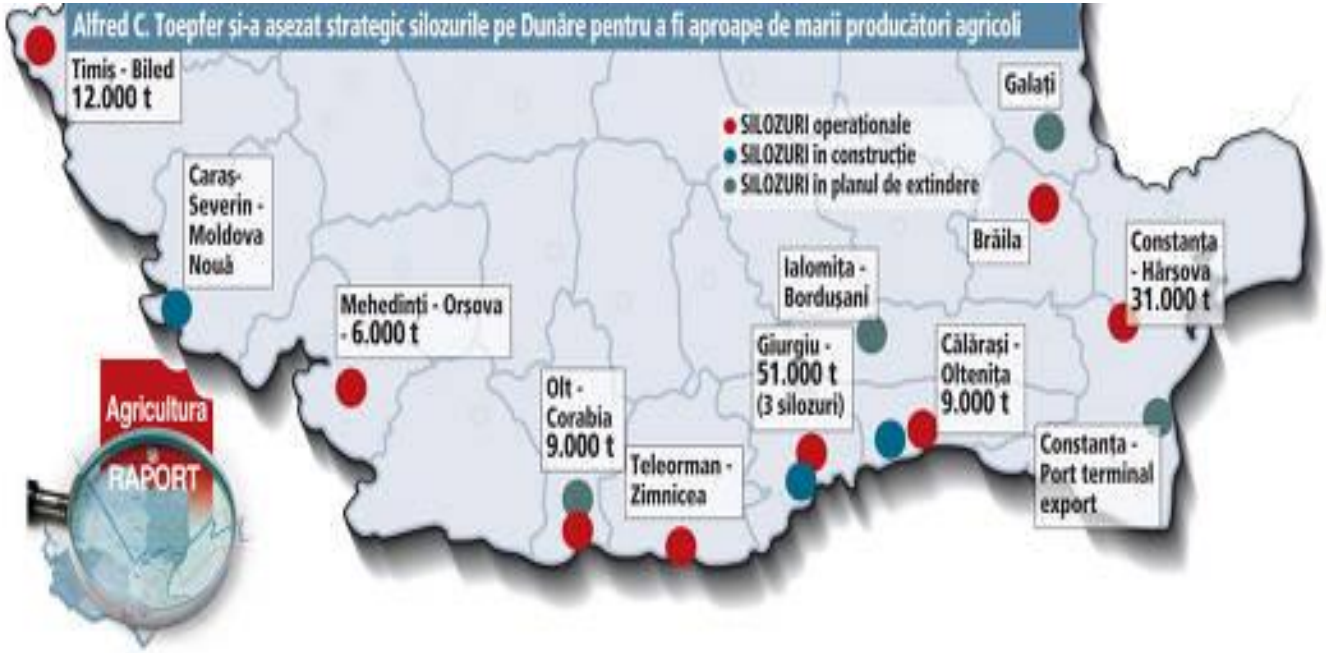


CARGILL



Siloz
Sediul central din Bucuresti
Cargill Oils, fabrica din Podari
Cargill Animal Nutrition

ADM

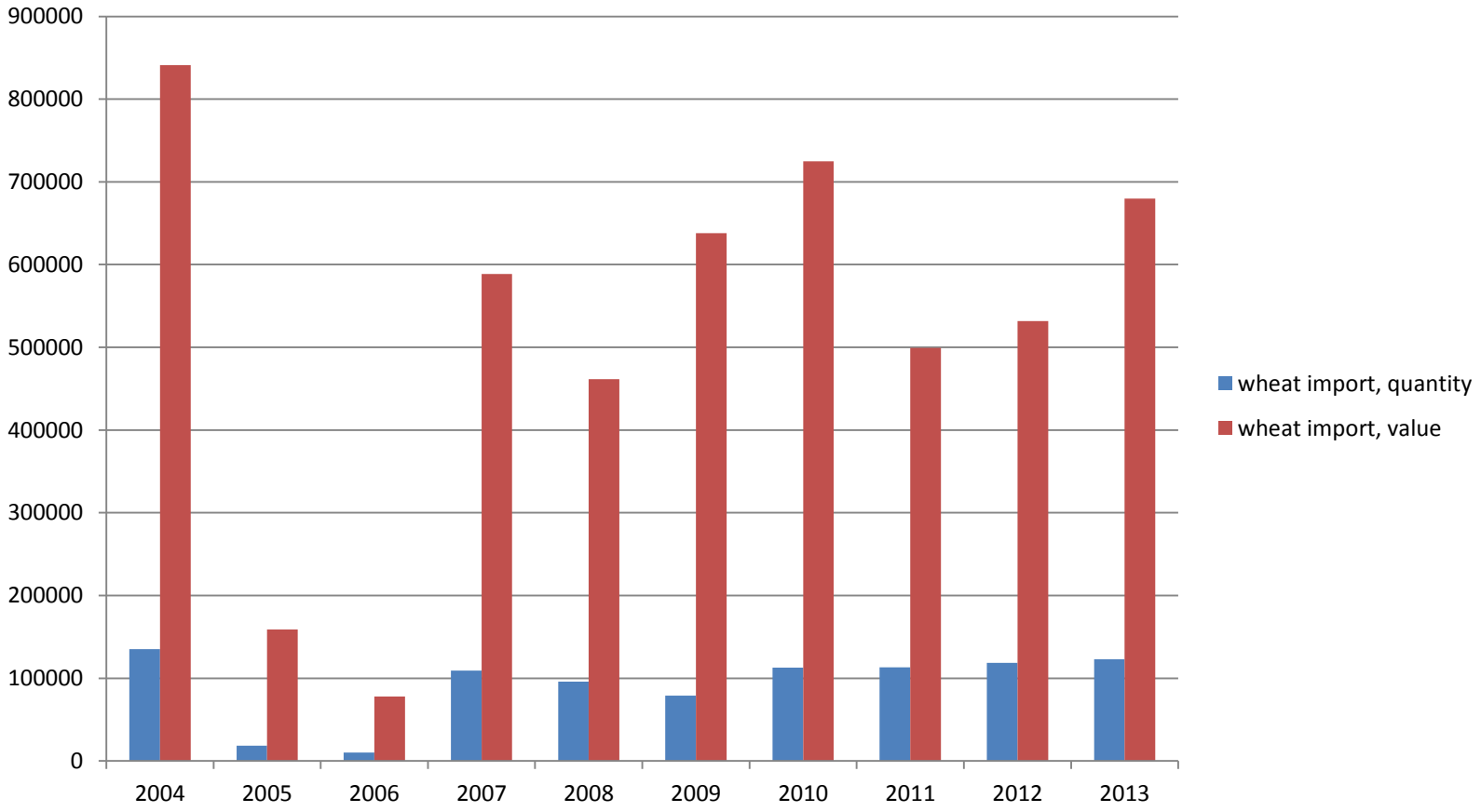

Alfred C. Toepfer și-a așezat strategic silozurile pe Dunăre pentru a fi aproape de marii producători agricoli
Timiș - Biled
12.000 t
Caraș-Severin - Moldova Nouă
Mehedinți - Orșova - 6.000 t
Olt - Corabia
9.000 t
Teleorman - Zimnicea
Giurgiu - 51.000 t (3 silozuri)
Ialomița - Bordușani
Călărași - Oltenița
9.000 t
Brăila
Galați
Constanța - Hârșova
31.000 t
Constanța - Port terminal export
SILOZURI operaționale
SILOZURI în construcție
SILOZURI în planul de extindere
Agricultura
RAPORT

Storage conclusions

- On the storage market is manifested an **oligopoly** tendency
- Only big farmers (> 1000 ha), have their own storage facilities
- The other farmers sell their cereals to the nearest silo in any conditions and at any price
- There is the tendency to invest in the silo facilities although their utilization degree is a very low one
- If the Romanian storage market becomes a regulated market the prices for storage market will get nearer to the EU level, and the farmers will use the service for storage much more in the future

Romanian wheat export

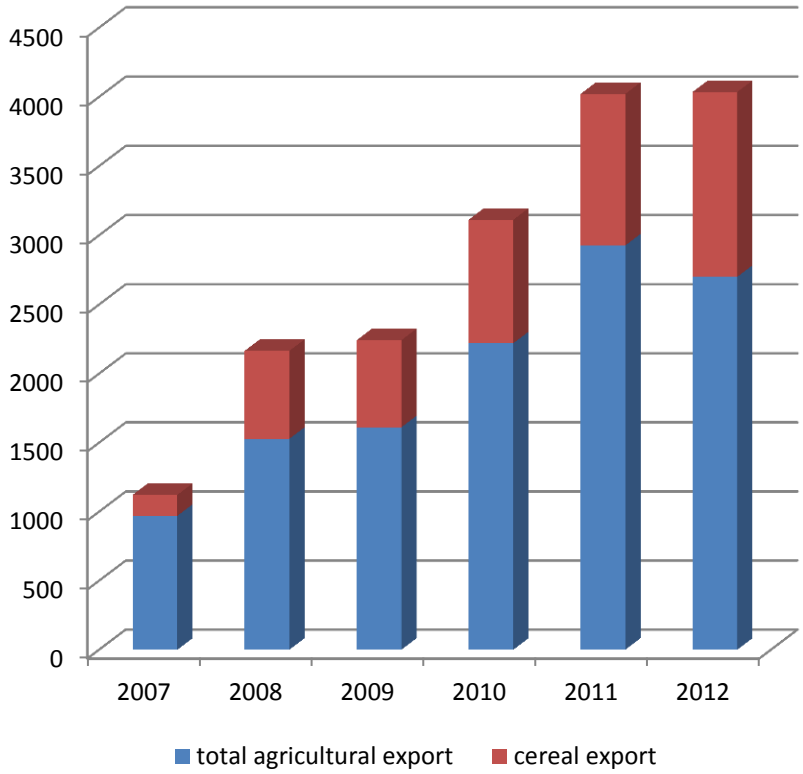
tons/thou euro



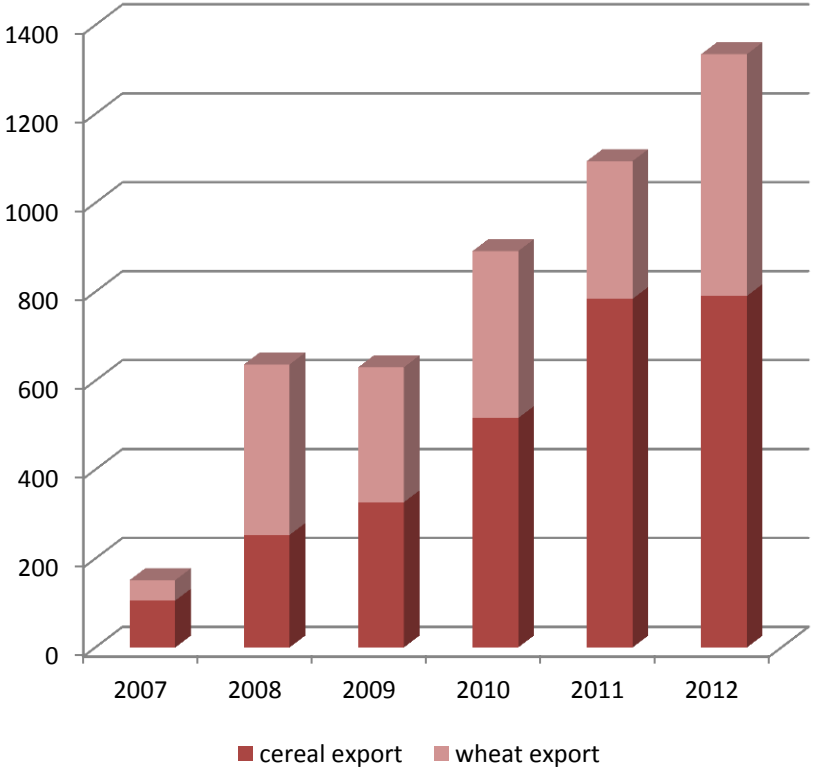
Source: Eurostat

The share of wheat export cereals export and agricultural export – thou tons

Share in total agricultural products



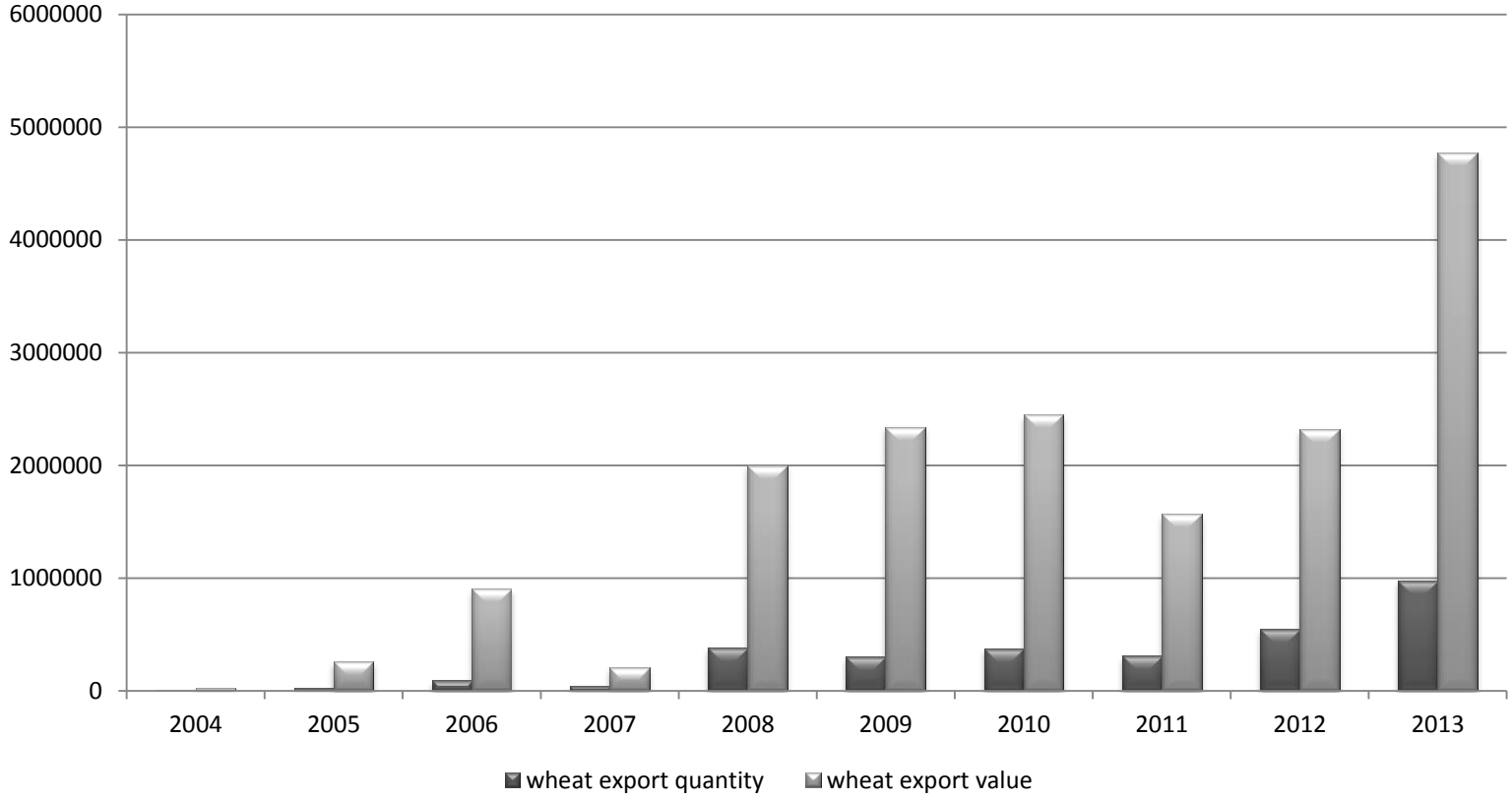
Share in cereals



Source: Eurostat

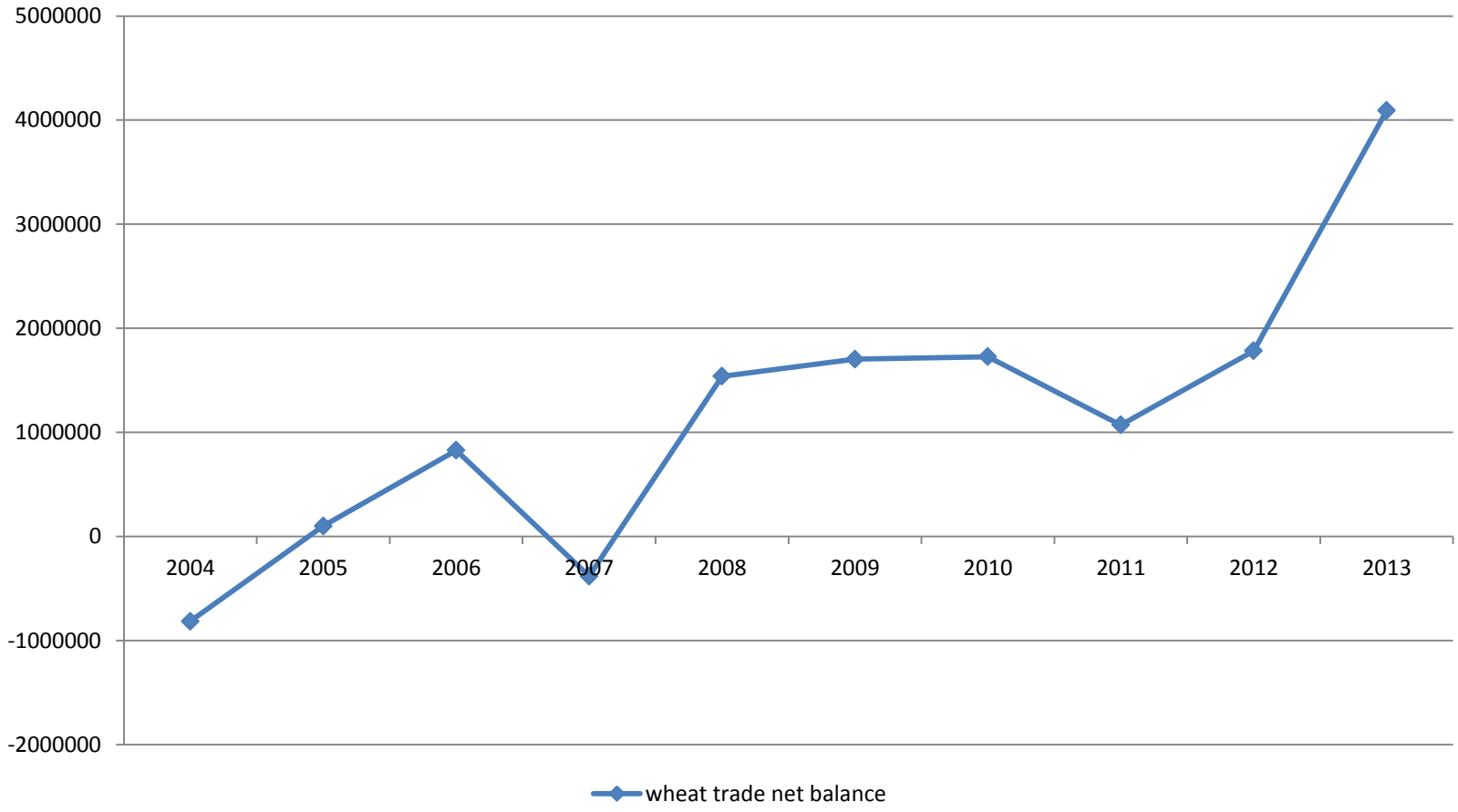
Romanian wheat import

(tons, thou euro)



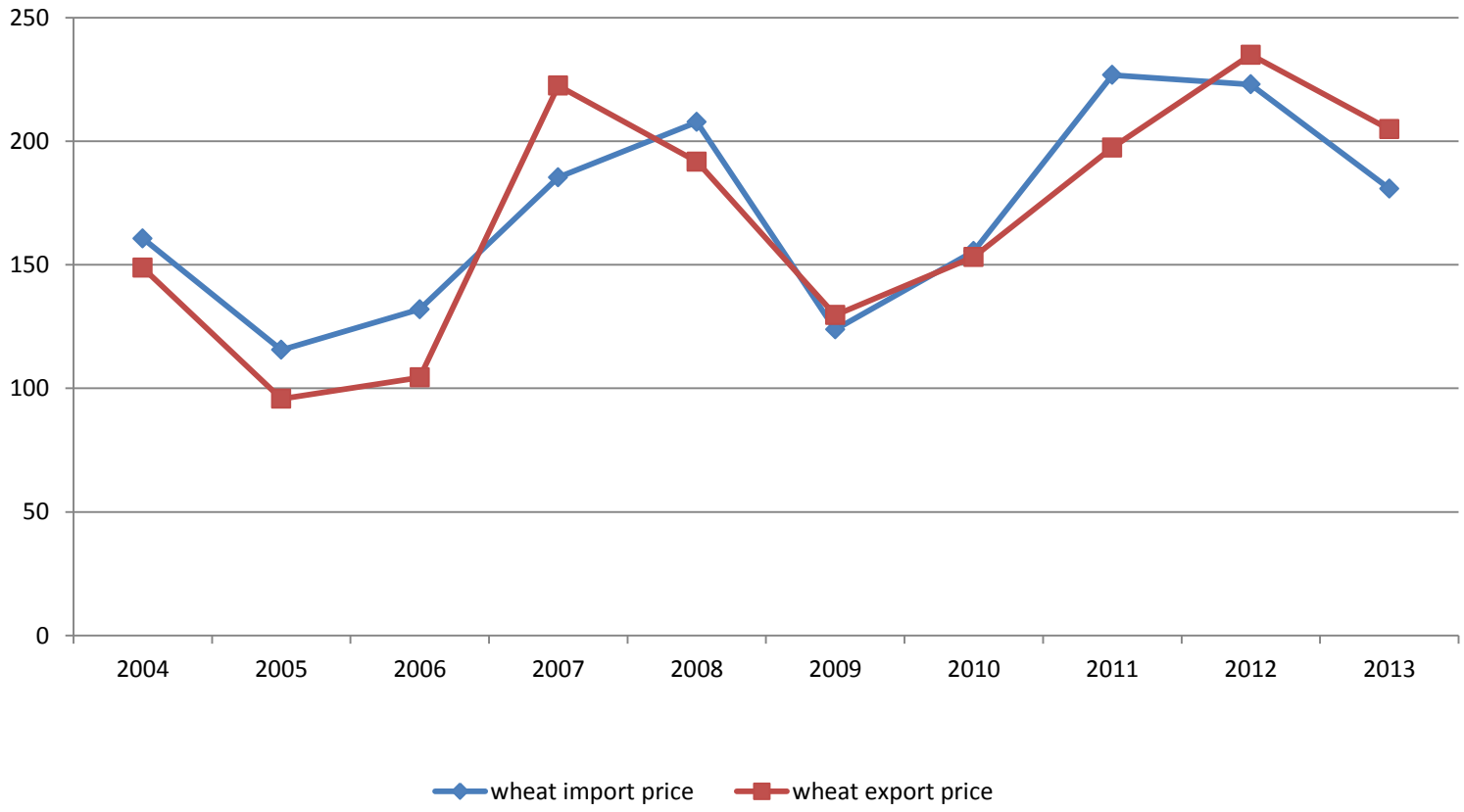
Source: Eurostat

Romania wheat trade balance
(thou euro)



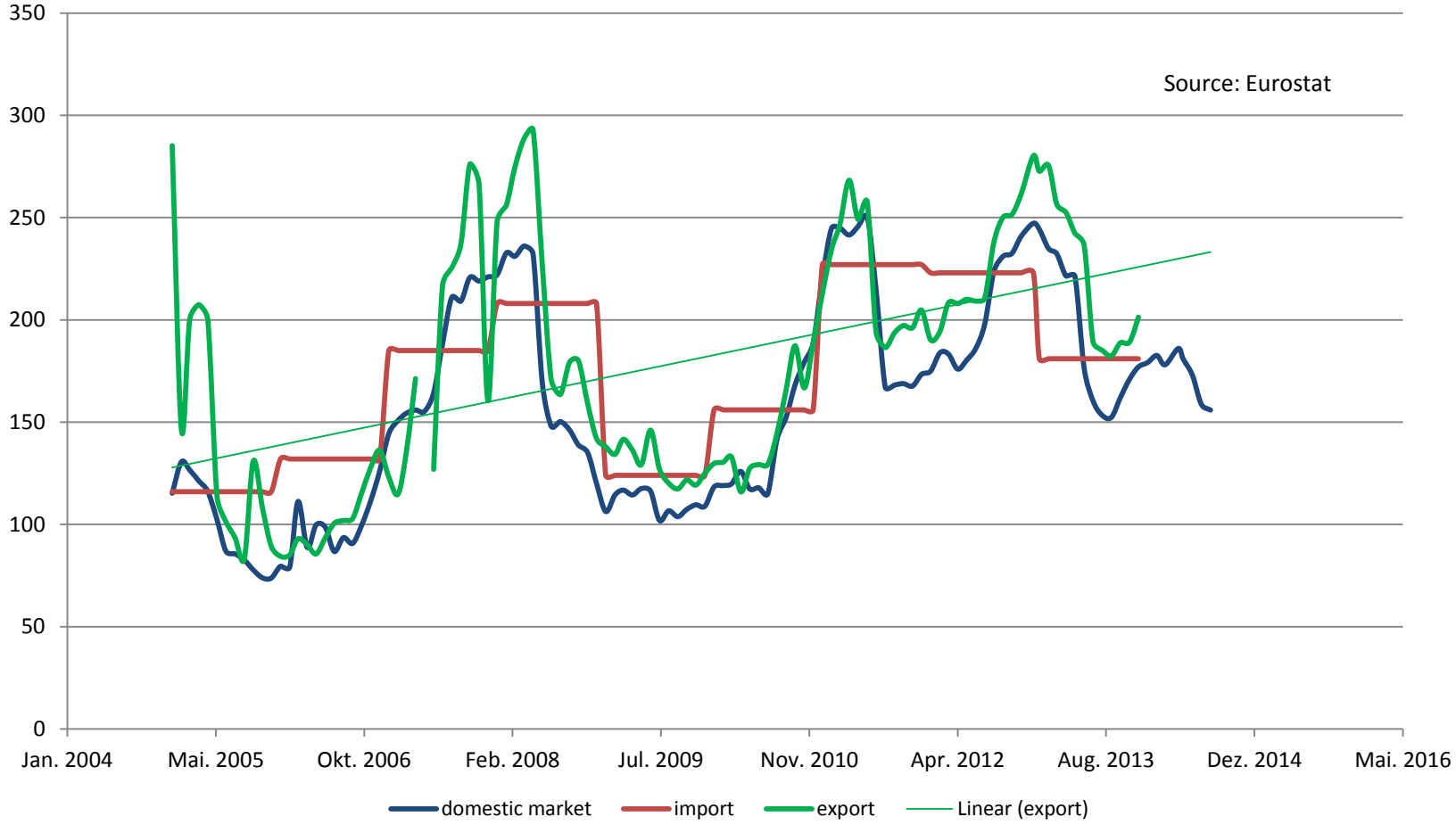
Source: Eurostat

Romanian wheat price import/export (euro/tone)



Source: Eurostat

Romanian wheat trade prices
(euro/tone)



Trade conclusions

Yearly:

- Export is up to 13 % of total production of wheat;
- Between 4-7% of the production is used for human consumption;
- Between 3-38% of the human consumption is imported;
- Oligopoly on the market with traders benefiting the most from the Romanian wheat export;
- The main destinations of the Romanian wheat export are: North Africa (Egypt) and the Mediterranean basin.

Constanta -2,600 Year Old Port

- Output of grains has gradually increased in Romania, Bulgaria, Hungary and Serbia;
- Constanta port was the main facility to benefit. It's the only large port with sufficient capacity to serve the region;
- Constanta is emerging as Europe's biggest grain transport hub in the $4.2 billion global wheat trade;
- Constanta handled 9.5 million tons of grain through August 2014, up 30 percent from 7.3 million tons an year earlier. Volume will top last year's record 15.3 million tons by year end


ACADEMIA ROMANA
INSTITUTUL DE ECONOMIE AGRARĂ
Thank you !
COMPETE
International comparison of product supply chains in the agro-food sector
SEVENTH FRAMEWORK PROGRAMME

ENLARGEMENT, INTRA AND EXTRA EU AGRI-FOOD TRADE

Project Meeting, COMPETE Workshop
November 26-28, Prague
Czech University of Life Sciences Prague (CZE)

Prof. Dr. Štefan Bojnec, UP, Slovenia
Prof. Dr. Imre Fertő, CUB, Hungary

ENLARGEMENT, INTRA-EU AND EXTRA-EU AGRI-FOOD TRADE

- Introduction
- Methodology and data
  - Constant market share
  - Duration analysis
  - Intensive vs. extensive margin
  - Intra-industry trade (IIT)
  - Data used
- Results
- Conclusion

Introduction

- Background and previous studies
- Intra-EU trade
- Extra-EU trade
- EU-27 countries (EU-15 + EU-12)
- Total global trade (intra + extra-EU trade)

Background on previous studies

- Kym Anderson (1992)
  - The CEE countries and the Soviet Republics might become major agricultural exporters
- Potential explanations
  - Dynamics of comparative advantages
  - New trade theory

Evolution of trade specialization

- **Heckscher-Ohlin model**
  - **the pattern of trade specialisation changes only if trading partners experience a change in their relative factor endowments: the existence of persistent trade patterns**
- **New trade theory**
  - **the nature of economies of scale varied in nature and outcomes: pattern of trade tends to become more specialised**
  - **Intra-industry trade**
  - **Quality trade**
  - **Trade variety**
  - **Duration of trade**

Intra-industry trade

- Horizontal product differentiation:
  - Different models of monopolistic competition developed based on preference structure
  - General equilibrium model developed by Helpman and Krugman (1985)
- Vertical product differentiation:
  - Falvey (1981), Falvey and Kierzkowski (1987) and Flam and Helpman (1987)
- Increasing importance of IIT in agri-food trade

Trade variety

- Krugman (1979, 1980, 1981): two channels for the gains from trade arising from variety growth:
  - reductions in trade costs
  - the growth of the income in the foreign country
- Policy implications (Romer, 1994):
  - trade liberalization increases the number of traded varieties as a source of welfare gains

Some empirics on trade specialization

- Trade increased among countries after the NMS-12 countries joined to the EU
- IIT tends to increase
- Most of IIT is based on vertically differentiated products
- Positive relationship between factor endowment and vertical IIT
- Positive impact of increased product variety on agri-food export growth
- duration of agri-food export differs in the NMS-12 and EU-15 markets

Methodology (1)

- **Constant market share**

$$\Delta q = S0\Delta Q + \Delta SQ0 + \Delta S\Delta Q$$

structural + residual + second-order effect

- **Duration analysis: Kaplan-Meier estimator of the survival function**

Methodology (2)

- **Intensive margin:**

  (1) increase of existing products in established markets;

  (2) decrease in existing products in established markets;

  (3) extinction of exports of products in established markets

Methodology (3)

- **Extensive margin:**

  (1) introduction of new products in new markets;

  (2) introduction of new products in established markets;

  (3) introduction of existing products in new markets;

  (4) product diversification in established markets

Methodology (4)

- **Intra-industry trade:**

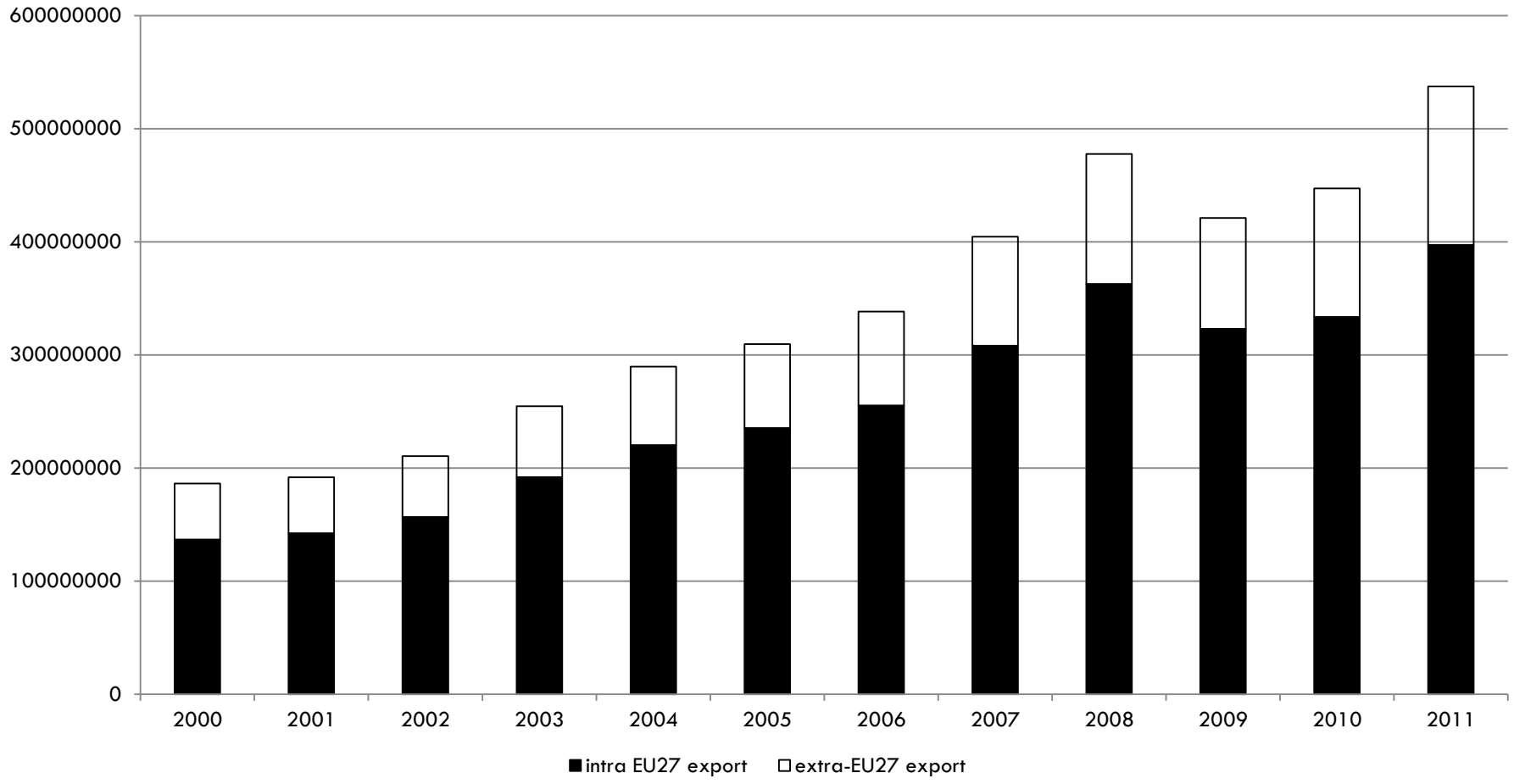
$$GHM_k^p = \frac{\sum_j \left[\left(X_{j,k}^p + M_{j,k}^p \right) - \left| X_{j,k}^p - M_{j,k}^p \right| \right]}{\sum_j \left(X_{j,k} + M_{j,k} \right)}$$

$$1-\alpha \leq \frac{UV_j^x}{UV_j^m} \leq 1+\alpha$$

Data

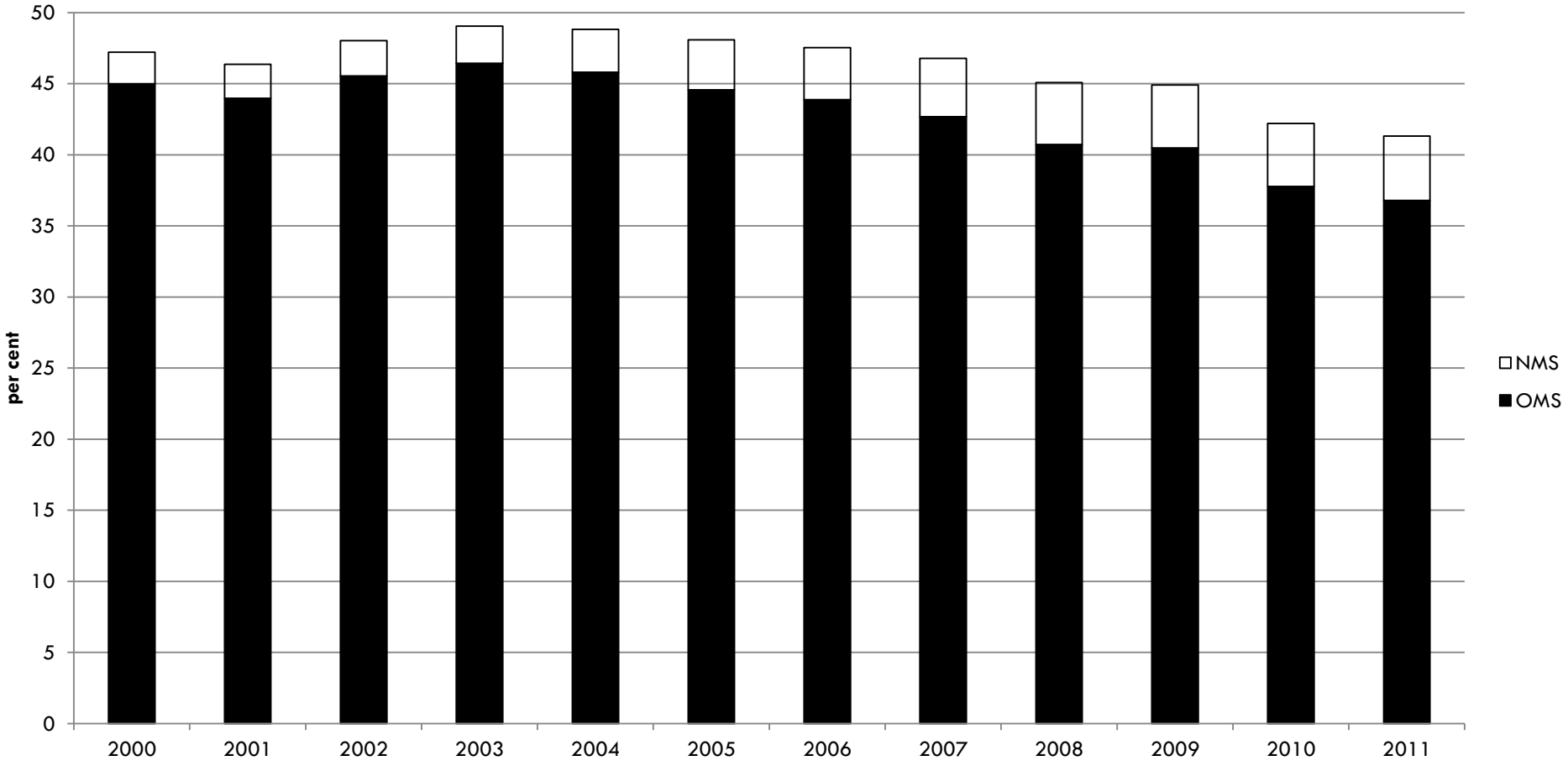
- EU-27 countries
- Six-digit World Customs Organization's Harmonized System (HS-6)
- Years 2000–2011
- Agri-food export is defined by the WTO consisting 789 products
- The UN Comtrade database
- The World Integrated Trade Solution (WITS) software

Results: evolution and structure



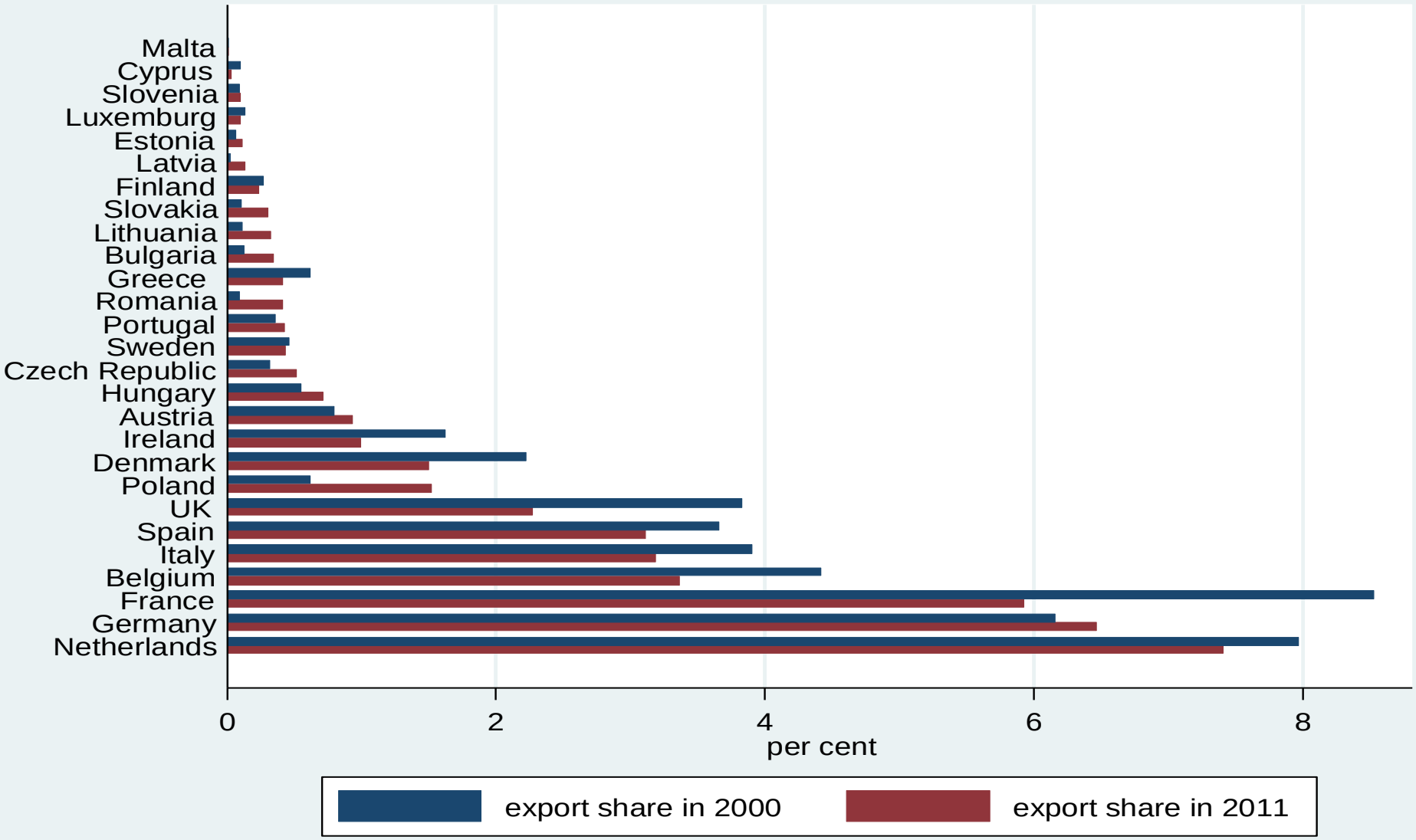
EU-27 agri-food exports, 2000-2011 (in thousand US dollars)

Results: evolution and structure



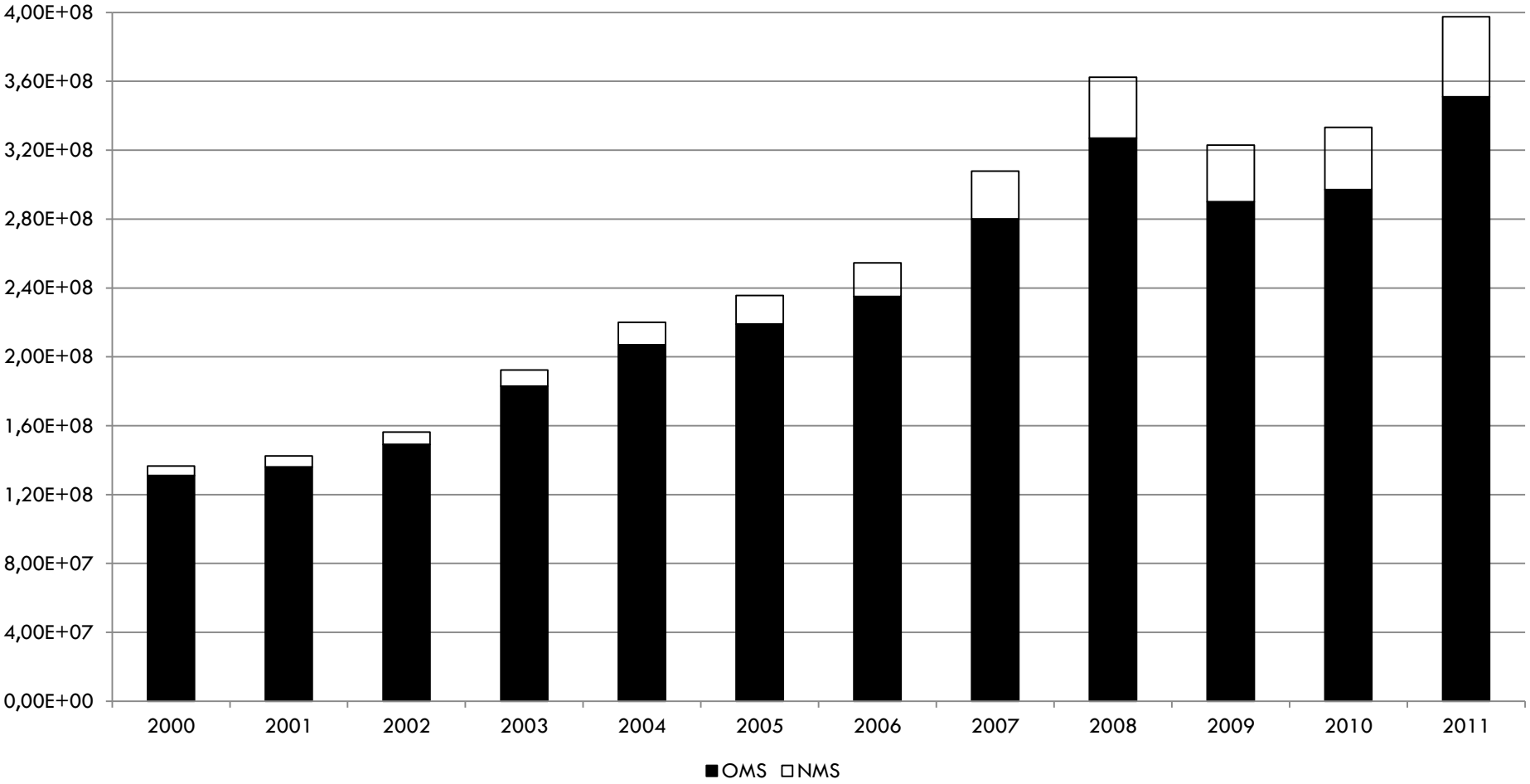
Export share of EU-27 at the world market by OMS and NMS

Results: evolution and structure



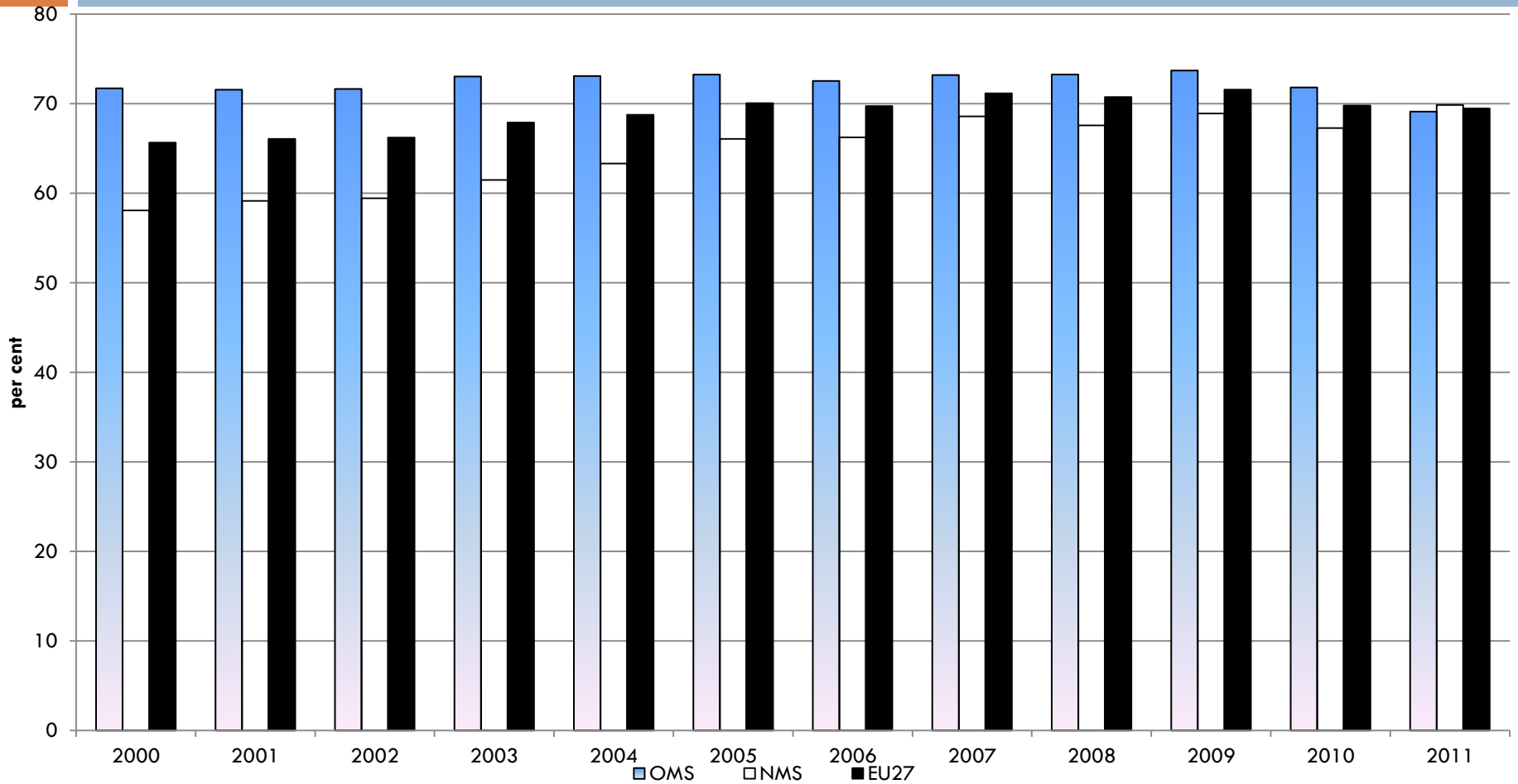
Agri-food export shares on global markets, 2000 and 2011

Results: evolution and structure



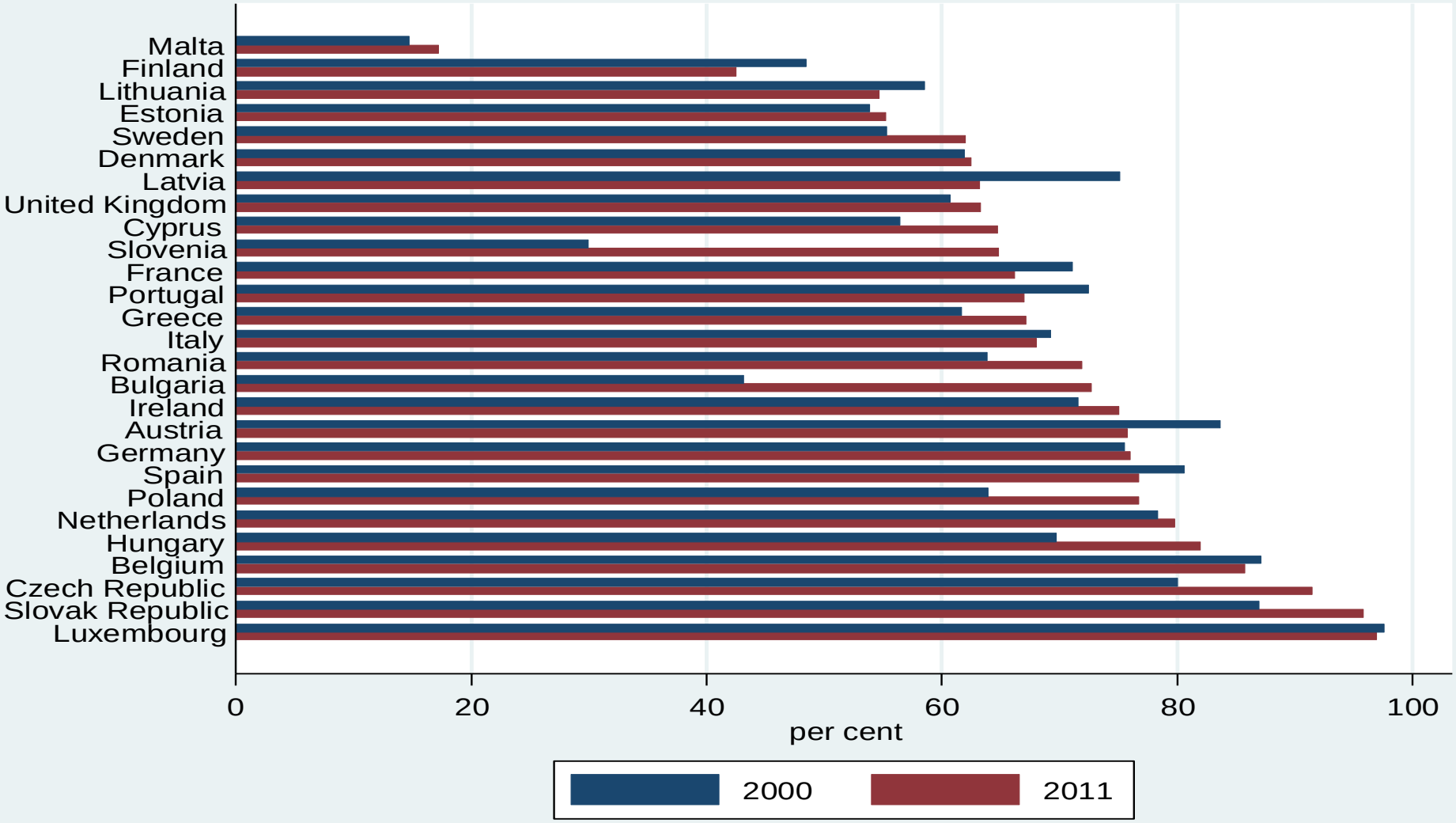
EU-27 agri-food exports to the EU27 markets (1000 dollars)

Results: evolution and structure



Share of EU27 markets in total agri-food trade by EU27, NMS and OMS

Results: evolution and structure



Share of EU-27 markets in total agri-food trade in 2000 and 2011 by country

Results: constant market share

	EU-27 markets			World markets		
	Structural	Residual	Second order	Structural	Residual	Second order
Austria	77	8	15	81	6	13
Belgium	133	-11	-22	152	-16	-36
Bulgaria	14	30	57	29	22	50
Cyprus	122	-7	-14	-4723	1462	3361
Czech Republic	38	21	41	53	14	33
Denmark	155	-19	-36	187	-26	-61
Estonia	43	20	38	52	14	33
Finland	128	-10	-19	124	-7	-17
France	170	-24	-46	178	-24	-54
Germany	78	8	15	94	2	4
Greece	138	-13	-25	192	-28	-64
Hungary	49	18	34	71	9	20
Ireland	173	-25	-48	226	-38	-88
Italy	116	-5	-11	136	-11	-25

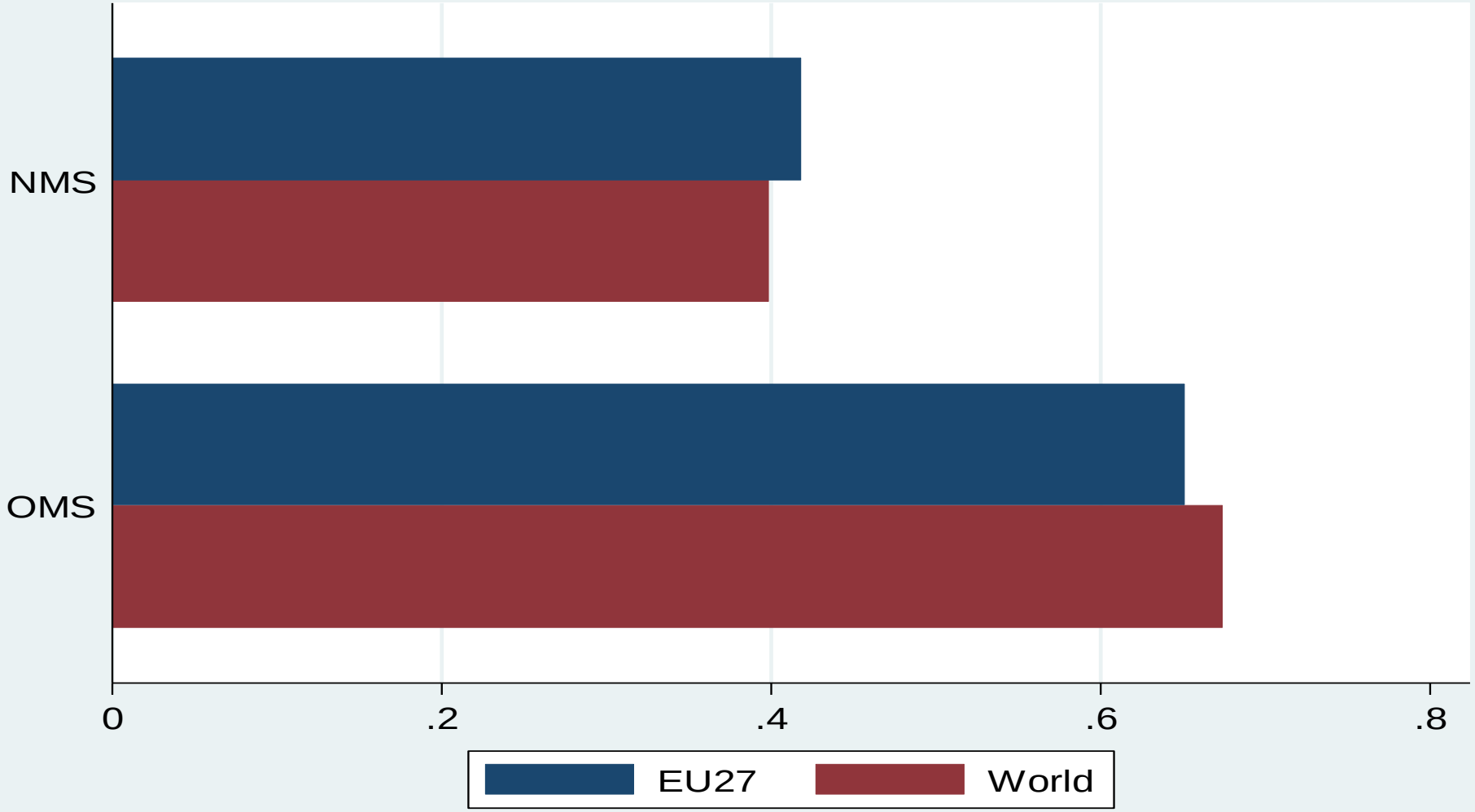
CMS models between 2011 and 2000 (in per cent)

Results: constant market share

	EU-27 markets			World markets		
	Structural	Residual	Second order	Structural	Residual	Second order
Latvia	14	29	57	14	26	60
Lithuania	24	26	50	27	22	51
Luxemburg	129	-10	-19	151	-15	-35
Malta	80	7	13	169	-21	-48
Netherlands	91	3	6	111	-3	-8
Poland	22	27	51	33	20	47
Portugal	73	9	18	78	7	15
Romania	12	30	58	16	25	58
Slovakia	20	27	53	27	22	51
Slovenia	29	24	47	90	3	7
Spain	115	-5	-10	127	-8	-19
Sweden	78	8	15	110	-3	-7
UK	189	-31	-59	241	-43	-98

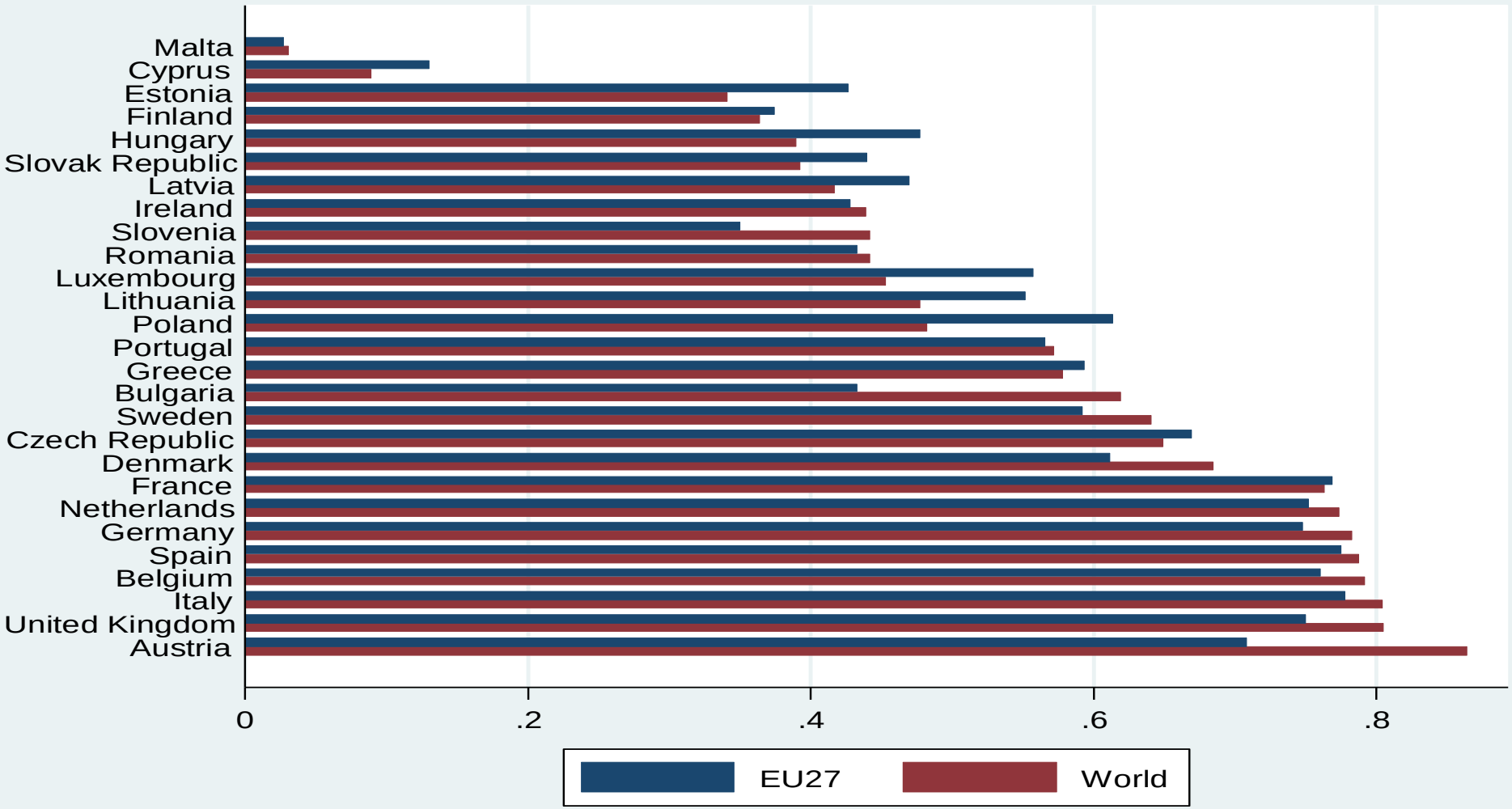
CMS models between 2011 and 2000 (in per cent) cont.

Results: duration of agri-food export



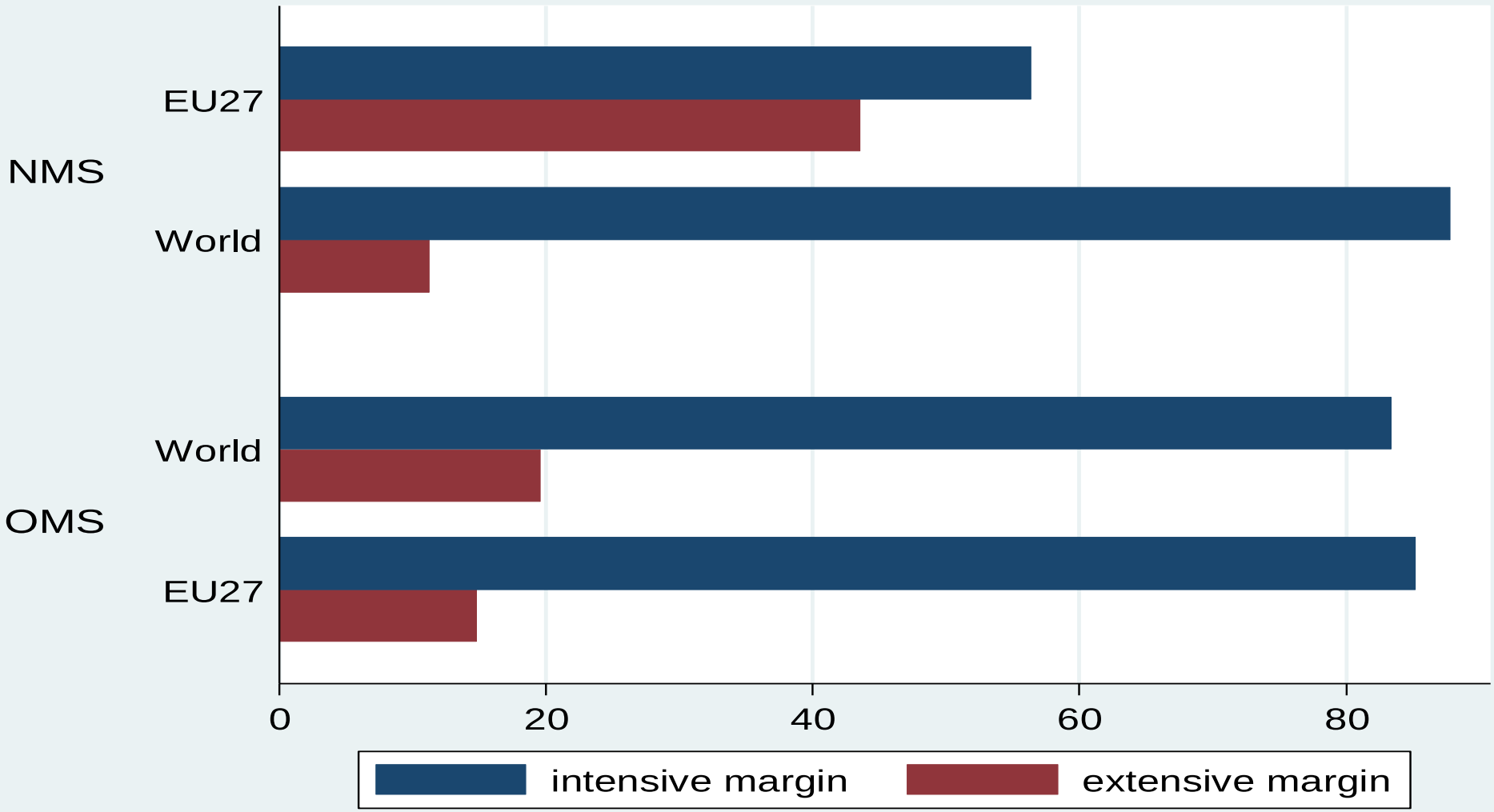
The mean of Kaplan-Meier survival rates for the last year by the EU27 and the world market

Results: duration of agri-food export



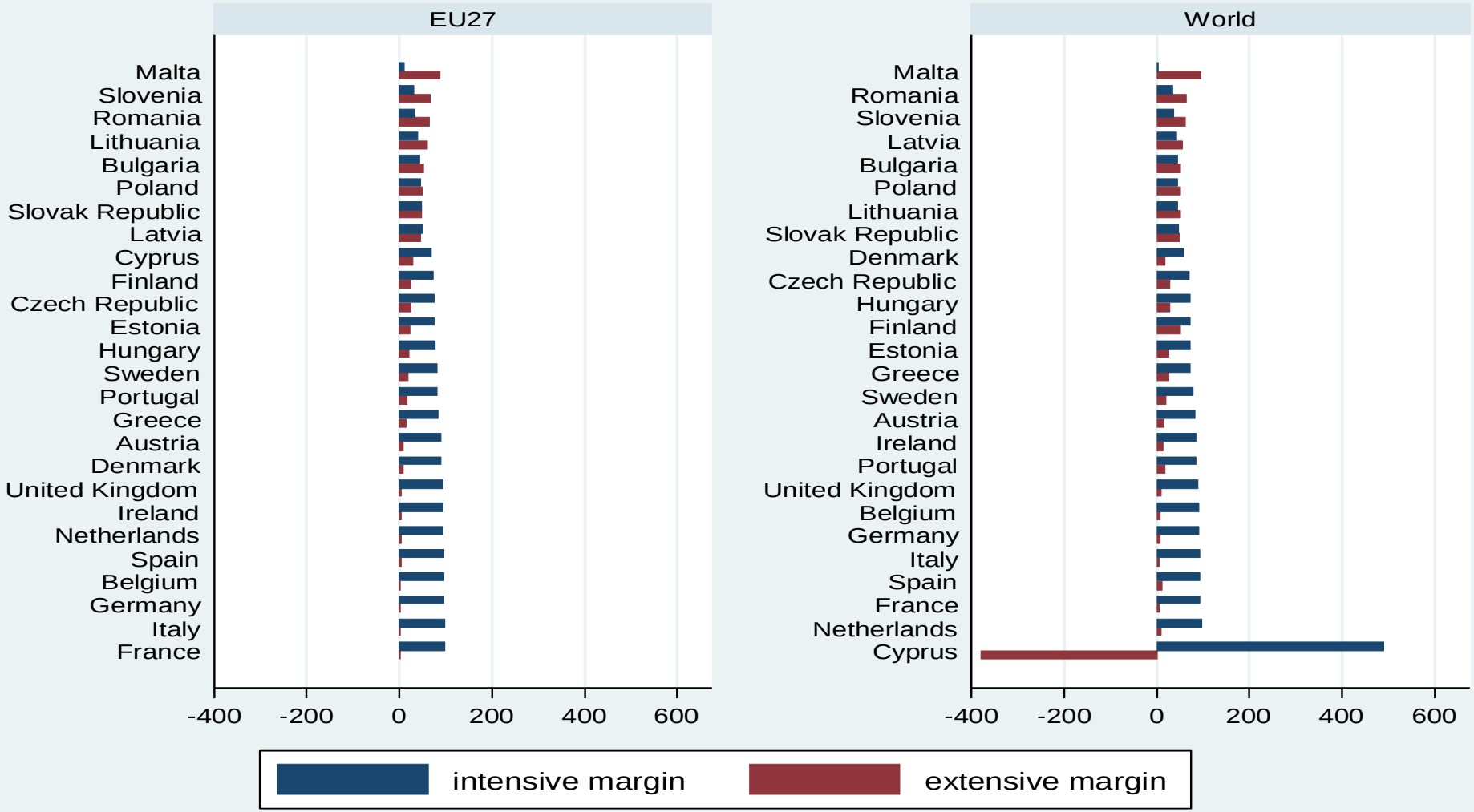
Kaplan-Meier survival rates for the last year by countries

Results: intensive vs. extensive margins



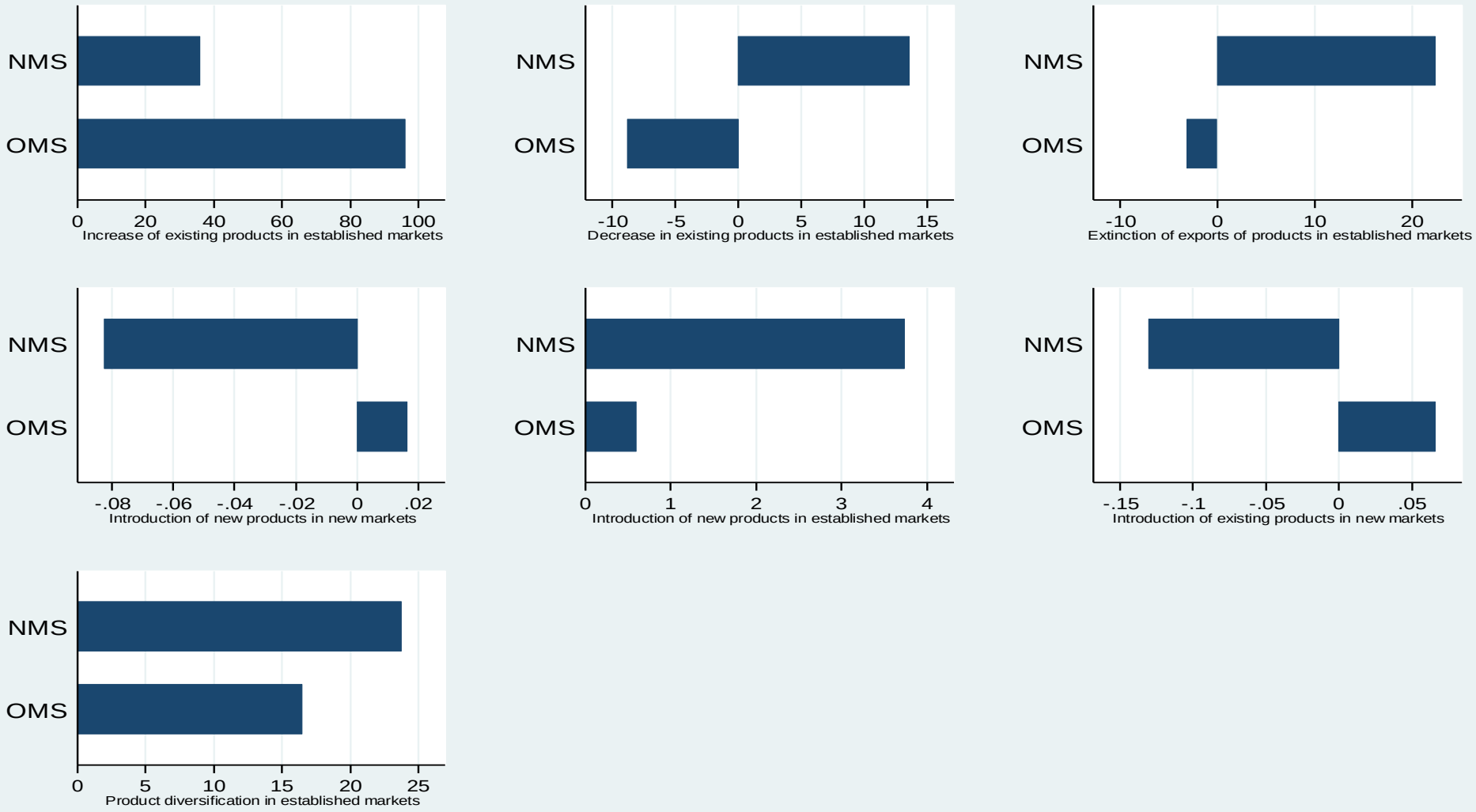
Decomposition of agri-food export growth along margins of trade (in %)

Results: intensive vs. extensive margins



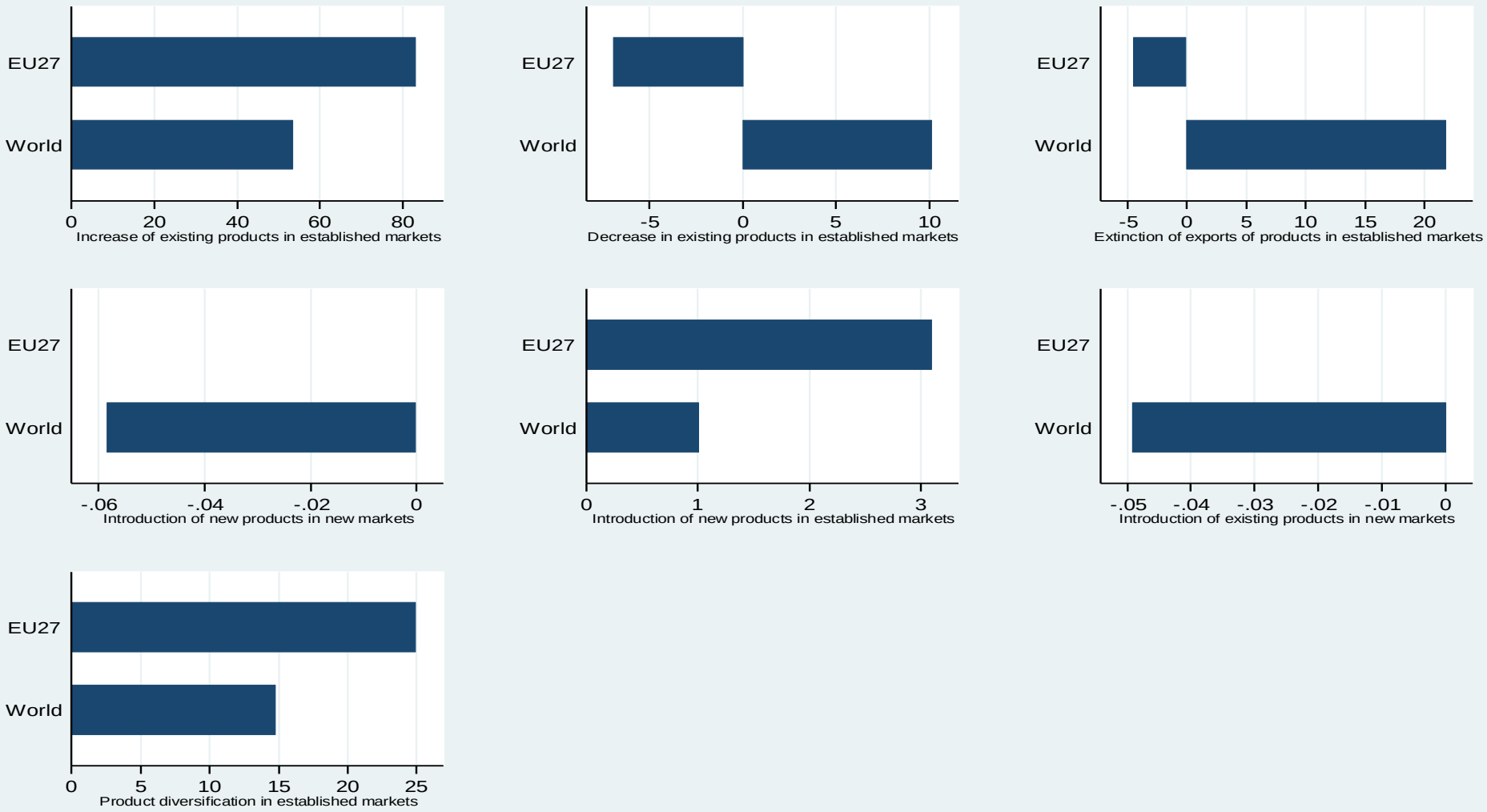
Decomposition of export growth along margins of trade by country

Results: intensive vs. extensive margins



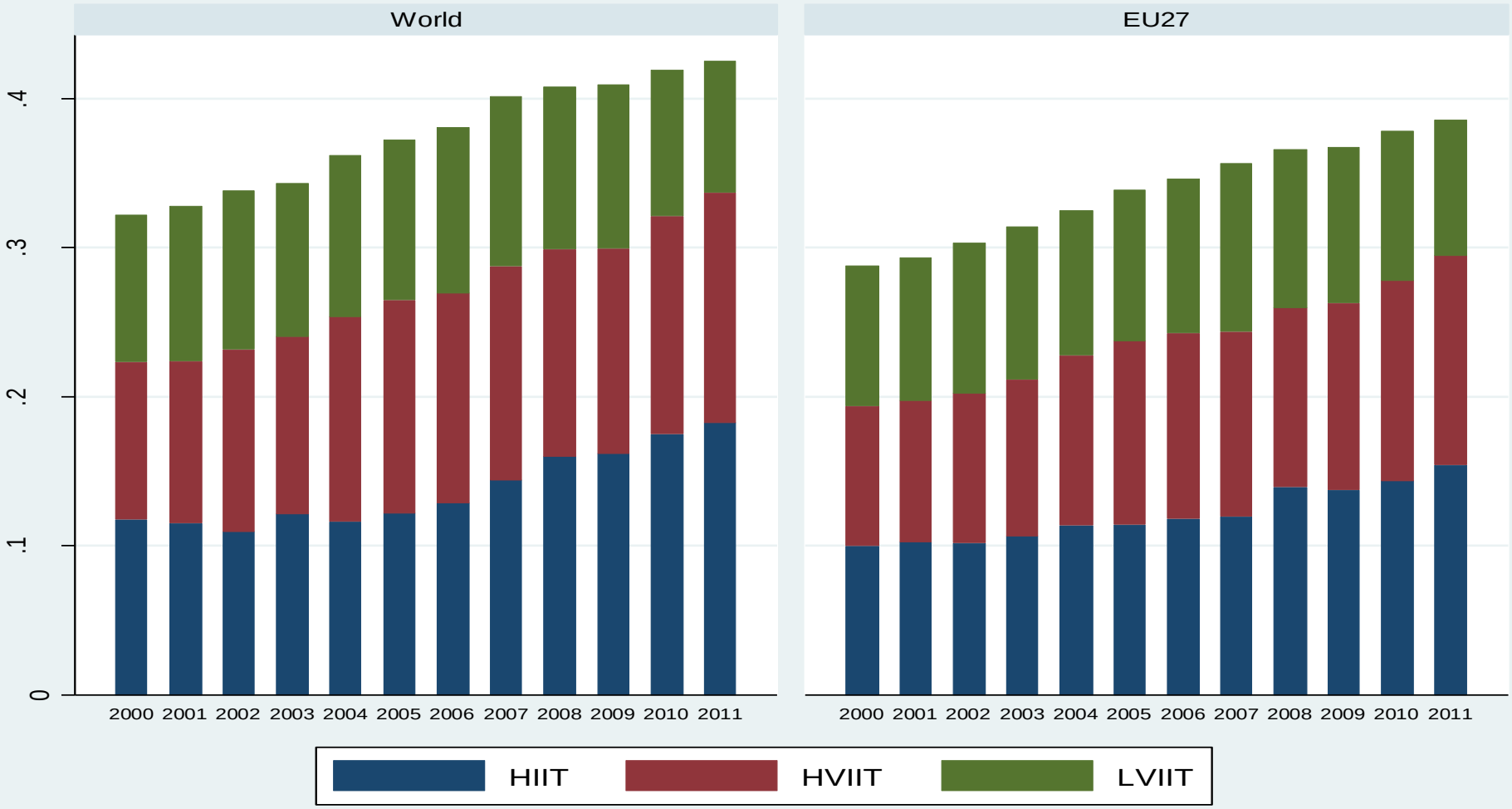
Decomposition of export growth along margins of trade by NMS and OMS

Results: intensive vs. extensive margins



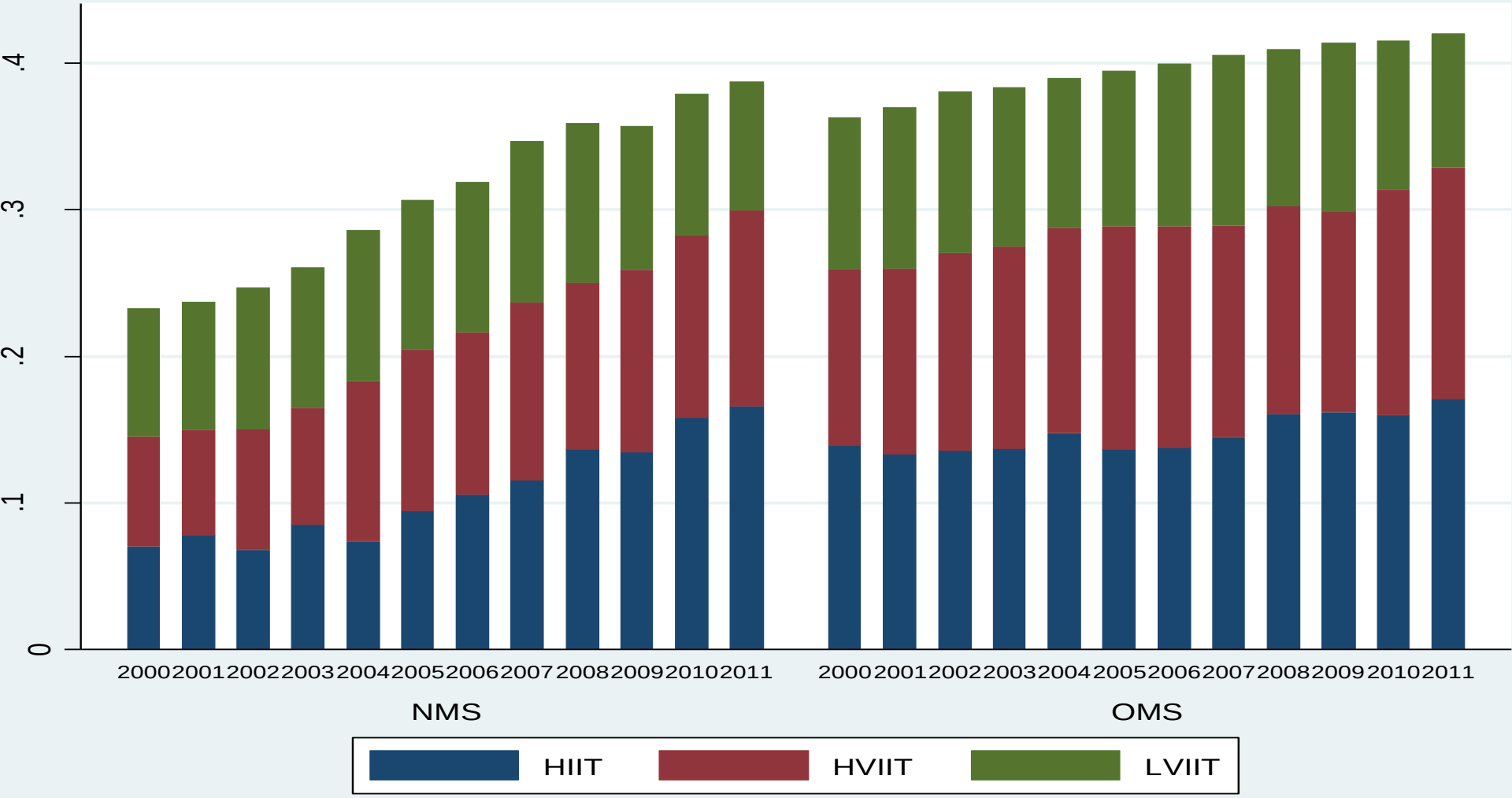
Decomposition of export growth along margins of trade on EU-27 and world markets

Results: intra-industry trade



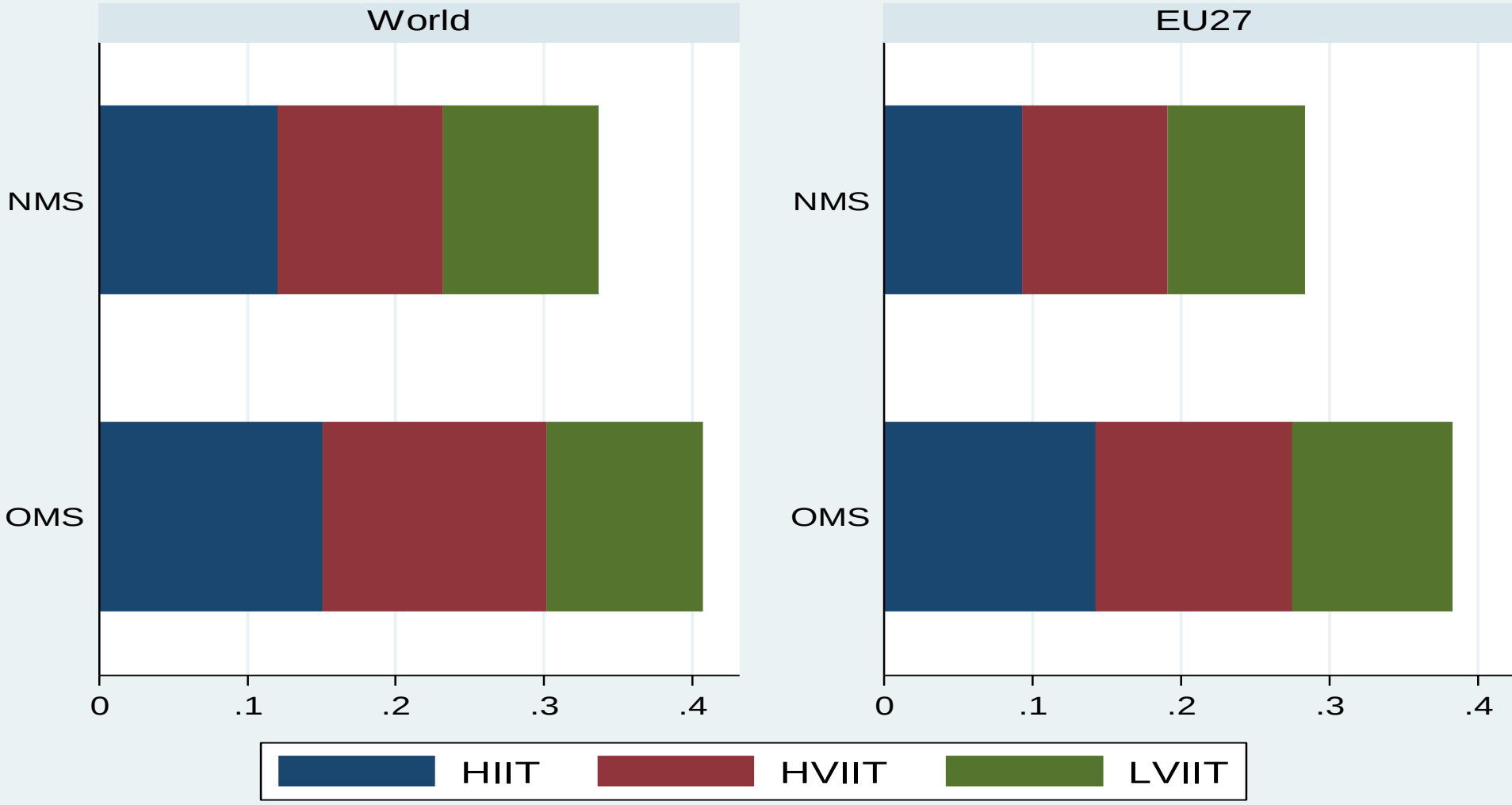
The mean of intra-industry trade indices on EU-27 and world markets

Results: intra-industry trade



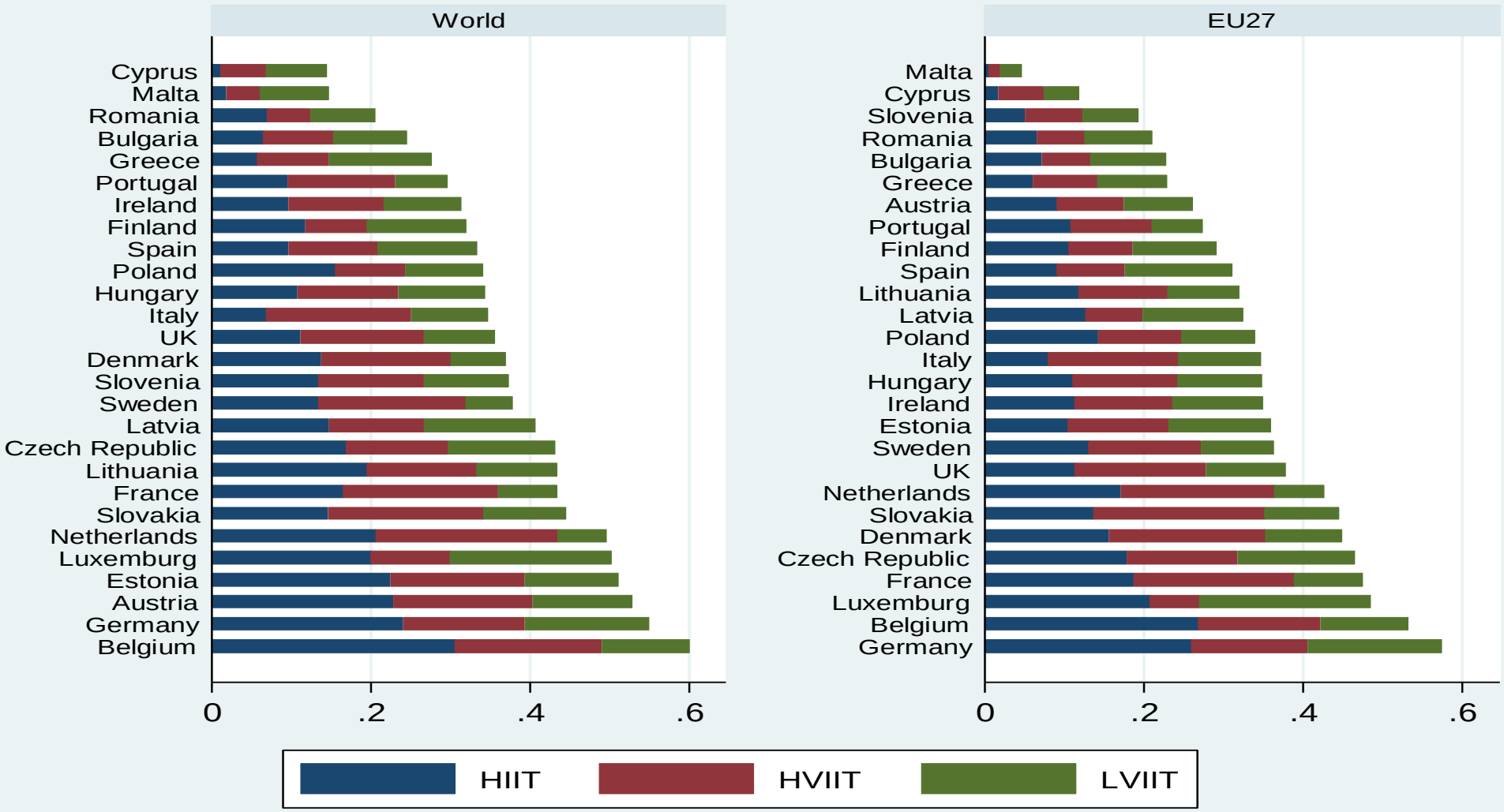
The mean of intra-industry trade indices by NMS and OMS

Results: intra-industry trade



The mean of intra-industry trade indices by NMS and OMS on world and EU-27 markets

Results: intra-industry trade



The mean of intra-industry trade indices by markets and country

CONCLUSIONS

- Growth of EU agri-food exports
- Faster growth in NMS than OMS
- EU-27 countries have lost agri-food export shares
- Innovation and technological improvements (S) and population and income growth (D)

CONCLUSIONS (cont.)

- **CMS analysis of agri-food exports:**
  - **structural effects more important for the OMS**
  - **residual and second order effects in for most of the NMS**
  - **structural effect is mostly positive for both OMS and NMS**
  - **residual and second order effects are more often positive for NMS**

CONCLUSIONS (cont.)

- The increases of intra-EU-27 agri-food exports from the NMS
- NMS trade diversion from traditional markets?
- Structural changes in the agri-food sector with improvements in quality and development of new products/varieties

CONCLUSIONS (cont.)

- **NMS agri-food export growth:**
  - **extensive margin in product diversification in established markets**
  - **introduction of new products in established markets**

CONCLUSIONS (cont.)

Duration analysis for agri-food exports:

- **longer duration of successful agri-food exports from the OMS than from the NMS**
- **NMS agri-food exports are more dynamic, whilst for the OMS more stable on long-term basis**

CONCLUSIONS (cont.)

- **Following the enlargement, the NMS have increased:**
  - **intra-EU-27 agri-food exports**
  - **horizontal and high vertical IIT**

THANK YOU FOR YOUR ATTENTION

COMPETE

International comparison of product supply chains in the agro-food sector

This project is funded by the European Union

Meat production in the Czech Republic (1990 – 2014)

Josef Kameník

University of Veterinary and Pharmaceutical Sciences Brno

Presentation to the 2nd COMPETE WORKSHOP: The competitiveness of the European agri-food chain

Meat production

4 main industries:

- **live animal production**
- **slaughtering**
- **processing**
- **trade**

↕

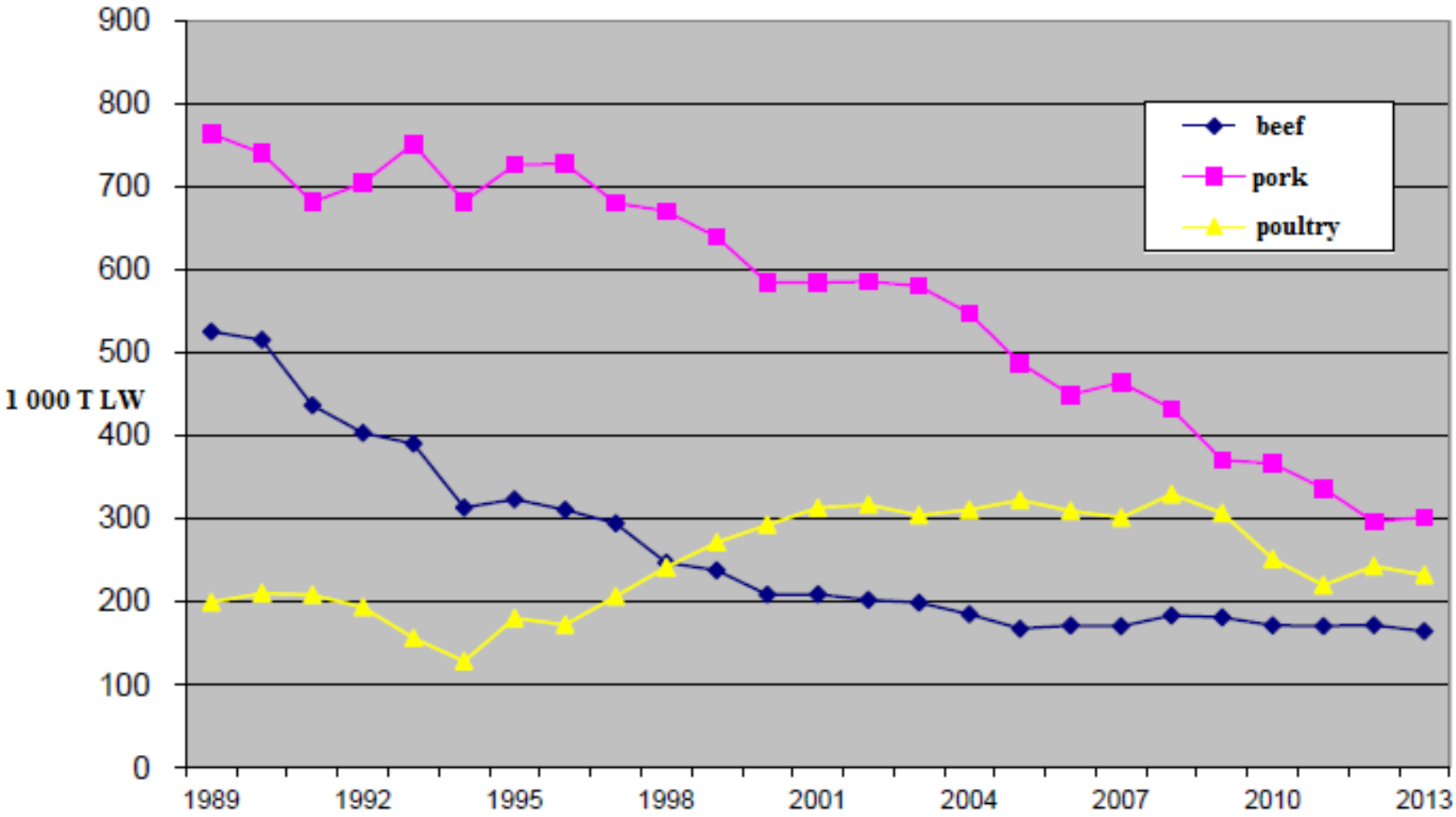
consumption

Meat Production

- **Meat production** in the Czech Republic (1 000 T LW)
  - 1 465 (1990)
  - 1 082 (2003)
  - 710 (2012): 458 300 T CWE
  - between 1990 and 2012: ↓ **51,5 %**

- **Meat consumption** in kg/person/year
  - 96,5 (1990)
  - 80,6 (2003)
  - 77,4 (2012)
  - between 1990 and 2012: ↓ **19,8 %**

Meat production in the Czech R. (1989 – 2013; ČSÚ, 2013)



Beef production

- CZ is net exporter of cattle livestock

- cattle population (1 000 heads):
  - 1 350 (1.4.2014)
  - 1 470 (2003)
  - 2 030 (1995)
  - 3 510 (1990)

- Brutto production (2012): 170 000 T LW

Beef production

- Self-sufficiency level:
  - 118.5 % (2013)
  - 105.7 % (2003)

- Beef consumption (kg/person/year)
  - **8.1 (2011)**
  - 11.2 (2003)
  - 28.0 (1990)
  - 2011 – 1990: ↓ 71.1 %

Beef production

- **slaughtering**:
  - 246.5 (1 000 heads, 2012) = 65 000 T CW
  - 335.8 (1 000 heads, 2004) = 96 700 T CW
- **foreign trade**:
  - positive balance in livestock trade
    - export: 204 000 heads (2012)
    - import: 2 190 heads
  - negative balance of beef trade (since 2003)
    - import: 19 700 T
    - export: 8 630 T

Pork production in the Czech Republic

- Pig population (million head):
  - 4.790 (1990)
  - 3.363 (2003)
  - **1.579** (2012)

- Pork production (2012):
  - 303 600 T (LW)
  - 239 800 T (CW)

Balance of Pork in the Czech Republic,

1 000 T/lw (Abrahamová, Boudný, 2014)

	2007	2010	2012	Index 2012/07 (%)
Production	**463.7**	**366.4**	**303.6**	**65.5**
import	177.7	279.6	328.5	184.9
supplies	658.7	659.5	647.9	98.4
domestic uses	**588.9**	**574.0**	**556.6**	**94.5**
export	51.5	68.6	77.6	150.7
total demand	640.4	642.6	634.2	99.0
Self-sufficiency level (%)	78.7	63.8	54.5	-

Pork consumption in the Czech Republic

- pork consumption (kg/person/year in CWE):
  - 50.0 (1990)
  - 41.5 (2003)
  - 41.3 (2012)
  - between 1990 and 2012: ↓ 17.4 %

Poultry meat

- **Production** (1 000 T LW):
  - 210 (1990)
  - 304 (2003)
  - 220 (2011)
  - between 1990 and 2003: ↑ 44.7 %
  - between 2003 and 2011: ↓ 27.6 %

Poultry meat

- **Consumption** (kg/person/year):
  - 13.6 (1990)
  - 23.8 (2003)
  - 25.2 (2012)
  - between 1990 and 2012: ↑ 85.3 %

Balance of Poultry in the CZ

1 000 T/lw (Teichmanová, Boudný, 2014)

	2008	2010	2012	Index 2012/08 (%)
Production	**246.8**	**188.2**	**184.6**	**74.6**
import	67.5	89.7	117.8	174.5
domestic uses	**257.3**	**221.7**	**238.0**	**92.5**
export	54.6	56.3	62.8	115.0
Self-sufficiency level (%)	95.9	84.9	77.6	-

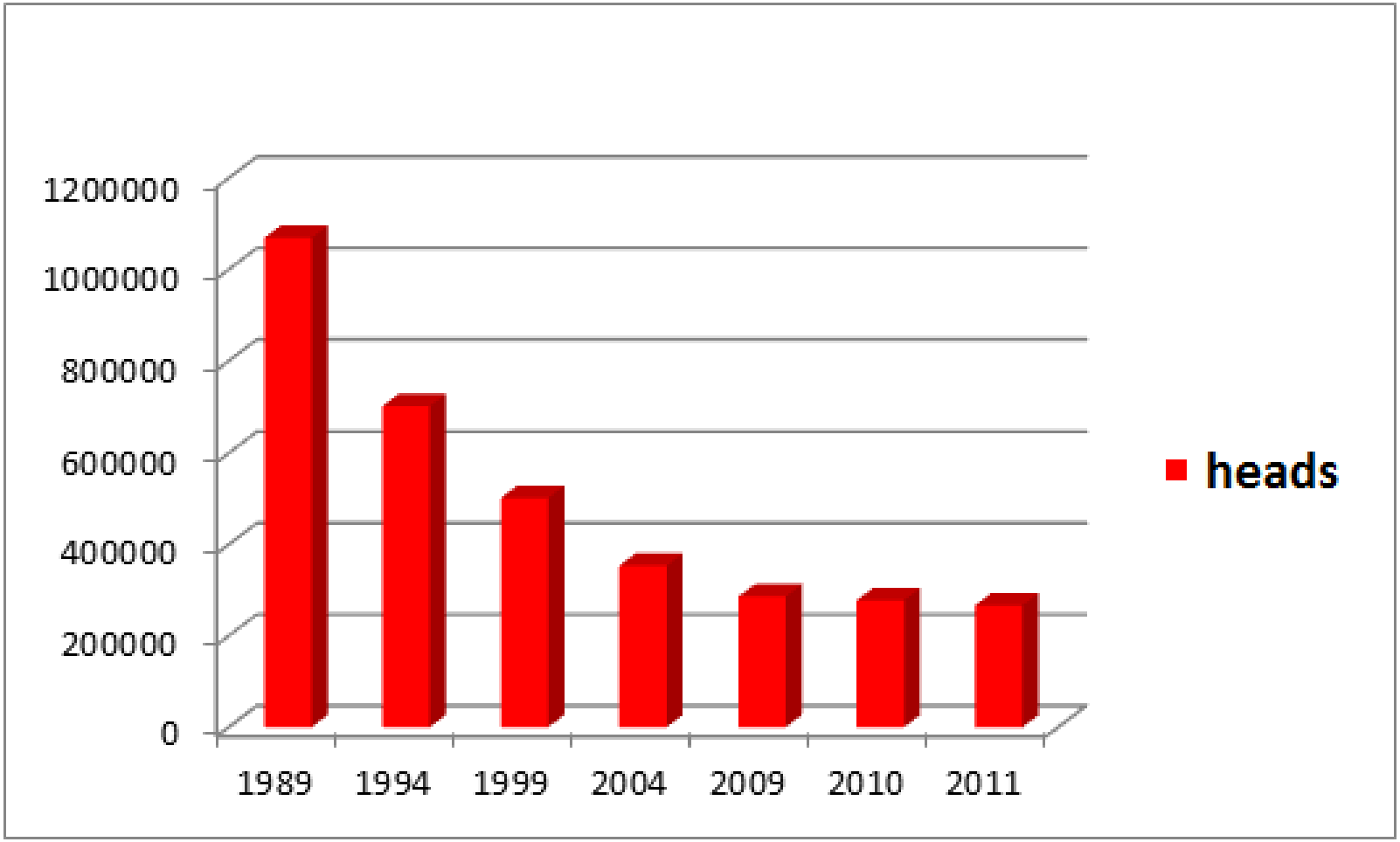
Meat production/1 person (kg CWE, 2012)

	CZ	SK	PL	AT	GE
beef	**6.2**	1.8	9.6	26.2	14.2
pork	**22.8**	10.0	44.0	62.7	67.8
poultry	**14.5**	-	40.2	-	17.7

Slaughtering

- 1990: only state-owned companies, industrial processing
  - 22 plants for the whole processing (slaughtering, deboning, other processing)
  - 20 plants for the slaughtering or for the manufacture of meat products
- 2014: only private companies, industrial plants
  - 206 registered subjects by State Veterinary Administration

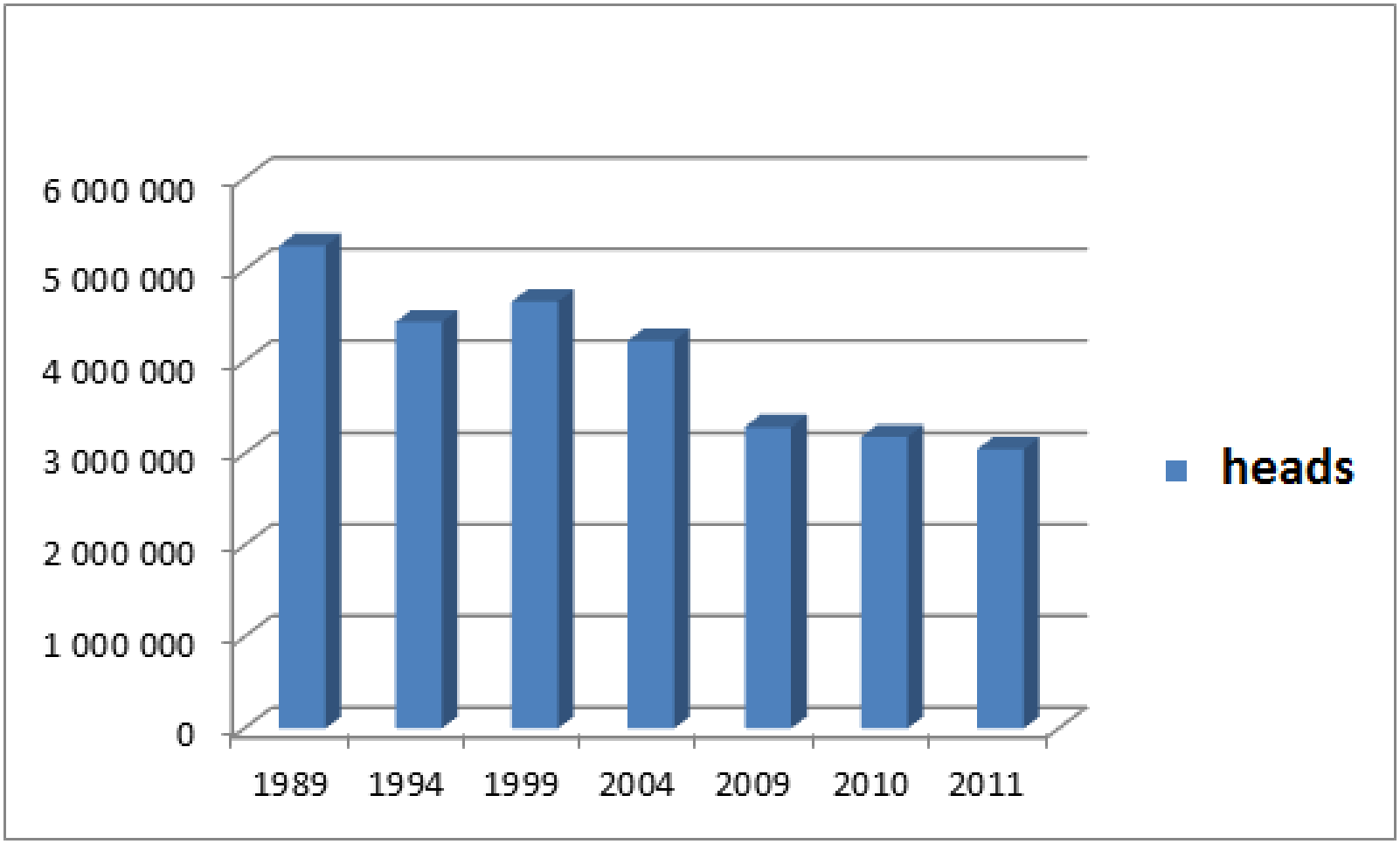
Cattle & calves slaughtering



Cattle & calves slaughtering

- 1989: 1 170 730
- 1993: 913 702
- 1998: 557 791
- 1999: 495 103
- 2004: 369 480
- 2011: 266 920

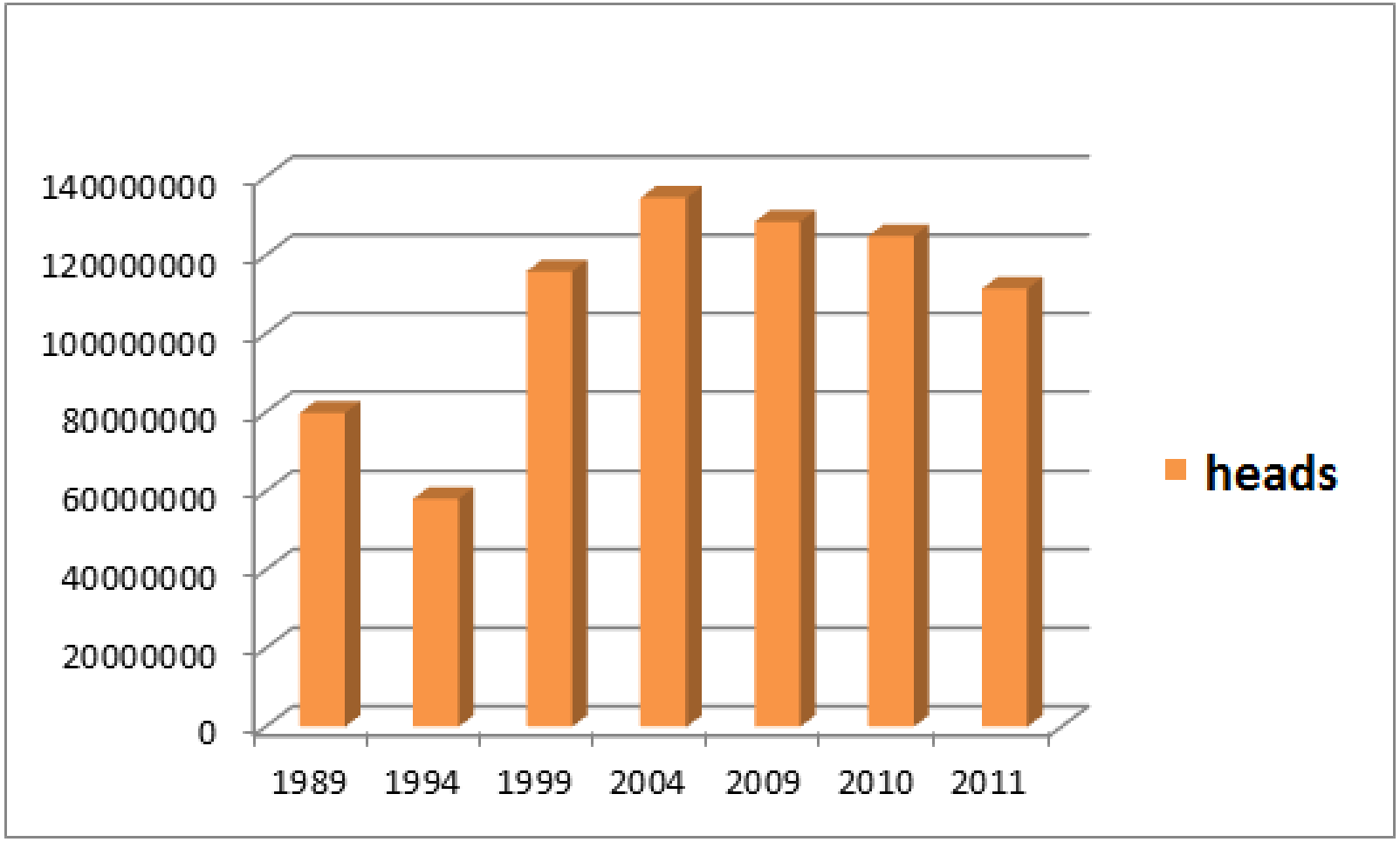
Pigs slaughtering



Pigs slaughtering

- **1989: 5 267 724**
- 1991: 4 714 753
- 1995: 4 224 109
- 1998: 4 720 939
- 2000: 4 500 000
- **2003: 4 500 000**
- 2004: 4 228 961
- **2011: 3 053 433**

Chicken slaughtering



Chicken slaughtering

- 1989: 79 856 293
- 1994: 58 142 024
- 2002: 141 777 870
- 2006: 141 452 119
- 2011: 111 481 389

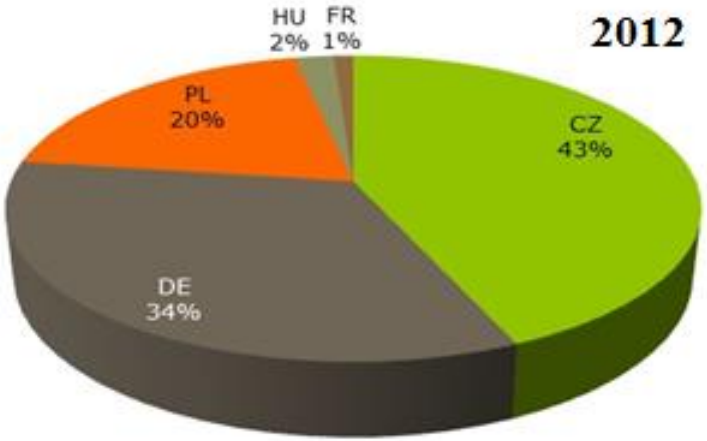
Meat products manufacture

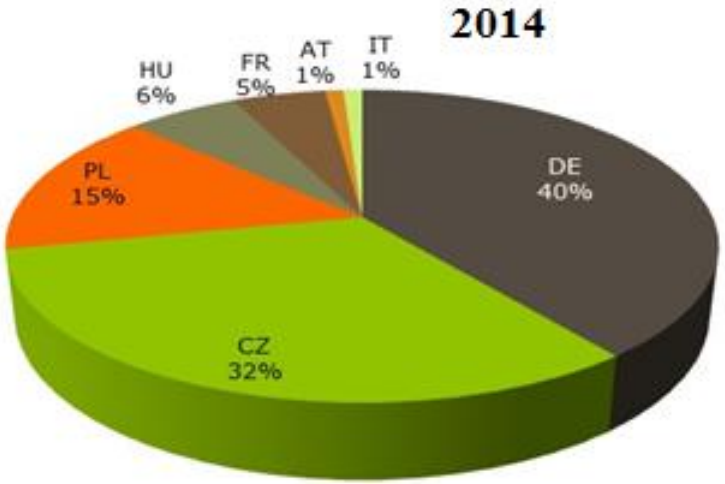
- industrial plants or
- butcher shops with its own production
- 405 registered subjects
- the standards as in western countries (IFS, BRC)
- the same raw material as in western countries
- the same machines as in western countries
- => **the same products**

Food retail in the Czech Republic

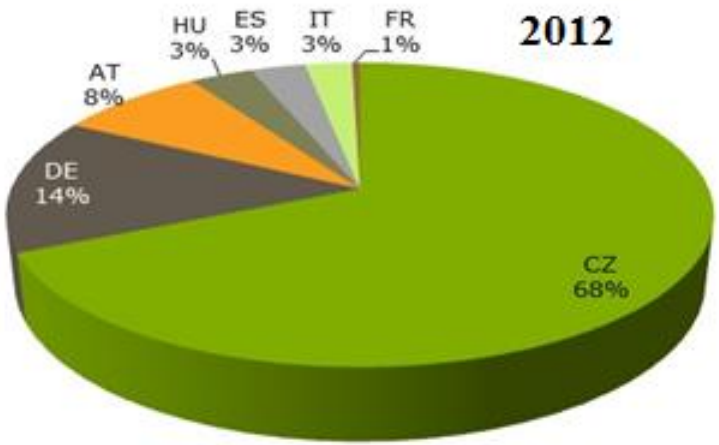
TOP 8 food chain retailers in the Czech Republic	Sales (2013) in billions CZK
1. Kaufland	51.30
2. Tesco Stores ČR	44.01
3. Ahold ČR	40.06
4. Penny Market	29.86
5. Makro Cash & Carry ČR	29.39
6. Lidl ČR	24.72
7. Globus ČR	23.00
8. Billa ČR	20.98

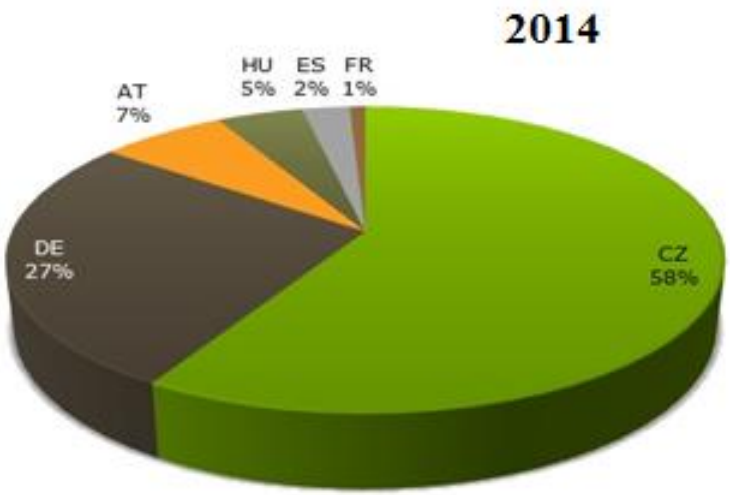
The share of the Czech meat products in food retail chains - LIDL





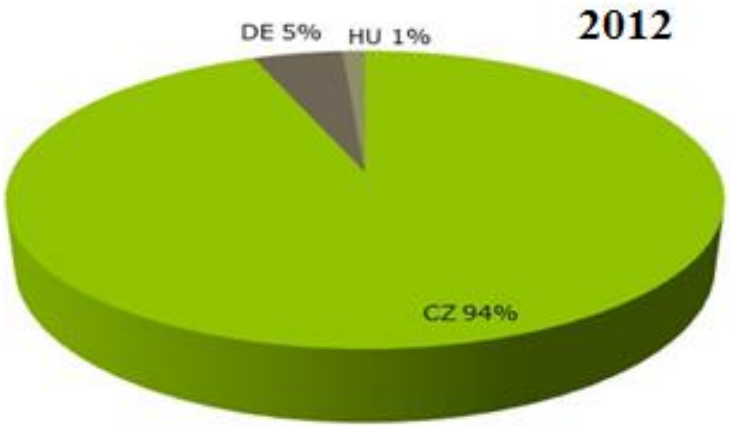
The share of the Czech meat products in food retail chains - Kaufland

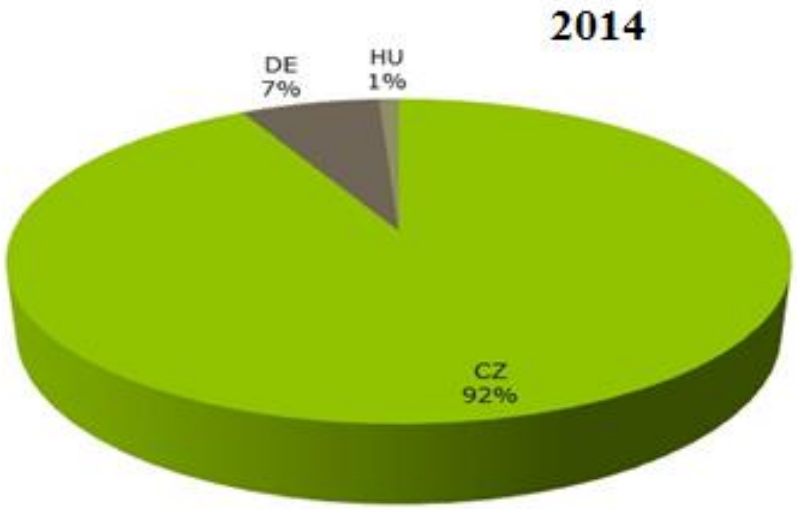




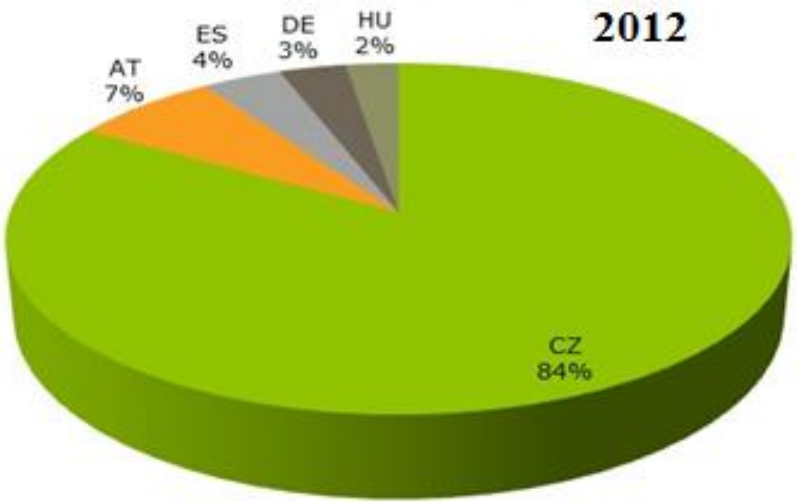

Kaufland
Tady jsem správně!
Z lásky k Česku
Aktuální nabídka
Sortiment
Tipy a zábava
Zákaznický se

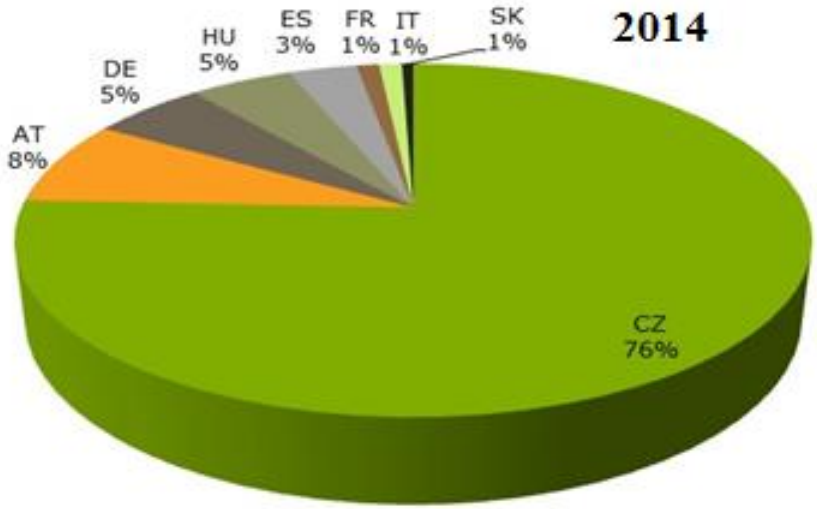
The share of the Czech meat products in food retail chains – Penny Market



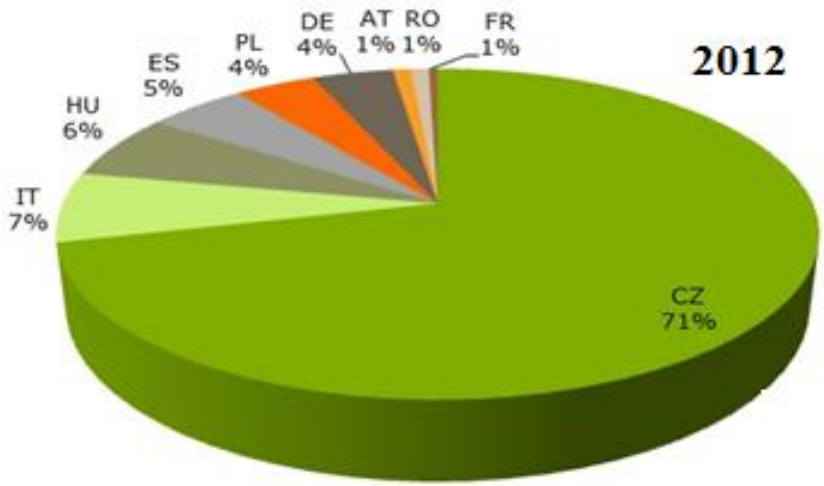


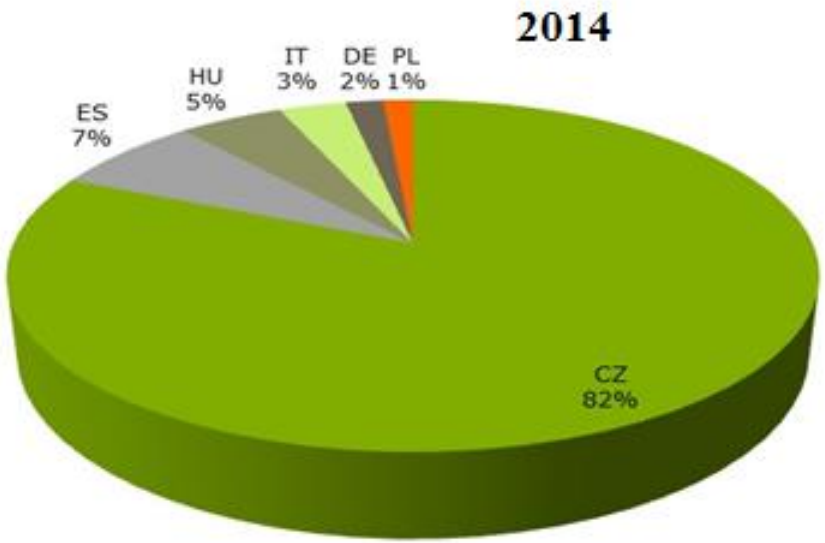
The share of the Czech meat products in food retail chains - BILLA





The share of the Czech meat products in food retail chains - Tesco





SWOT matrix of the Czech meat production

Strengths	• **modern technology** • **tradition in the manufacturing of meat products**
Weaknesses	• **low capacity utilization (slaughterhouses)** • **retail ownership (German companies)**
Opportunities	• **increase production of animals**
Threats	• **import of foreign meat products** • **production decline** • **adjacent states with strong production**