

What factors affect the speed of pork price transmission in the EU?

- Background – Eastern expansion of EU to include 10 new members in May 2004, and 2 more in January 2007
- Eliminated remaining barriers to trade in agricultural products
- Consider closely price and trade data for 15 countries
 - 10 'old' member states: Austria, Denmark, Germany, the Netherlands, Belgium, Italy, France, Portugal, UK and Spain
 - 5 'new' member states: Poland, Czech Republic, Slovakia, Slovenia and Hungary
- 8 years of weekly data from December 2004 to December 2012

Hypotheses

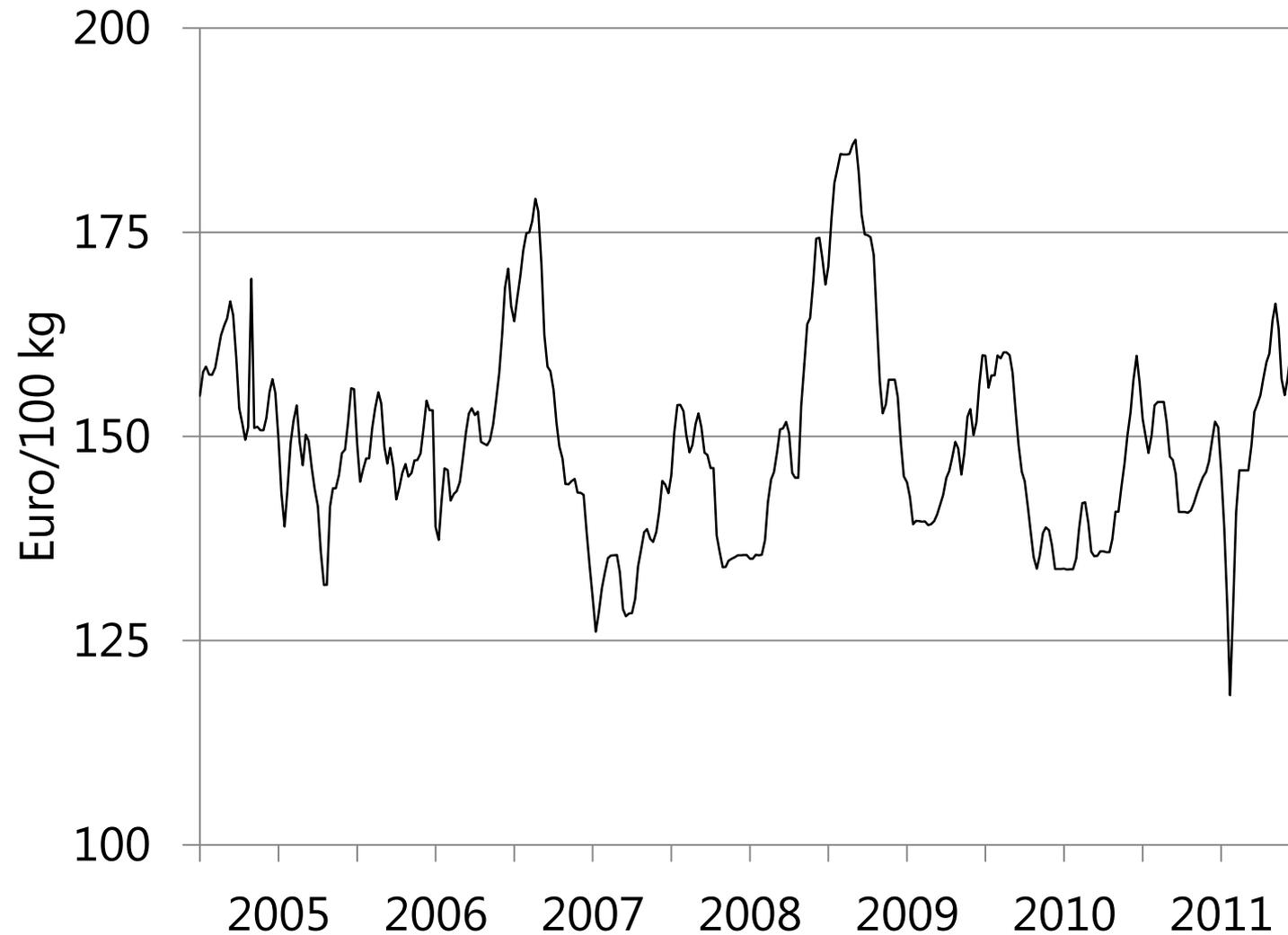
- *Hypothesis 1:* Larger volumes of slaughter pig trade between two countries are associated with higher speeds of pork price transmission between these countries.
- *Hypothesis 2:* Price transmission is more rapid between countries that share a common border than between countries that do not.
- *Hypothesis 3:* Price transmission is more rapid between Euro-zone countries.
- *Hypothesis 4:* The speed of intra-regional price transmission in the EU is higher than the speed of inter-regional price transmission.
- *Hypothesis 5a:* The speed of inter-regional price adjustment has increased over time.
- *Hypothesis 5b:* The speed of intra-regional price adjustment between old member states has fallen over time.
- *Hypothesis 6:* In inter-regional pork trade (e.g. Germany-Poland), pork prices in the new member state will respond more rapidly to shocks than prices in the old member state.

4. Agricultural prices in space (cont'd)

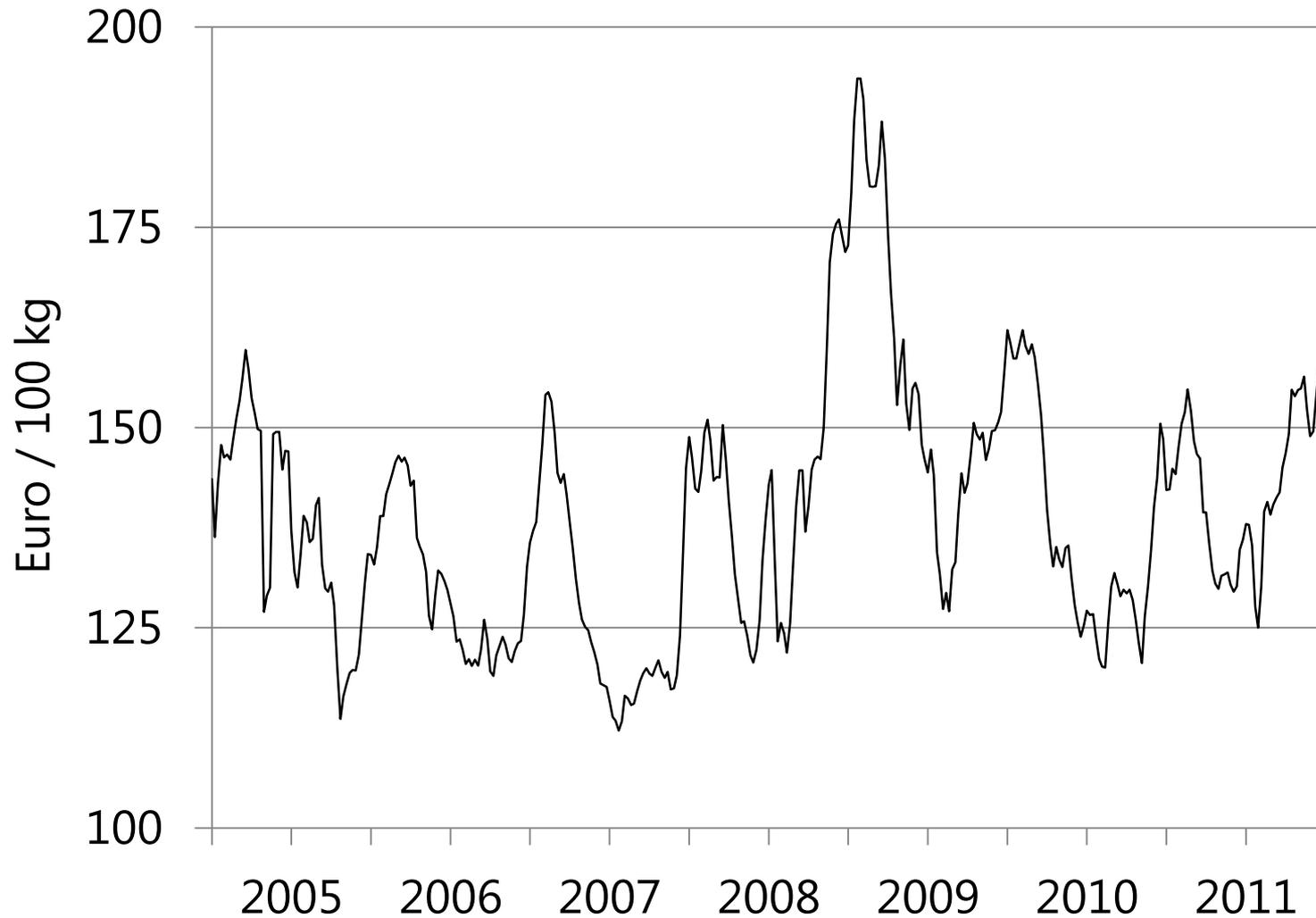
Changes in EU pork production since expansion

| | December 2003 (in 1,000) | December 2012 (in 1,000) | Change 2003-2012 | Average number of all pigs per farm (2010) |
|--------------------------|-----------------------------|-----------------------------|------------------|---|
| Germany | 10,427 | 12,459 | + 19 % | 459 |
| Netherlands | 3,934 | 4,189 | + 6 % | 1743 |
| Belgium | 2,807 | 2,933 | + 5 % | 1092 |
| Italy | 4,875 | 5,075 | + 4 % | 356 |
| Spain | 9,772 | 10,142 | + 4 % | 354 |
| Austria | 1,254 | 1,208 | - 4 % | 85 |
| France | 5,821 | 5,570 | - 4 % | 569 |
| Denmark | 3,539 | 3,253 | - 8 % | 2598 |
| Portugal | 716 | 659 | - 8 % | 38 |
| United Kingdom | 1,704 | 1,557 | - 9 % | 445 |
| Other countries of EU-15 | 2,179 | 2,018 | - 7 % | |
| Poland | 6,300 | 3,982 | - 37 % | 39 |
| Slovenia | 250 | 147 | - 41 % | 14 |
| Hungary | 2,308 | 1,305 | - 43 % | 18 |
| Czech Republic | 1,269 | 615 | - 52 % | 477 |
| Slovakia | 555 | 252 | - 55 % | 55 |
| Other countries of EU-12 | 5,286* | 3,916 | - 26 % | |
| Aggregate EU-15 | 47,027 | 49,063 | + 4 % | |
| Aggregate EU-12 | 15,968* | 10,216 | - 36 % | |
| Aggregate EU-27 | 62,995* | 59,279 | - 6 % | |

Producer prices for slaughter pigs in Germany



Producer prices for slaughter pigs in Poland

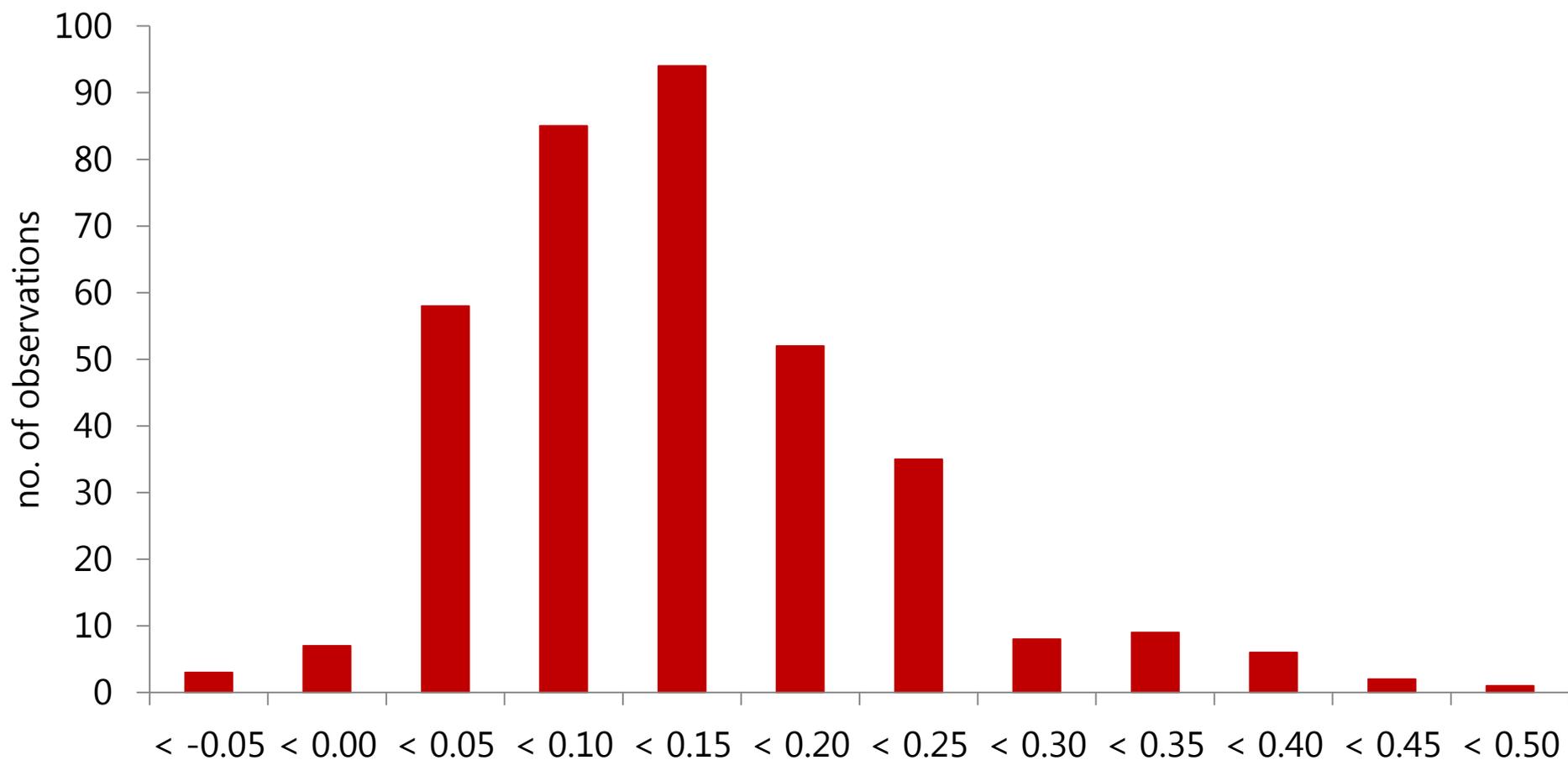


The result: A panel of estimated α 's

| Country pair | 2005- 2006 | 2007- 2008 | 2009- 2010 | 2011- 2012 | Common border | Euro- zone | Old- old | New- new |
|-----------------|------------------|------------------|------------------|------------------|------------------|---------------|-------------|-------------|
| Germany-Belgium | $\alpha_{G-B,1}$ | $\alpha_{G-B,2}$ | $\alpha_{G-B,3}$ | $\alpha_{G-B,4}$ | 1 | 1 | 1 | 0 |
| Germany-Spain | $\alpha_{G-S,1}$ | $\alpha_{G-S,2}$ | $\alpha_{G-S,3}$ | $\alpha_{G-S,4}$ | 0 | 1 | 1 | 0 |
| Germany-Poland | $\alpha_{G-P,1}$ | $\alpha_{G-P,2}$ | $\alpha_{G-P,3}$ | $\alpha_{G-P,4}$ | 1 | 0 | 0 | 0 |
| ... | ... | ... | ... | ... | ... | ... | ... | ... |
| Hungary-Poland | $\alpha_{H-P,1}$ | $\alpha_{H-P,2}$ | $\alpha_{H-P,3}$ | $\alpha_{H-P,4}$ | 0 | 0 | 0 | 1 |
| Hungary-UK | $\alpha_{H-U,1}$ | $\alpha_{H-U,2}$ | $\alpha_{H-U,3}$ | $\alpha_{H-U,4}$ | 0 | 0 | 0 | 0 |

$$\alpha_{i-j,t} = \gamma_0 + \gamma_1 Trade_{i-j,t} + \gamma_2 D_{CommonB} + \gamma_3 D_{EuroZone} + \gamma_4 D_{Old-old} + \dots$$

Estimated adjustment parameters for the 45 possible pairs of countries over 4 sub-periods



4. Agricultural prices in space (cont'd)

Results: What explains the speed of transmission?

| Symbol | Variable | Coefficient | Std. dev. | p-value | Sig. |
|--------|---|-------------------------------|-----------|---------|------|
| | Constant | 0.041 | 0.009 | <0.001 | *** |
| | $\ln(\text{bilateral trade volume between A and B}/\text{number of pigs in A})^*$ | 0.018 | 0.004 | <0.001 | *** |
| | Dummy(Common border) | 0.036 | 0.012 | 0.004 | *** |
| | Sub-period*Common border | -0.005 | 0.004 | 0.222 | |
| | Dummy(Common currency) | 0.013 | 0.008 | 0.104 | |
| | Dummy(Intra-regional trade among old member states) | 0.060 | 0.013 | <0.001 | *** |
| | Sub-period*Intra-regional trade among old member states | -0.011 | 0.003 | <0.001 | *** |
| | Dummy(Intra-regional trade among new member states) | 0.076 | 0.018 | <0.001 | *** |
| | Sub-period*Intra-regional trade among new member states | 0.001 | 0.005 | 0.913 | |
| | Dummy(Inter-regional trade, adjustment in old member states) | - | - | - | - |
| | Sub-period*Inter-regional trade, adjustment in old members | 0.007 | 0.003 | 0.035 | ** |
| | Dummy(Inter-regional trade, adjustment in new member states) | 0.046 | 0.013 | <0.001 | *** |
| | Sub-period*Inter-regional trade, adjustment in new members | 0.013 | 0.003 | <0.001 | *** |
| | R ² | 0.245 | | | |
| | Breusch-Pagan-Test | $\chi^2(1) = 285.3$ (p<0.001) | | | |
| | Hausman-Test | $\chi^2(7) = 10.8$ (p=0.149) | | | |

Main conclusions

- Trade flows and the speed of price transmission do appear to be correlated
- The speed of price transmission is lower in pairs involving trade with new member states (because transaction costs higher?), but this difference is becoming smaller as time since accession elapses (transaction costs falling?)
- Intra-regional price transmission between old member states is more rapid than between new member states (lower transaction costs?)
- In inter-regional trade, price in the new member states adjust more strongly than prices in the old member states (new member markets smaller than old member markets)