Comparative Analysis of Factor Markets for Agriculture across the Member States

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# Simulation Results on the Impact of Changes in the Main EU Policy Tools on Farm Investment Behaviour


## ABSTRACT

This paper completes the comparative analysis of the investment demand behaviour, of a sample of specialised arable crop farms, for farm buildings and machinery and equipment, as a function of the different types and levels of Common Agricultural Policy support, in selected European Union Member States. This contribution focuses on their quantitative interdependence calculating the relevant elasticity measures. In turn, they constitute the methodological tool to simulate the percentage expected change in average net investment levels associated to the implementation of the, recently proposed and currently under discussion, reductions in the Pillar I Direct Payments disbursed under the Common Agricultural Policy. Evidence suggests a statistically significant elastic and inelastic relationship between both types of subsidies and the investment levels for both asset classes in Germany and Italy, respectively. An elastic dependence of investment in farm buildings on decoupled subsidies exists in Hungary while changes in the level of coupled payments appear to translate into less than proportional changes in the demand for both farm buildings and machinery and equipment in France. Coupled payments appear to influence the UK demand for both asset classes in an elastic manner while decoupled support seems to induce a similar effect on investment in machinery and equipment. Since the currently discussed Common Agricultural Policy reform options imply, almost exclusively, a reduction in the level of support granted through Direct Payments, simulated effects were expected to reveal a worsening of the farm investment prospects for both asset types (i.e., a larger negative investment or a smaller positive one). The actual evidence largely respects this expectation with the sole exception of investment in machinery and equipment in France and Italy reaching smaller negative or larger positive levels irrespectively of the magnitude of the implemented cuts in Direct Payments.


**Keywords**: Farm Investment, Simulations, FADN Data, Common Agricultural Policy



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## 1. Introduction

The 2005 reform of the Common Agricultural Policy (CAP), characterised by the phasing in of support tools decoupled from production choices, was intended to support farmers' income with a Single Farm Payment (SFP) reducing the distortionary effects of price support implemented for many years, that heavily affected output choices by farmers, as well as by coupled payments, linked to land allocations to the different crops. Deliverable D5.2 has tackled the estimation of the role of both coupled and decoupled subsidies on investment choices, in farm buildings (FB) and machinery and equipment (ME), of a sample of farms specialised in field crops in selected European Union (EU) countries. The contribution mainly focused on the specification of a model able to account for irregularities in the cost adjustment function as well as to characterise the existence of a zero investment regime as a farm's optimal choice in presence of credit constraints (Sckokai, 2005), differences in the assets' purchase and resale prices (Johnson, 1956), asset fixity and real option (Huttel et al., 2010).

The present Deliverable builds on the estimates in Deliverable D5.2 focusing on evaluating the quantitative evidence associated with the most frequent farms' attitude – among disinvestment (Dis), zero investment (ZInv) and investment (Inv) – toward the adjustment of capital stocks in the countries for which the investment models have been estimated (Hansen, 1999). Moreover, it provides an in depth analysis of the dependence of investment levels on support ones, studying the regime and year specific elasticities of capital adjustment to both types of support. Moreover, since the current debate on CAP reform after 2013 proposes significant changes of the average level of Direct Payments (DPs) disbursed to farmers in different countries, in order to achieve a redistribution of support levels among EU Member States, it is interesting to evaluate the expected consequences of the debated reform scenarios on farm investment in the countries of interest. This is achieved carrying out a comparative static analysis of the percentage changes in investment levels calculated applying the regime-dependent elasticies calculated for 2008 and the percentage changes in DPs occurring under the different implementation scenarios (EC, 2011).

The remainder of the Deliverable provides, in section 2, a description of the policy scenarios of interest, in section 3 presents the Empirical Model; section 4 summarises the data at hand while section 5 presents and discusses the simulation results. The last section offers some concluding remarks.

## 2. CAP policy reform scenarios

The CAP towards 2020 policy reform proposal is built upon three main drivers: the *Adjustment*, the *Integration* and the *Refocus* scenarios for DPs disbursement levels (EC,

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2011). In turn, the *Adjustment* scenario comprises three different implementations: the *EU flat rate*, the *Min 80%* and the *Min 90% and objective criteria*. The *EU flat rate* envisages an EU-wide flat rate payment per hectare of potential eligible area (PEA). Although the *Min 80%* scenario is inherently a policy scheme disbursing a flat rate payment, it is implemented to equalise the average level of DPs in Member States (MSs) to at least 80% of the current EU average. In the *Min 90% and objective criteria* implementation the minimum payment reaches 90% of the EU average, while additional environmental and economic criteria are spelled out to address the financing of the extra 10% disbursed under this, compared to the previous, policy scenario. The European Commission (EC) proposal for reforming the DPs allocation among MSs in the *Integration* scenario implies that MSs receiving less than 90% of the EU-27 average DPs will experience, over the Multi-Annual Financial Framework 2014-2020, a reduction in their gap – from the EU average – by a third. Lastly, the *Refocus* scenario implies a radical shift in the CAP support policies, since DPs are scrapped altogether while the funds allocated to Pillar-II measures are doubled. Note that we are unable to simulate the changes in investment patterns due to the implementation of the policies under the Refocus scenario since we have not included Pillar-II measures among the determinants of farms' investment demands. The level of DPs associated to each policy scenario is evaluated in EC (2011) with respect to a 2020 status quo scenario implying a full phasing-in (i.e., 100%) of DPs in the EU-12 paid to both small and large farms. Moreover, the percentage changes in DPs are determined as if a regional model at the MS level was applied and accounting for some limited provision of coupled payments (mainly for livestock production and cotton). Table 1 presents the percentage change in DPs in the countries of interest under the different policy scenarios.

*Table 1. Percentage change in DPs under different CAP Policy Reform Scenarios*

| | **EU Flat Rate (1)** | **Min 80% (2)** | **Min 90% and objective criteria (3)** | **Integration (4)** |
|---|---|---|---|---|
| **FR** | -17 | -12 | -13 | -2 |
| **DEU** | -23 | -13 | -16 | -4 |
| **HUN** | -10 | -7 | -8 | 0 |
| **ITA** | -37 | -10 | -22 | -6 |
| **UK** | 6 | -10 | -5 | -2 |

*Source*: authors' compilation based on EC (2011).

## 3. Empirical Model

The methodological approach to the yearly classification of farms in the estimated regimes relies on the original procedure coded by Hansen (1999).

Employing the estimated betas for *coupsub* and *decsub* estimated in Deliverable 5.25, and presented in column 1 of Tables 2 and 3, and the yearly and regime specific averages for *sub* and *Inv*, presented in the subsequent columns, we calculate the regime-specific yearly elasticities of investment to the relevant CAP support as:

$$\xi_{i,j}^{sub} = \beta^{sub} * \frac{\overline{sub_{i,J}}}{\overline{inv_{i,J}}} \quad (1)$$

where $\beta^{sub} = \frac{\partial Inv_{i,j}}{\partial \overline{sub_i}}$, with *sub=c,d* for coupled and decoupled support before and after 2005, respectively, is the beta coefficient for every investment demand equation estimated in Deliverable 5.2. Since subscripts *i* and *j* identify the year and the regime, $\overline{sub_{i,J}}$ and $\overline{inv_{i,J}}$ represent the yearly and regime-specific average value of subsidies received under the relevant support policy and of net investment levels in each asset class. Note that while the capital stock in the previous period ($K_{-1}$) was allowed to have regime-specific behaviours,

such that the related investment levels ($inv$) can be thought to be genuinely regime-specific, the average value of subsidies is regime specific through the number of farms which belong to the identified regime (i.e., the estimated beta for each type of subsidies is unique). HUN is the only country for which two sets of elasticities can be calculated, since this is the only country which benefitted from both types of support in 2005-08. Given $\beta^{sub}$ is the only stochastic element in (1), the statistical significance of $\xi_{i,j}^{sub}$ is due to the statistical significance of the related $\beta^{sub}$.

Comparative static analyses of the percentage effects of the implementation of the policy scenarios presented in Table 1 is carried out as in (2):

$$\Delta\overline{inv_j} = \xi_{2008,j}^{sub} * \Delta d_s \quad (2)$$

where $\Delta\overline{inv_j}$ is the percentage change variation in average net investment levels in the asset class of interest in regime $j$ to be used for comparative static analyses; $\xi_{2008,j}^{sub}$ is the most recent, regime-specific, elasticity which appears suitable to simulate the expected variations in investment levels while $\Delta d_s$ is the percentage change in DPs presented in Table 1 where the subscript *s=1,…4* denotes the columns' identifiers.

## 4. Data

This paper simulates percentage changes in average net investment levels of a sample of specialised arable crop farms drawn from those subject, every year, to the survey each MS carries out – on behalf of the EC – as part of the FADN initiative intended to collect relevant economic information from agricultural holdings in the EU. Specialised arable crop farms are those classified, according to their main output, as "specialist cereals, oilseeds and protein crops (COP)", "general field cropping" and "mixed cropping" (TF8=13 or TF8=14 or TF8=60). Table 2 and 3 present a summary of the variables relevant to this exercise. The interested reader is referred to the same section of Deliverable 5.2 where data construction is described in a very detailed manner. Due to the consequential link existing between the present Deliverable and Deliverable 5.2, we are able to calculate the simulated percentage changes in regime-specific average net investment for France (FR), Germany (DEU), Hungary (HUN), Italy (IT) and the United Kingdom (UK).

*Table 2. Estimated beta and average values of the investment levels and coupled support*

| | | Regimes | $\beta^c$ | 2001 $\overline{Inv}$ | 2001 $\overline{coupsub}$ | 2002 $\overline{Inv}$ | 2002 $\overline{coupsub}$ | 2003 $\overline{Inv}$ | 2003 $\overline{coupsub}$ | 2004 $\overline{Inv}$ | 2004 $\overline{coupsub}$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **FR** | **FB** | Dis | -4.3330 | -85.8388 | 2.7309 | -42.2751 | 2.6143 | 45.1803 | 2.8233 | -17.2545 | 2.8637 |
| | | ZInv | | | | | | | | | |
| | | Inv | -4.3330 | -0.9388 | 1.7797 | 46.4072 | 1.7019 | -34.6451 | 1.9007 | 100.0143 | 3.0251 |
| | **ME** | Dis | 54.4573 | -480.4792 | 1.5422 | -160.9772 | 1.6732 | -357.0226 | 1.5216 | -175.7271 | 1.6657 |
| | | ZInv | 54.4573 | -300.7790 | 1.5882 | -32.8439 | 1.5329 | -109.7984 | 1.6513 | 37.5810 | 1.5352 |
| | | Inv | 54.4573 | -290.4564 | 1.1437 | -83.1586 | 1.1260 | -341.6830 | 1.8532 | 98.1631 | 1.2264 |
| **DEU** | **FB** | Dis | 595.9798*** | 165.1218 | 9.4084 | 576.8825 | 8.7541 | -90.5728 | 8.7105 | -10.7442 | 8.8358 |
| | | ZInv | 595.9798*** | 511.8539 | 8.6272 | -1220.5550 | 7.5304 | -1179.3850 | 6.2993 | -199.6953 | 9.9075 |
| | | Inv | 595.9798*** | -1.8108 | 3.0070 | 360.5040 | 1.9171 | 25.5168 | 1.8708 | 521.4499 | 3.2597 |
| | **ME** | Dis | 541.5990*** | -282.8019 | 2.4319 | -510.5523 | 2.8352 | -482.4994 | 2.7536 | -285.3839 | 3.1599 |
| | | ZInv | 541.5990*** | -442.8172 | 3.3141 | -403.0906 | 2.5913 | -256.6002 | 2.5714 | 39.0497 | 2.6652 |
| | | Inv | 541.5990*** | -75.3888 | 1.0725 | -207.6631 | 1.5082 | 21.9524 | 1.2842 | -240.2413 | 1.6082 |
| **IT** | **FB** | Dis | -32.3735*** | -232.4673 | 3.7006 | -280.9582 | 6.0218 | -173.2511 | 3.2082 | -240.4110 | 8.9763 |
| | | ZInv | -32.3735*** | -254.9004 | 2.7696 | -275.1392 | 2.0567 | -375.2426 | 3.4175 | -249.3320 | 2.9351 |
| | | Inv | | | | | | | | | |
| | **ME** | Dis | 146.9623† | -500.6398 | 1.8659 | -388.3957 | 1.6419 | -420.0337 | 2.3178 | -330.7886 | 2.0897 |
| | | ZInv | 146.9623† | -246.7776 | 0.6341 | -385.3715 | 0.6230 | -316.4096 | 1.1263 | -327.7776 | 0.9469 |
| | | Inv | | | | | | | | | |
| **UK** | **FB** | Dis | 199.3998** | 39.3872 | 3.7197 | -230.4640 | 3.6308 | -208.2371 | 4.0420 | -129.5489 | 2.8296 |
| | | ZInv | 199.3998** | 225.1431 | 3.8789 | -122.4917 | 3.1095 | -152.4852 | 2.8910 | -309.8737 | 2.5075 |
| | | Inv | | | | | | | | | |
| | **ME** | Dis | 320.4714 | -201.6851 | 3.1535 | -401.9202 | 2.8446 | -566.6652 | 3.2503 | -409.3267 | 2.7014 |
| | | ZInv | | | | | | | | | |
| | | Inv | | | | | | | | | |

*Notes:* $\overline{Inv}$ measured in real Euros, $\overline{coupsub}$ expressed in 1,000 real Euros, *** denotes statistical significance at the 1% level, ** at the 5% level, * at the 10% level based on two tailed tests; † denotes significant at 15%; values for the UK are for the period 1997 – 2001 due to data limitations.

*Source*: authors' estimates from Deliverable 5.2 and calculations based on EU-FADN - DG AGRI data.

*Table 3. Estimated betas and average values of the investment levels and CAP support*

| | | | $\beta^c$ | $\beta^d$ | 2005 | | | 2006 | | | 2007 | | | 2008 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | $\overline{Inv}$ | $\overline{coupsub}$ | $\overline{decsub}$ | $\overline{Inv}$ | $\overline{coupsub}$ | $\overline{decsub}$ | $\overline{Inv}$ | $\overline{coupsub}$ | $\overline{decsub}$ | $\overline{Inv}$ | $\overline{coupsub}$ | $\overline{decsub}$ |
| **FR** | **FB** | Dis | § | 51.2279* | -68.0199 | § | 0.0103 | -97.2210 | § | 2.3081 | -142.5983 | § | 2.1750 | -3.9044 | § | 2.4681 |
| | | ZInv | § | | | | | | | | | | | | | |
| | | Inv | § | 51.2279* | -137.5089 | § | 0.0080 | 434.9408 | § | 1.3461 | -289.1418 | § | 2.5957 | -129.1957 | § | 1.9726 |
| | **ME** | Dis | § | -121.6025† | -173.9966 | § | 0.0057 | -338.3541 | § | 1.1848 | -221.5117 | § | 1.0925 | -229.9723 | § | 0.8858 |
| | | ZInv | § | -121.6025† | 6.6026 | § | 0.0056 | -149.6155 | § | 1.3755 | 52.0708 | § | 1.3440 | 73.8329 | § | 1.2264 |
| | | Inv | § | -121.6025† | 179.6021 | § | 0.0053 | -155.7135 | § | 0.8318 | 34.0780 | § | 0.8439 | 232.8085 | § | 0.9644 |
| **DEU** | **FB** | Dis | § | 435.5835*** | -369.1033 | § | 7.4358 | -390.3945 | § | 7.2177 | 449.4405 | § | 7.9690 | 3500.7560 | § | 7.4631 |
| | | ZInv | § | 435.5835*** | -370.9423 | § | 6.0595 | 178.5169 | § | 5.6156 | 213.2981 | § | 5.7941 | 510.9320 | § | 7.8235 |
| | | Inv | § | 435.5835*** | -141.7203 | § | 2.5951 | 1557.5980 | § | 2.7397 | 2510.9070 | § | 3.3581 | 1320.0380 | § | 5.9821 |
| | **ME** | Dis | § | 622.7084** | -322.5650 | § | 2.3359 | 33.7894 | § | 2.1157 | -46.5602 | § | 2.2857 | -232.6132 | § | 2.6059 |
| | | ZInv | § | 622.7084** | -66.0053 | § | 1.2836 | -40.0645 | § | 1.5594 | 181.3366 | § | 1.4377 | 319.2914 | § | 2.4877 |
| | | Inv | § | 622.7084** | 43.4546 | § | 0.8175 | 195.0587 | § | 0.8812 | 533.5139 | § | 1.0484 | -9.6516 | § | 1.5453 |
| **HUN** | **FB** | Dis | 341.4439 | 673.5537*** | 779.5925 | 1.3221 | 1.0444 | -314.6286 | 0.8422 | 1.7098 | -322.1168 | 1.7694 | 2.8897 | -332.7315 | 0.5206 | 1.9626 |
| | | ZInv | 341.4439 | 673.5537*** | 1994.1780 | 1.6970 | 1.7240 | 4.1907 | 1.5565 | 2.7868 | 371.0842 | 2.5918 | 5.7904 | -33.5046 | 0.1598 | 3.9170 |
| | | Inv | 341.4439 | 673.5537*** | 1250.5670 | 1.7104 | 1.5048 | -30.0638 | 1.1400 | 1.3215 | 112.4543 | 1.7824 | 3.4396 | 470.7855 | 0.2139 | 2.8659 |
| | **ME** | Dis | 374.3918† | 274.1298 | -4.4098 | 0.4589 | 0.3582 | 61.9654 | 0.2606 | 0.5251 | 180.9316 | 0.4187 | 0.7248 | 332.2688 | 0.2543 | 0.6496 |
| | | ZInv | 374.3918† | 274.1298 | -412.4267 | 0.6660 | 0.6751 | -284.6523 | 0.5007 | 0.8897 | 82.9343 | 0.5403 | 1.2089 | -202.1463 | 0.0461 | 1.2831 |
| | | Inv | 374.3918† | 274.1298 | 224.1603 | 0.5455 | 0.4921 | -297.1134 | 0.4223 | 0.5804 | 374.0162 | 0.4025 | 0.7359 | -99.5305 | 0.0641 | 0.8210 |
| **ITA** | **FB** | Dis | § | 21.8279 | -203.9176 | § | 2.0198 | 399.4837 | § | 2.5169 | -317.8424 | § | 2.6564 | -366.8578 | § | 2.3278 |
| | | ZInv | § | 21.8279 | 139.7718 | § | 2.7742 | 95.7715 | § | 3.5908 | -332.1156 | § | 2.9296 | -365.0720 | § | 3.1328 |
| | | Inv | § | 21.8279 | 393.0961 | § | 2.2120 | 342.7694 | § | 2.5312 | -237.0799 | § | 2.8713 | -550.8514 | § | 2.8969 |
| | **ME** | Dis | § | | | | | | | | | | | | | |
| | | ZInv | § | -12.7120† | -328.4479 | § | 0.9417 | -395.5967 | § | 1.1571 | -333.5289 | § | 1.2129 | -374.5699 | § | 1.1454 |
| | | Inv | § | | | | | | | | | | | | | |
| **UK** | **FB** | Dis | § | 49.1979 | 127.9110 | § | 2.8224 | 409.9789 | § | 3.2890 | 82.3340 | § | 1.8955 | -327.1312 | § | 2.4714 |
| | | ZInv | § | 49.1979 | -179.5111 | § | 3.0260 | -16.1941 | § | 3.0593 | 169.8991 | § | 2.5671 | 44.6537 | § | 3.1493 |
| | | Inv | § | | | | | | | | | | | | | |
| | **ME** | Dis | § | | | | | | | | | | | | | |
| | | ZInv | § | 687.1385* | -36.3025 | § | 2.9841 | 118.3018 | § | 2.7465 | 435.7149 | § | 2.4230 | 428.3541 | § | 2.6680 |
| | | Inv | § | | | | | | | | | | | | | |

*Notes:* $\overline{Inv}$ measured in real Euros, $\overline{coupsub}$ and $\overline{decsub}$ expressed in 1,000 real Euros *** denotes statistical significance at the 1% level, ** at the 5% level, * at the 10% level based on two tailed tests; † denotes significant at 15%; § denotes Not Applicable.

*Source*: authors' estimates from Deliverable 5.2 and calculations based on EU-FADN - DG AGRI data.

# 5. Results

## 5.1 Classification into regimes

Following Hansen (1999), and differently from Serra et al. (2009), in Table 4 and 5 we provide a classification of the number of farms which belong to each of the highlighted regimes (if any) every year we have data for. This allows for recognising any change, over time and/or asset class in the most relevant attitude towards investment in the countries of interest.

*Table 4. Farm classification into estimated regimes 2001 - 2004*

| | | Regimes | #farms 2001 | #farms 2002 | #farms 2003 | #farms 2004 |
|---|---|---|---|---|---|---|
| **FR** | **FB** | Dis ZInv | 339 | 357 | 356 | 338 |
| | | Inv | 70 | 52 | 53 | 71 |
| | **ME** | Dis | 88 | 140 | 109 | 120 |
| | | ZInv | 224 | 188 | 220 | 198 |
| | | Inv | 97 | 81 | 80 | 91 |
| **DEU** | **FB** | Dis | 152 | 159 | 186 | 145 |
| | | ZInv | 76 | 78 | 67 | 74 |
| | | Inv | 67 | 58 | 42 | 76 |
| | **ME** | Dis | 71 | 65 | 106 | 76 |
| | | ZInv | 120 | 119 | 103 | 103 |
| | | Inv | 104 | 111 | 86 | 116 |
| **IT** | **FB** | Dis | 13 | 12 | 11 | 6 |
| | | ZInv Inv | 57 | 58 | 59 | 64 |
| | **ME** | Dis | 36 | 37 | 24 | 34 |
| | | ZInv Inv | 34 | 33 | 46 | 36 |
| **UK** | **FB** | Dis | 24 | 61 | 62 | 65 |
| | | ZInv Inv | 77 | 40 | 39 | 36 |
| | **ME** | Dis ZInv Inv | 101 | 101 | 101 | 101 |

*Notes*: 1997-2001 period for the UK due to data limitations.

*Source*: authors' estimates based on results and EU-FADN - DG AGRI data from Deliverable 5.2.

*Table 5. Farm classification under estimated regimes 2005- 2008*

| | | | #farms 2005 | #farms 2006 | #farms 2007 | #farms 2008 |
|---|---|---|---|---|---|---|
| **FR** | **FB** | Dis ZInv | 313 | 316 | 308 | 249 |
| | | Inv | 37 | 34 | 42 | 101 |
| | **ME** | Dis | 128 | 146 | 120 | 35 |
| | | ZInv | 144 | 139 | 150 | 153 |
| | | Inv | 78 | 65 | 80 | 162 |
| **DEU** | **FB** | Dis | 56 | 87 | 57 | 27 |
| | | ZInv | 185 | 175 | 188 | 166 |
| | | Inv | 62 | 41 | 58 | 110 |
| | **ME** | Dis | 144 | 163 | 141 | 72 |
| | | ZInv | 116 | 110 | 127 | 154 |
| | | Inv | 43 | 30 | 35 | 77 |

| | | | | | | |
|---|---|---|---|---|---|---|
| **HUN** | **FB** | Dis | 36 | 44 | 42 | 37 |
| | | ZInv | 114 | 118 | 51 | 71 |
| | | Inv | 57 | 45 | 114 | 99 |
| | **ME** | Dis | 35 | 41 | 45 | 36 |
| | | ZInv | 97 | 113 | 78 | 73 |
| | | Inv | 75 | 53 | 84 | 98 |
| **ITA** | **FB** | Dis | 216 | 212 | 227 | 80 |
| | | ZInv | 167 | 184 | 207 | 194 |
| | | Inv | 187 | 174 | 136 | 296 |
| | **ME** | Dis | | | | |
| | | ZInv | 570 | 570 | 570 | 570 |
| | | Inv | | | | |
| **UK** | **FB** | Dis | 27 | 20 | 16 | 5 |
| | | ZInv | 69 | 76 | 80 | 91 |
| | | Inv | | | | |
| | **ME** | Dis | | | | |
| | | ZInv | 96 | 96 | 96 | 96 |
| | | Inv | | | | |

*Source*: authors' estimates based on results and EU-FADN - DG AGRI data from Deliverable 5.2.

Over the years coupled support was in place, farms in FR appear to be consistently Disinvestment (Dis) and Zero Investment (ZInv) (the two behaviours being indistinguishable between themselves) in FB while – once again consistently – ZInv in ME.[1] Note that in 2002 and 2004 the number of farms in the Dis regime render the latter the second most relevant type of investment behaviour characterising this asset class. In DEU the majority of farms appear to be Dis FB over the whole period of coupled support while have ZInv in ME until 2002 with the following years experiencing fluctuations in the most relevant regime. The indistinguishable regimes ZInv and Inv are the ones describing, persistently, the attitude of IT farms towards a change in the quantity of FB. Over the years, the only persistent changes in the number of farms belonging to each regime occur for the ME and FB asset classes in IT and the UK, respectively. In the former country, the predominant Dis behaviour turns into the combined ZInv and Investment (Inv) one. Note that a significant difference between the number of farms belonging to either regimes arises only in the year 2003. In the latter country, the prevalence of farms in the combined regime ZInv Inv in 1997 evolves in the concentration of farms into the Dis regime since 1998.

Over the years characterised by decoupled support, the consistent predominance of the Dis and ZInv (indistinguishable) behaviours, which characterised the period of coupled support, is still verified in FR for FB. The only perceivable change occurs in 2008 when a large increase, from the previous year, in the number of farms Inv is recorded. On the contrary, each of the three different investment behaviours is the most relevant, over the period 2005-2008, for ME investment in FR. Note that the ZInv one occurs twice in those years. Following the move toward DPs, the investment in FB in DEU seems to have increased since the regime consistently absorbing the largest number of farms is ZInv, rather than Dis. Note that 2008 suggests a further move towards higher investment levels given the Inv regime has doubled, from the previous year, the number of farms included and the gap with the ZInv has decreased substantially. The model for ME investment in DEU turns from being characterised by a large number of farms Dis to a significant number of farms ZInv in 2008, somewhat confirming an improvement in investment dynamics. A similar phenomenon characterises HUN which turns from ZInv in both FB and ME until 2006 to Inv then on,

[1] Abel and Eberly (1994) remark that in presence of a single root of the function maximizing, choosing investment, the value of discounted value of the firm, "...the range of inaction is degenerate" (Abel and Eberly, 1994:1375). Whenever two regimes are identified and although we report the conflation of the two indistinguishable regimes, the reader should intend the estimated regimes as Dis and Inv only.

although the second most relevant regime is now at a closer distance. IT seems to have already endured some adaptation towards lower levels of FB investment since the most populated regime – between 2004 and 2007 – is the Dis one while a resurgence of Inv occurs in 2008. Probably the most marked effect of the change in CAP support materialises for investment in FB in the UK. In fact, while Dis had prevailed – over a combined ZInv Inv regime – since 1998, the latter has return to consistently include the majority of UK farms investing in FB.

## 5.2 Elasticities calculations

Table 6 and 7 present the elasticities of investment to agricultural support at the yearly and regime-specific means of the relevant variables obtained by equation (1).

*Table 6. Elasticity of average net investment to average coupled subsidies (2001-2004)*

| | | | $\xi^{c}_{2001,j}$ | $\xi^{c}_{2002,j}$ | $\xi^{c}_{2003,j}$ | $\xi^{c}_{2004,j}$ |
|---|---|---|---|---|---|---|
| **FR** | **FB** | Dis | 0.1379 | 0.2680 | -0.2708 | 0.7191 |
| | | ZInv | | | | |
| | | Inv | 8.2141 | -0.1589 | 0.2377 | -0.1311 |
| | **ME** | Dis | -0.1748 | -0.5660 | -0.2321 | -0.5162 |
| | | ZInv | -0.2876 | -2.5416 | -0.8190 | 2.2246 |
| | | Inv | -0.2144 | -0.7374 | -0.2954 | 0.6804 |
| **DEU** | **FB** | Dis | 33.9581*** | 9.0439*** | -57.3161*** | -490.1210*** |
| | | ZInv | 10.0451*** | -3.6770*** | -3.1832*** | -29.5684*** |
| | | Inv | -989.6793*** | 3.1693*** | 43.6951*** | 3.7256*** |
| | **ME** | Dis | -4.6574*** | -3.0076*** | -3.0909*** | -5.9968*** |
| | | ZInv | -4.0534*** | -3.4817*** | -5.4274*** | 36.9649*** |
| | | Inv | -7.7049*** | -3.9335*** | 31.6832*** | -3.6255*** |
| **IT** | **FB** | Dis | 0.5153*** | 0.6939*** | 0.5995*** | 1.2087*** |
| | | ZInv | 0.3518*** | 0.2420*** | 0.2948*** | 0.3811*** |
| | | Inv | | | | |
| | **ME** | Dis | -0.5477 | -0.6213 | -0.8110 | -0.9284 |
| | | ZInv | -0.3776 | -0.2376 | -0.5231 | -0.4246 |
| | | Inv | | | | |
| **UK** | **FB** | Dis | 18.8312*** | -3.1414*** | -3.8705*** | -4.3553*** |
| | | ZInv | 3.4354*** | -5.0618*** | -3.7805*** | -1.6135*** |
| | | Inv | | | | |
| | **ME** | Dis | | | | |
| | | ZInv | -5.0108 | -2.2681 | -1.8382 | -2.1150 |
| | | Inv | | | | |

*Notes*: *** denotes statistical significance at the 1% level, ** at the 5% level, * at the 10% level based on two tailed tests; values for the UK are for the period 1997 – 2001 due to data limitations.

*Source*: authors' calculations based on data from Table.

*Table 7. Elasticity of investment to decoupled subsidies (2005-2008)*

| | | | $\xi^{c}_{2005,j}$ | $\xi^{d}_{2005,j}$ | $\xi^{c}_{2006,j}$ | $\xi^{d}_{2006,j}$ | $\xi^{c}_{2007,j}$ | $\xi^{d}_{2007,j}$ | $\xi^{c}_{2008,j}$ | $\xi^{d}_{2008,j}$ |
|---|---|---|---|---|---|---|---|---|---|---|
| **FR** | **FB** | Dis | | | | | | | | |
| | | ZInv | § | -0.0078* | § | -1.2162* | § | -0.7814* | § | -32.3828* |
| | | Inv | § | -0.0030* | § | 0.1585* | § | -0.4599* | § | -0.7822* |
| | **ME** | Dis | § | 0.0040 | § | 0.4258 | § | 0.5997 | § | 0.4684 |
| | | ZInv | § | -0.1031 | § | 1.1180 | § | -3.1387 | § | -2.0199 |
| | | Inv | § | -0.0036 | § | 0.6495 | § | -3.0113 | § | -0.5037 |
| **DEU** | **FB** | Dis | § | -8.7751*** | § | -8.0532*** | § | 7.7233*** | § | 0.9286*** |
| | | ZInv | § | -7.1154*** | § | 13.7021*** | § | 11.8323*** | § | 6.6697*** |
| | | Inv | § | -7.9762*** | § | 0.7662*** | § | 0.5826*** | § | 1.9740*** |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | **ME** | Dis | § | -4.5094** | § | 38.9905** | § | -30.5696** | § | -6.9760** |
| | | ZInv | § | -12.1098** | § | -24.2372** | § | 4.9371** | § | 4.8517** |
| | | Inv | § | 11.7148** | § | 2.8132** | § | 1.2237** | § | -99.7007** |
| **HUN** | **FB** | Dis | 0.5790 | 0.9023*** | -0.9140 | -3.6603*** | -1.8755 | -6.0424*** | -0.5342 | -3.9729*** |
| | | ZInv | 0.2906 | 0.5823*** | 126.8183 | 447.9107*** | 2.3848 | 10.5101*** | -1.6286 | -78.7439*** |
| | | Inv | 0.4670 | 0.8105*** | -12.9473 | -29.6071*** | 5.4119 | 20.6017*** | 0.1551 | 4.1002*** |
| | **ME** | Dis | -38.9606 | -22.2671 | 1.5745 | 2.3230 | 0.8664 | 1.0981 | 0.2865 | 0.5359 |
| | | ZInv | -0.6046 | -0.4487 | -0.6586 | -0.8568 | 2.4391 | 3.9959 | -0.0854 | -1.7400 |
| | | Inv | 0.9111 | 0.6018 | -0.5321 | -0.5355 | 0.4029 | 0.5394 | -0.2411 | -2.2612 |
| **ITA** | **FB** | Dis | § | -0.2162 | § | 0.1375 | § | -0.1824 | § | -0.1385 |
| | | ZInv | § | 0.4332 | § | 0.8184 | § | -0.1925 | § | -0.1873 |
| | | Inv | § | 0.1228 | § | 0.1612 | § | -0.2644 | § | -0.1148 |
| | **ME** | Dis<br>ZInv<br>Inv | § | 0.0364 | § | 0.0372 | § | 0.0462 | § | 0.0389 |
| **UK** | **FB** | Dis | § | 1.0856 | § | 0.3947 | § | 1.1326 | § | -0.3717 |
| | | ZInv<br>Inv | § | -0.8293 | § | -9.2942 | § | 0.7434 | § | 3.4698 |
| | **ME** | Dis<br>ZInv<br>Inv | § | -56.4834* | § | 15.9526* | § | 3.8212* | § | 4.2798* |

*Notes*: *** denotes statistical significance at the 1% level, ** at the 5% level, * at the 10% level based on two tailed tests; § denotes Not Applicable § denotes Not Applicable.

*Source*: authors' calculations based on data from Table 3.

Evidence in Table 6 suggests that the demand for investments has been elastic to coupled subsidies in DEU and the UK while inelastic in FR and IT, irrespective of the asset class considered. The evolution of the regime-specific elasticity in FR reflects a move towards a more elastic demand for FB investment in the combined Dis ZInv regime while the rigidity of FB investment in the Inv regime has largely remained unchanged, if very large values of elasticity are ignored.[2] Somewhat similar to the behaviour of FB investment, and despite the significant fluctuations it is subject to, the elasticity of ME investment in FR has increased in each of the three regimes. The evolution, over time, of the elasticity of investment demand in IT appears to be remarkably similar across asset classes, for the same regime considered. The Dis one seems to feature an increasingly more elastic investment demand while the combined ZInv Inv one appears to be characterised by fluctuations which compensate themselves, yielding a largely stable, and smaller than one in absolute value, elasticity. The demand for FB investments in DEU is clearly elastic to a change in coupled subsidies, yet its dynamics is somewhat hard to evaluate since a few instances of large elasticity values occur. If large elasticity values were ignored, the elasticity of FB investment to changes in coupled subsidies, in the ZInv and Inv regimes, have moved in opposite directions: the former has declined, in absolute value, while the latter has increased. Aside for the elasticity of ME investment in the Inv regime suggesting the evolution towards a more rigid demand for ME investment, those for the other two regimes highlight an opposite evolution towards more elastic demands. While characterised by elastic demands for both FB and ME in every regime, the UK appears to have experienced a decline in the elasticity values for FB in the combined ZInv Inv regime. Neglecting the 2001 value of FB elasticity, its dynamics – in the Dis regime – poses for the associated investment demand becoming more elastic.

[2] While we are aware that elasticities larger than, say, 20 might induce significant concerns, we cannot avoid large values of subsidies and/or small values of investment to yield elasticites like the ones above.

In Table 7 we present the elasticity calculations for the 2005-2008 period, in the countries and for the asset classes of interest. The main differences with the previous Table concern the possibility of calculating the elasticities of interest also for HUN, since it joined the EU in 2005. Moreover, while for the other countries the two time spans imply that only one CAP regime is in place, in HUN both coupled and decoupled support were in place, such that – in every year – two sets of elasticities can be calculated. In what follows, the commentary will distinguish between coupled and decoupled elasticities only for HUN; in any other case comments should be intended to describe the relationship between investment and decoupled subsidies. In line with the previous case, significance of the relevant $\beta$ coefficient drives the significance of the related calculated elasticity.

One of the peculiar pieces of evidence in Table 7 is the occurrence of almost zero elastic investment demand functions. Aside for the one calculated for the ZInv regime of ME investment in FR, the 2005 elasticities to decoupled subsidies are very close to zero, across the identified regimes and irrespectively of the concerned asset class. Since this result arises for the first year of implementation of decoupled support, we might speculate that farms in FR were not prepared to the switch in the nature of the subsidies, such that they did not condition their choices to this variable. A somewhat similar evidence, although it occurs consistently for the whole 2005 – 2008 period, affects the zero-threshold model for ME investment in IT. FB and ME investment in FR appear largely inelastic, except for the ZInv regime in ME. While the dynamics of the elasticity for the Inv regime of FB investment in FR is monotonically increasing towards 1, all the other regimes for the two types of investments experience the same change between beginning and end of the period but record also fluctuations in the opposite direction in the intervening years. IT features inelastic investment demand functions for FB across all the estimated regimes which, over time, become more inelastic, except for the one for the Inv regime in FB investment whose elasticity increases for the two central years before resulting slightly lower than the 2005 one. In the UK, investment demands appear to be largely unstable in their elasticity values, fluctuating between elastic and inelastic relationships with decoupled subsidies. The only clear trend emerging relates to a move towards a less elastic demand in the zero threshold model for ME. Beginning and end of the period elasticites for the Dis and the combined ZInv Inv regimes for FB investment in the UK denote the transformation of elastic demand into an inelastic one, and vice-versa, for the two regimes, respectively. On the contrary, FB and ME investment demands in DEU appear to be largely elastic, across all the identified regimes. Concerning FB investment, the elasticity values denote a decline of the parameters' values, denoting an increasing rigidity of the related investment demands with the one for FB in the Dis regime declining monotonically. ME investment demand in the Dis and ZInv regimes become, subject to somewhat unusually large values, more and less elastic, respectively, between the beginning and the end of the period of interest. Excluding a really large value for 2008, the variation over time of the elasticity of ME in the Inv regime in DEU presents a monotonic decline towards values implying an iso-elastic behaviour of the related demand functions. FB investment in HUN seems characterised by a dependence from coupled subsidies which fluctuates over the years maintaining the inelastic behaviour of FB investment in the Dis and Inv regimes with the value of elasticity declining over time. On the contrary, the elasticity of FB demand in the ZInv regime becomes bigger to exceed one, in absolute value. The decline in the elasticity values, over the period, is also a feature of the elasticity of ME investment to coupled subsidies across all the estimated regimes. The FB demand, across all the estimated regimes, is elastic to coupled subsidies, instead. ME investment demand becomes elastic only since 2007 in the ZInv and in 2008 in the Inv regimes while it actually monotonically becomes more rigid in the Dis regime.

## 5.3 Simulated percentage changes in investment levels under CAP policy reform scenarios and comparative static analyses

Table 8 presents the percentage change in investment obtained applying (2) when the policy shocks are those in the four columns in Table 1

*Table 8. Simulated changes in average net investment levels due to proposed CAP policy reform scenarios*

| | | | Sign of $\beta^d$ | $\xi^d_{2008,j}$ | $\overline{inv_j}$ | $\Delta\overline{inv_j}$ (1) | Dir. effect | $\Delta\overline{inv_j}$ (2) | Dir. effect | $\Delta\overline{inv_j}$ (3) | Dir. effect | $\Delta\overline{inv_j}$ (4) | Dir. effect |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **FR** | **FB** | Dis ZInv | + | -32.3828* | -3.9044 | 550.51 | - | 388.59 | - | 420.98 | - | 64.77 | - |
| | | Inv | + | -0.7822* | -129.1957 | 13.30 | - | 9.39 | - | 10.17 | - | 1.56 | - |
| | **ME** | Dis | - | 0.4684 | -229.9723 | -7.96 | + | -5.62 | + | -6.09 | + | -0.94 | + |
| | | ZInv | - | -2.0199 | 73.8329 | 34.34 | + | 24.24 | + | 26.26 | + | 4.04 | + |
| | | Inv | - | -0.5037 | 232.8085 | 8.56 | + | 6.04 | + | 6.55 | + | 1.01 | + |
| **DEU** | **FB** | Dis | + | 0.9286*** | 3500.7560 | -21.36 | - | -12.07 | - | -14.86 | - | -3.71 | - |
| | | ZInv | + | 6.6697*** | 510.9320 | -153.40 | - | -86.71 | - | -106.72 | - | -26.68 | - |
| | | Inv | + | 1.9740*** | 1320.0380 | -45.40 | - | -25.66 | - | -31.58 | - | -7.90 | - |
| | **ME** | Dis | + | -6.9760** | -232.6132 | 160.45 | - | 90.69 | - | 111.62 | - | 27.90 | - |
| | | ZInv | + | 4.8517** | 319.2914 | -111.59 | - | -63.07 | - | -77.63 | - | -19.41 | - |
| | | Inv | + | -99.7007** | -9.6516 | 2293.12 | - | 1296.11 | - | 1595.21 | - | 398.80 | - |
| **HUN** | **FB** | Dis | + | -3.9729*** | -332.7315 | 39.73 | - | 27.81 | - | 31.78 | - | 0.00 | § |
| | | ZInv | + | -78.7439*** | -33.5046 | 787.44 | - | 551.21 | - | 629.95 | - | 0.00 | § |
| | | Inv | + | 4.1002*** | 470.7855 | -41.00 | - | -28.70 | - | -32.80 | - | 0.00 | § |
| | **ME** | Dis | + | 0.5359 | 332.2688 | -5.36 | - | -3.75 | - | -4.29 | - | 0.00 | § |
| | | ZInv | + | -1.7400 | -202.1463 | 17.40 | - | 12.18 | - | 13.92 | - | 0.00 | § |
| | | Inv | + | -2.2612 | -99.5305 | 22.61 | - | 15.83 | - | 18.09 | - | 0.00 | § |
| **ITA** | **FB** | Dis | + | -0.1385 | -366.8578 | 5.12 | - | 1.39 | - | 3.05 | - | 0.83 | - |
| | | ZInv | + | -0.1873 | -365.0720 | 6.93 | - | 1.87 | - | 4.12 | - | 1.12 | - |
| | | Inv | + | -0.1148 | -550.8514 | 4.25 | - | 1.15 | - | 2.53 | - | 0.69 | - |
| | **ME** | Dis ZInv Inv | - | 0.0389 | -374.5699 | -1.44 | + | -0.39 | + | -0.86 | + | -0.23 | + |
| **UK** | **FB** | Dis | + | -0.3717 | -327.1312 | -2.23 | + | 3.72 | - | 1.86 | - | 0.74 | - |
| | | ZInv Inv | + | 3.4698 | 44.6537 | 20.82 | + | -34.70 | - | -17.35 | - | -6.94 | - |
| | **ME** | Dis ZInv Inv | + | 4.2798* | 428.3541 | 25.68 | + | -42.80 | - | -21.40 | - | -8.56 | - |

*Note*: $\overline{inv_j}$ expressed in real Euros, (1) denotes the *EU flat rate* scenario of CAP reform, (2) denotes the *Min 80%* scenario of CAP reform, (3) denotes the *Min 90% and objective criteria* scenario of CAP reform, (4) denotes the *Integration* scenario of CAP reform; § denotes Not Applicable since no sign can be clearly associated to a zero percentage change variation.

*Source*: authors' calculations based on Table 7 and equation (2).

To facilitate the interpretation of the results of this simulation exercise, we also present the ancillary columns for the sign of $\beta^d$ as well as values for the $\xi^{sub}_{2008,j}$ and $\overline{inv_j}$. Except for the UK under the EU flat rate and the HUN under the integration DPs reform scenarios, all the remaining policy reform options are characterized by a percentage decline in the level of DPs. In turn, the resulting sign for the $\Delta\overline{inv_j}$ (#) is opposite the one of the calculated elasticity $\xi^{sub}_{2008,j}$. To define a qualitative effect of the impact of $\Delta\overline{inv_j}$ (#) on the regime-specific average investment level $\overline{inv_j}$, we arrange the column for the directional effect (Dir. effect) which aims to define whether $\overline{inv_j}$ should decline or rise because of the policy change. A negative sign (-) of the Dir. effect in each regime, suggesting a worsening in the investment prospects of farms in a given regime, is the result of a positive percentage change in average net investment when the latter is negative (namely negative investment becoming even more negative) or of a negative percentage change in presence of positive average investment levels. A positive sign (+) of the Dir. effect in each regime, suggesting an improvement in the investment prospects of a farm in a given regime, is the result of a negative percentage change in average net investment when the latter is negative (namely negative investment becoming less negative) or of a positive percentage change in presence of positive average investment levels. Note that no sign is associated to the zero percentage change in net investment levels expected in HUN if the Integration scenario were implemented.

The switch in the Dir. effect for investment in both asset classes in the UK, from (+) to (-),is essentially due to the UK expecting an increase in DPs under the EU flat rate policy reform scenario. Every other country appears to be subject to consistent Dir. effects across the reform scenarios. The generalised reduction in support levels induced by the scenarios in Table 1, leads to the expectation that the prospects for average net investment levels will worsen across countries and asset classes. This expectation is met in all cases except for ME in both FR and IT, under all policy scenarios. While unexpected, this result is worthy of some confidence since it is consistent across reform scenarios which all imply a percentage reduction in DPs.

## 6. Conclusions

The present Deliverable completes the analysis, initiated in Deliverable 5.2, of the investment behaviour, in farm buildings and machinery and equipment, of a sample of specialised arable crop farms as a function of endowments (i.e., the stock of capital at the beginning of the period), market conditions (i.e., cost of capital, output and input prices) and existing public support schemes (i.e., coupled and/or decoupled CAP provisions).

It does so better describing the nature and relevance of the different investment behaviours based on the number of statistically significant estimated threshold values (see Deliverable 5.2) and the number of farms belonging to each regime, respectively. Moreover, it describes the quantitative dependence of regime-dependent farm agricultural investment levels on the level of CAP payments calculating the respective elasticities. Lastly, since CAP payments are subject to a number of reform proposals, this deliverable calculates the comparative static percentage changes in average net investment levels associated to the currently debated set of policy options.

The quantitative evidence provided suggests that under coupled support the number of farms falling every year in the identified regimes appears more stable than what happens when decoupled support is in place, especially when the counts for 2008 are compared to those for 2005. Moreover, investment in both asset classes and every detected regime appears clearly elastic, and statistically significantly so, to both coupled and decoupled subsidies in Germany. On the contrary, the same relationships are inelastic in Italy, although only statistically significantly so for farm building investment under coupled CAP payments. In France, both farm building and machinery and equipment regime-dependent investment quantities react inelastically to coupled payments while dependence is inconclusive under decoupled support. It is interesting to note that regime-dependent investment decisions in both assets in 2005

appear largely zero elastic to decoupled payments. The evidence for Hungary suggests a largely mixed relationship between both types of investment and coupled payments while a largely elastic – and statistically significant – one with decoupled payments for the sole farm buildings. While the United Kingdom displays elastic relationships of both types of investments with coupled subsidies, with the one for farm buildings being also statistically significant at conventional levels, this result holds certain only for investment in machinery and equipment under decoupled support. Note that the latter result is statistically significant only at the 10% level. On the contrary, mixed evidence emerges for investment in farm buildings in presence of DPs.

The analysis of the expected changes in the regime-dependent investment levels due to the implementation of some debated CAP reform scenarios, of Pillar I payments reveals that only few pieces of evidence contrast the anticipated reduction in investment levels following a cut in support. In fact, investment in machinery and equipment in France and Italy appears to respond positively to the widespread reduction in support levels induced by the policy scenarios considered. The other instance of positive reaction of investment levels to the reform scenario occurs for the United Kingdom which, under the EU flat rate implementation of the reform of Pillar I payments, is actually expected to receive higher payments.

## References

EC (2011), Impact Assessment Common Agricultural Policy towards 2020, Annex 10, Commission Staff Working Paper SEC(2011) 1153 final/2.

Hansen, B.E. (1999), "Threshold effects in non-dynamic panels: Estimation, testing, and inference", Journal of Econometrics, Vol. 93, pp. 345-368.

Heady, E.O., Diesslin, H.G., Jensen, H.R. and Johnson, G.L. (eds.) (1956). Agricultural Adjustment Problems in a Growing Economy, Iowa State University Press, Ames, IA, 74-93.

Huttel, S., Mußhoff, O. and Odening, M. (2010). "Investment reluctance: irreversibility or imperfect capital markets?", European Review of Agricultural Economics, Vol. 37, N° 1, pp. 51–76.

Johnson, G.L. (1956). Supply Function – Some Facts and Notions in Heady, E.O., Diesslin, H.G., Jensen, H.R. and Johnson, G.L. (eds.), (1956). Agricultural Adjustment Problems in a Growing Economy, Iowa State University Press, Ames, IA, 74-93.

Sckokai, P. (2005). Modelling the impact of agricultural policies on farm investments under uncertainty: the case of the CAP arable crop regime. Working Paper AGR/CA/APM(2005)13/FINAL. Paris: OECD.

Serra, T., Stefanou, S., Gil, J.M. and Featherstone, A. (2009), "Investment rigidity and policy measures", European Review of Agricultural Economics, Vol. 36, pp.103-120.

Comparative Analysis of Factor Markets for Agriculture across the Member States

245123-FP7-KBBE-2009-3

## The Factor Markets project in a nutshell

| | |
|---|---|
| **Title** | Comparative Analysis of Factor Markets for Agriculture across the Member States |
| **Funding scheme** | Collaborative Project (CP) / Small or medium scale focused research project |
| **Coordinator** | CEPS, Prof. Johan F.M. Swinnen |
| **Duration** | 01/09/2010 – 31/08/2013 (36 months) |
| **Short description** | Well functioning factor markets are a crucial condition for the competitiveness and growth of agriculture and for rural development. At the same time, the functioning of the factor markets themselves are influenced by changes in agriculture and the rural economy, and in EU policies. Member state regulations and institutions affecting land, labour, and capital markets may cause important heterogeneity in the factor markets, which may have important effects on the functioning of the factor markets and on the interactions between factor markets and EU policies.<br><br>The general objective of the FACTOR MARKETS project is to analyse the functioning of factor markets for agriculture in the EU-27, including the Candidate Countries. The FACTOR MARKETS project will compare the different markets, their institutional framework and their impact on agricultural development and structural change, as well as their impact on rural economies, for the Member States, Candidate Countries and the EU as a whole. The FACTOR MARKETS project will focus on capital, labour and land markets. The results of this study will contribute to a better understanding of the fundamental economic factors affecting EU agriculture, thus allowing better targeting of policies to improve the competitiveness of the sector. |
| **Contact e-mail** | info@factormarkets.eu |
| **Website** | www.factormarkets.eu |
| **Partners** | 17 (13 countries) |
| **EU funding** | 1,979,023 € |
| **EC Scientific officer** | Dr. Hans-Jörg Lutzeyer |