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Off-farm Labour Decision of Italian Farm Operators

ABSTRACT

This paper analyses the factors affecting off-farm labour decisions of Italian farm operators. Using micro-level data from the Farm Business Survey (REA) over the pre- and post-2003 CAP reform periods, we investigated the impact that operator, family, farm and market characteristics exert on these choices. Among other things, the paper focuses also on the differential impact of those variables for operators of smaller and larger holdings. The main results suggest that operator and family characteristics have a significant impact on the decision to participate in off-farm work more for smaller than for bigger farms. By contrast, farm characteristics are more relevant variables for bigger farms. In particular, decoupled farm payments, by increasing the marginal productivity of farm labour, lower the probability of working off the farm only in bigger farms, while coupled subsidies in pre-reform years do not have a significant impact on labour decisions. Finally, we show that, after accounting for the standard covariates, local and territorial labour market characteristics generally have a low effect on off-farm work operators' choices.

FACTOR MARKETS Working Papers present work being conducted within the FACTOR MARKETS research project, which analyses and compares the functioning of factor markets for agriculture in the member states, candidate countries and the EU as a whole, with a view to stimulating reactions from other experts in the field. See the back cover for more information on the project. Unless otherwise indicated, the views expressed are attributable only to the authors in a personal capacity and not to any institution with which they are associated.

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1. Introduction

Over the last decades, rural areas of Italy have experienced a substantial loss of farms and an out-migration of both farm and non-farm rural residents. For example, the number of farms has decreased from 2.6 million in 1990 to only 1.6 million in 2010. Similar patterns can be found in several other developed countries, such as other European Union countries and the US. An important concern for rural residents and public decision-makers is related to the extent to which rural economic development, which provides more employment opportunities in the rural non-farm sector, leads to more rapid losses of farm operators by increasing off-farm employment opportunities, or permits individuals to continue to farm by supplementing family income (Goetz & Debertin, 2001). A related question concerns the extent to which agricultural support policy gives its own contribution to reducing the loss of farmers, or the hours farmers work off-farm.

Existing evidence on the effect of farm subsidies on farm labour decisions is indeed quite inconclusive. In fact, focusing on farmers' decisions to work off-farm, in the literature there are papers that find a negative effect of (decoupled) farm subsidies (Ahearn et al., 2006; Goodwin et al., 2007; Goodwin & Mishra, 2004), papers that find no effect (Serra et al., 2005; Corsi & Salvioni, 2012), and even papers that find a positive effect of farm subsidies on off-farm labour participation (Goodwin et al., 2007; Hennessy & Rehman, 2008). With respect to Italy, Corsi & Salvioni (2012) investigated the impact of the 2005 introduction of decoupled Single Farm Payments (SFP) on off-farm labour participation, finding from weak to no effect. This result is not inconsistent with theory, since the reform entails both wealth and substitution effects, which tend to balance each other out. According to neo-classical economic theory, an increase in off-farm employment is not an inevitable outcome of this reform, given that the introduction of the SFP provided a new non-labour source of income, i.e. a wealth effect. In this framework, the substitution effect must compete with the wealth effect in order to determine whether or not off-farm labour supply responded significantly to the new policy regime.

However, the factors affecting off-farm labour participation will likely vary with farm size (see Alasia et al., 2009; Weersink, 1992). This is a central point in analysing the farm labour decisions in Italy, because the agricultural sector is first of all characterised by a large presence of many micro farms, which survive together with a few large farms. This structural characteristic is reflected in the level of off-farm work participation, which not surprisingly varies a lot with farm size. Indeed, the rate of off-farm labour participation is about 25% in smaller farms, a value that goes down to 9.7% for bigger farms.[1]

In this paper, we investigated the determinants of off-farm participation in a sample of Italian farms, focusing on two main research questions. First of all, we are interested in analysing the extent to which the introduction of the SFP in 2005 affected off-farm labour

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[1] See the data section for definition of smaller and bigger farms.

participation decisions. In doing so, we put particular emphasis on the possibility that different farm types in terms of size may react differently to the policy shock. This is because there could exist different motivations behind the choice of off-farm labour participation. On the one hand, the motivation can be driven by an income level or income stabilisation objective. On the other hand, off-farm labour may be the primary household employment for many residents in rural areas. Clearly, these different motivations suggest the potential for different effects of the introduction of SFP, depending on farm size.

In addition to investigating the effect of the introduction of SFP on off-farm work, the present analysis tries to understand the role attributable to the characteristics of the labour market. In particular, following Alasia et al. (2009), we use a set of 'spatial' variables, which allow us to assess the effect of regional and local characteristics on off-farm labour decisions. The objective is to understand the extent to which more or less proximity to an urban centre affects the joint decisions to participate in off-farm work and to operate a holding. Indeed, there is evidence showing that household income in rural areas is increasingly determined by labour markets rather than the agricultural sector (Gardner, 2005). Indeed, because the growth in employment opportunities tends to be concentrated in urban regions, clearly the link between urban labour markets and rural population could be crucial for the sustainability of rural areas.

The remainder of the paper is organised as follows. In the next section we present our empirical model and the estimation procedure to study the determinants of off-farm work participation. Section 3 introduces the farm sample and the micro data used and explains how we selected a sub-sample of small and large farms. The econometric results are presented and discussed in section 4. Finally, section 5 reports some concluding comments.

2. Conceptual considerations and estimation procedure

From a theoretical point of view we rely on 'households' models (Lee, 1965; Becker, 1965; Singh et al., 1986). In this class of models, households maximise their utility by considering how they allocate their labour between work and leisure. The optimal amount of farm work is where the incremental value of extra time on the farm is equal to the marginal rate of substitution between leisure and consumption. Thus, if the wage rate is greater than the marginal return to farm work, then the farmer will engage in off-farm employment until the incremental returns to both forms of employment are equal. Since the work allocation between farm and off-farm is determined jointly, the decision to participate in off-farm employment is a function of all exogenous variables in the household production model: operator, family, farm and labour market characteristics.

In these models farm income support policy may affect farmers' labour allocation decisions in a number of ways: increasing the marginal value of farm labour, increasing household wealth and reducing income variability. However, what is important for our purpose is that the net effect of (decoupled) farm subsidies tend to be theoretically ambiguous (see El-Osta et al., 2004; Serra et al., 2005; Ahearn et al., 2006; Dewbre & Mishra, 2007; Corsi, 2008; Hennessy & Rehman, 2008). This is because, on the one hand, we can expect a reduction of the relative return to (farm) labour, and thus economic theory would suggest that the probability of farmers' participation in off-farm activities should increase. However, as decoupled payments are also a source of wealth for the farm household, the budget constraint would be relaxed and could reduce the need or desire for off-farm income.

Because we deal with the labour allocation decisions of the farm operator only, a reduced form of the agricultural household model is used that represents the decisions of the farm operator, excluding among other things the possible interdependence between the farm operator and the spouse in the decision-making process (Singh et al., 1986).

The farm operator's decision to work off-farm can be expressed as a discrete choice model, where Y denotes the work decision of the operator, which is 1 if the operator decides to work off-farm and 0 otherwise; $\boldsymbol{X}$ denotes a vector of exogenous variables that includes, among

other things, the policy variable of interest. We use a probit specification to model the probability of this event, which can be presented as:

$$\Pr(Y = 1|\boldsymbol{X}) = \int_{-\infty}^{X\beta} \frac{1}{\sqrt{2\pi}} exp\left(-\frac{u^2}{2}\right) \mathrm{d}u = \Phi(\boldsymbol{X}\beta) \quad (1)$$

where $\Phi(\cdot)$ denotes the cumulative normal distribution function.

The marginal effects are generally used to display the relationship between single explanatory variables and the probability of a certain outcome. However, the marginal effects in a probit model are non-linear and their values depend on the level of all explanatory variables at which they are evaluated. Thus, we compute the probability of off-farm work associated at minimum and maximum values for each explanatory variable, and the corresponding probability change between these two values. Moreover, for continuous variables, we compute the probability change associated with one standard deviation change of the covariate around its mean.

3. Data and empirical specification

To study the off-farm labour decision of Italian farm operators we use data from the Farm Business Survey (REA) carried out by the Italian Institute of Statistics (ISTAT). Each year the database surveys a sample of agricultural holdings that are representative of Italian agriculture, stratified by region, farm type and economic size of the holdings.

Besides a detailed set of variables on farm structure, the database includes households' composition variables as well as extra-farm source of income variables. From this data, we extract a balanced panel that includes only the 3,573 farms surveyed during the two periods analysed here: the years before the implementation of the Fischler reform *pre-reform* (2002-04) and the years *post-reform* (2005-09).

The dependent variable 'off-farm work participation' of the holder is derived in the database from the existence of off-farm wages. The human capital theory (Becker, 1965) suggests that the marginal productivity of the operator is affected by socio-economic factors; thus, among farmer characteristics we include age, gender and marital status. At the same time, an impact on off-farm operator choice could be determined by some family characteristics, namely the presence of young children, which may increase the financial need but could also increase the importance of home time; the number of individuals in the farmer's household, and the job status of the spouse, often determined in agreement with the farmer (Keeney, 2000). Farm characteristics, such as livestock units per hectare, type of farming operation (dairy), land area, the value of direct (single farm) payments as well as the number of family workers and the presence of hired labour, are also included as covariates, due to the fact that previous studies showed their role in affecting labour allocation decision (Kilkenny, 1993; Kimihi, 1994).

Some of the previous covariates are derived from elementary information of the database. In particular, the 'married' status of the farmer comes from the spouse information, which, however, could be not recorded if he/she does not work on the farm nor earn any extra-farm income. In the same way, the 'number of family members living on the farm' and the 'number of young in the family farm', due to the nature of the available data that mainly include family members working on or off-farm, does not allow a precise measurement of family size and could underestimate the real dimension of these variables.[2] Finally, for the binary variable 'Dairy' we report the value of 1 when the farm belongs to business productivity activity of cow breeding and the number of cows is greater than one, with a possible over-dimensioning of the unitary values.

[2] Due to the presence of many unreported data that become zero values, the mean values of these variables, reported in Table A1 in the Annex, also appear strongly underestimated.

Local and territorial characteristics reflect the strength of the labour market and institutional factors affecting both demand and supply of non-farm employment. The idea is that the local dimension could be critical in determining employment outcomes of farm operators, and that the conditions of the territorial labour market have a great bearing affecting off-farm employment. To assess the effect of territorial characteristics on off-farm labour decisions, we follow Alasia et al. (2009), using a set of spatially lagged covariates that, for each local characteristic, are constructed as a distance-weighted average of the neighbouring values for that given indicator.[3] The proximity criteria used here consider all the neighbours in an area of 40 kilometres of diameter. Community indicators and their corresponding spatial lags are based on data from the 1991 and 2001 population census. We included the following local and territorial characteristics: total employment growth between 1991 and 2001, the Herfindahl index of concentration to capture the degree of employment specialisation and population density. Finally, the distance to the centre of the Local Labour System is also included.[4]

The model, estimated for the pre- and post-reform periods, also distinguishes between the two sub-samples corresponding respectively to small holdings, with gross farm income equal to or lower than 16 UDE (1 UDE = €1,200), and to operators of large farms, with gross farm income greater than 16 UDE. Table A1 in the Annex reports descriptive statistics of the variables mentioned above. Mean values are provided both for the dependent variables and the independent variables used in our analysis. Considering the two periods separately, the values are presented for the entire sample and for the two sub-samples distinguished by farm economic size. In terms of dependent variables, it is clear that off-farm employment is much more common among small farm operators than among big farm operators (see Table A1). Moreover, in small farms, the spouse is more often engaged in off-farm work, while the presence of hired work is much smaller than in big farms. While differences between small and big farms prove to be evident, there is not any clear difference in data between pre- and post-reform period.

4. Results

Tables A2 and A3 report levels and changes in predicted probabilities associated with selected values of the explanatory variables, for the pre-reform and post-reform periods, respectively, estimated for the full sample, as well as for operators of smaller and larger farms separately. The coefficients shown in bold are the ones statistically significant at 90% or higher confidence level.[5] The discussion of the results focuses on differences between operators of smaller and larger farms, giving specific attention to possible differences between the two periods, when they exist.

Compared to male operators, the female operators are from 7% to 11% less likely to be engaged in off-farm work when we consider the full sample and the two periods. However, female operators of smaller farms are up to 21% less likely to work off-farm, while, in larger units, the gender of the operator does not seem to exert substantial effect on the probability of being engaged in off-farm work, and female operators are only 4% less likely to work off-farm. Also the farmer's age has an important role in the probability of being engaged in off-farm work, and this is particularly true for operators of smaller farms. Compared to the average farm operator, who has a predicted probability of off-farm work of 14%, the youngest operators have about double the likelihood to be engaged off-work. This difference increases

[3] For a complete description of the calculation procedure, see Alasia et al. (2009).

[4] The Local Labour Systems (LLS) represent a set of neighbouring municipalities in which people live and work.

[5] The coefficients of the probit models are not reported due to limited space and interpretability, but are available on request. The measures of fit of the models are reasonably good for all farm groups and periods: McFadden's R2 value is from 0.09 to 0.18; and McKelvey and Zavoina's R2 value is from 0.18 to 0.35.

further in smaller farms, where this probability increases to three times passing from 20% to over 60% for the average farm operator and the youngest farm operator, respectively. This is true for both periods analysed. However, the relationship between age and off-farm work is non-linear and the probability that a farmer works off-farm increases with age but at a declining rate. Thus, in smaller farms where the average operator is 57 years old, a change in the age of 13 years, corresponding to one standard deviation, from 50 to 63 years, is associated with a 13% decrease in probability of off-farm work. Smaller effects are noted when considering the full sample, while age is not a significant variable for large farms. Finally, among the farmers' characteristics, also the fact of being married generally reduces the probability of off-farm work by 10%, and this is particularly true during the pre-reform years, with the only exception being smaller farms, which preserve their framework during both periods.

Among the farmers' family characteristics, the off-farm job status of the spouse exerts a positive effect on off-farm work decision, increasing by 30% the probability that also the operator works off-farm. This significant effect is found for operators of both small and large farms, although the effect is once again lower for the latter in more recent years.

Also the number of young individuals in a farm household influences the off-farm work decision positively, up to the point that farm operators with a higher number of children are 45% more likely to work off-farm compared to operators without any children. This is particularly true for smaller farms, while the presence of young individuals is not a significant variable for larger farms. These results support the findings of Mishra & Goodwin (1997); Goodwin & Holt (2002); El-Osta et al. (2008); and Pandit et al. (2013), that highlighted how the presence of children in the household limits the time available for off-farm work, especially for farm households where women have traditionally devoted themselves to caring for children. Thus, when the spouse works on-farm with children, the operator's probability of working off-farm increases to 54%.

The total number of family members living in the farm has significant effect only for operators of bigger farms, but with opposite direction in the two periods. Indeed, passing from 1 to 3, the number of family members increases (decreases) the likelihood of off-farm work of the operator by 2% (3%) during the pre-reform (post-reform) period. Combining characteristics of the operator with the ones of his family, a male operator of a small farm, with a spouse working off-farm and three children has 80% (70%) more chance to be engaged in off-farm work in the pre-reform (post-reform) period. By contrast, such predicted probability is not significant for bigger farm operators.

The effects of farm characteristics on the probability of off-farm labour show that farms with more unpaid family labour units have lower probability that the farm operator engages in off-farm employment, in line with the observations by Hennessy & Rehman (2008) for Irish farms. At the same time, the use of hired labour causes a decline in the probability of off-farm work for smaller farms, while it increases the likelihood to work off-farm in bigger farms. All this suggests that hired labour is a complement to operator's labour for smaller farms, while it represents a clear substitute in the case of bigger farms. The effect of farm size is negative for the full sample and in both periods. However, farm size is a critical factor in determining off-farm labour participation, but has a significant effect just for operators of smaller farms indicating that larger farm operators are less likely to participate in the off-farm labour market. As shown in Tables A2 and A3, a discrete change from the minimum to the maximum value of firm size generally has a large impact on the probability of working off-farm, but this effect is generally smaller if we consider a change of one standard deviation. As for smaller farms, a change of one standard deviation in acreage around the mean leads the likelihood of off-farm work to decrease by approximately 8% during the pre-reform period, and up to 13% in the post-reform period. By contrast, for larger farms, size does not exert any significant effect on off-farm work decisions in the pre-reform period, while during the post-reform year the likelihood to work off-farm increases with the acreage dimension. The effect of being a dairy operator on the probability of off-farm work is striking and confirms that

dairy operators are universally less likely to seek off-farm employment, due to the more labour-intensive nature of dairy farming.

Finally, the CAP subsidies exert, in the pre-reform period, a negative (but not significant) impact on the probability of off-farm work and a marginal effect that is much higher for small farm operators than for bigger ones. During the post-reform period, namely considering the decoupled payments impact, the payment coefficients are negative and significant, but only for operators of bigger farms, indicating that, as payments increased, the likelihood of operators working off-farm declined. In particular, for every €10,000 of subsidy received, the probability of off-farm work reduces by 1%. By contrast, the effect on decoupled payments for operators of smaller farms turns out to be positive but insignificant.

Local and territorial labour market characteristics generally have a low effect on operators' choices to work off-farm, but they prove to be more relevant for operators of smaller farms. In particular, territorial employment growth exerts a positive impact on small farm operators' decisions during the pre-reform period, while local population density as well as territorial specialisation (Herfindahl index) variables show a negative effect during the post-reform years. Although the population density effect appears puzzling and confirms the unclear effect of urbanisation factors on off-farm labour decisions, the latter result confirms the intuition that less diversified economies (high Herfindahl index value) offer less opportunities for off-farm employment. Finally, once other factors are accounted for, proximity to urban centres does not have a positive effect on off-farm labour.

5. Conclusions

This paper investigated the determinants of off-farm participation in a balanced sample of Italian farms. The analysis focused on both the effect of farm subsidies and the characteristics of the local labour markets. In doing so, particular emphasis has been put on the possibility that the determinants of off-farm work participation are sensitive to the size of the holding. Overall, we find strong evidence for this hypothesis. Main results suggest that operator and family characteristics have a significant impact on the decision to participate in off-farm work, more for smaller than for bigger farms. By contrast, farm characteristics are more relevant variables for bigger farms. In particular, decoupled farm payments appear to increase the marginal productivity of farm labour and subsequently lower the probability of working off the farm, but only in bigger farms. Coupled subsidies in pre-reform years however, did not have a significant impact on labour decisions. Finally, we show that, after accounting for the standards covariates, local and territorial labour market characteristics generally have a low effect on off-farm work operator's choices, but the results are more relevant for smaller farm operators. These results have clear and interesting implications for the choice of rural development policy.

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Statistical Annex

Table A1. Sample descriptive statistics

Pre-Reform sample

	Full sample		Smaller Farms		Bigger Farms	
Variable	Mean	Std.	Mean	Std.	Mean	Std.
Off-farm labor partecipation	0.174	0.379	0.253	0.435	0.097	0.296
Gender (1=female)	0.216	0.411	0.302	0.459	0.132	0.339
Age	53.635	13.551	57.143	13.421	50.222	12.788
Marital Status	0.571	0.495	0.579	0.494	0.563	0.496
Spouse working off-farm	0.132	0.338	0.168	0.374	0.096	0.295
Number of young in HH	0.036	0.226	0.068	0.306	0.006	0.088
No. of Household members	2.010	0.914	1.889	0.846	2.128	0.962
No. of Unpaid Labor Units	0.350	0.573	0.224	0.432	0.472	0.660
Hired Labor	0.301	0.459	0.132	0.338	0.465	0.499
Farm size	24.463	54.446	6.165	8.843	42.261	71.628
No. of Livestock Units per Hectare	0.969	5.106	0.536	3.880	1.391	6.037
Dairy	0.171	0.376	0.110	0.313	0.230	0.421
Size of Direct Payments	0.801	3.323	0.164	0.251	1.422	4.577
Local Population Density	24.998	41.181	23.943	39.108	26.023	43.088
Area Population Density	21.888	24.722	22.096	26.231	21.686	23.166
Local Employment Growth	0.109	0.837	0.085	0.303	0.133	1.136
Area Employment Growth	0.077	0.152	0.066	0.155	0.088	0.147
Local Specialization	2.248	0.967	2.223	0.946	2.272	0.986
Area Specialization	2.433	0.528	2.396	0.530	2.469	0.524
Distance to STL	9.023	7.330	9.208	7.314	8.843	7.343

Post-Reform sample

	Full sample		Smaller Farms		Bigger Farms	
Variable	Mean	Std.	Mean	Std.	Mean	Std.
Off-farm labor partecipation	0.172	0.377	0.260	0.439	0.088	0.284
Gender (1=female)	0.227	0.419	0.311	0.463	0.146	0.354
Age	57.138	13.569	60.878	13.327	53.585	12.826
Marital Status	0.479	0.500	0.478	0.500	0.480	0.500
Spouse working off-farm	0.109	0.311	0.151	0.359	0.068	0.251
Number of young in HH	0.043	0.262	0.073	0.336	0.013	0.160
No. of Household members	1.859	0.904	1.725	0.790	1.985	0.984
No. of Unpaid Labor Units	0.357	0.617	0.206	0.423	0.500	0.727
Hired Labor	0.346	0.476	0.162	0.369	0.520	0.500
Farm size	26.094	55.356	6.494	9.864	44.714	71.921
No. of Livestock Units per Hectare	0.958	5.575	0.392	1.255	1.495	7.650
Dairy	0.159	0.365	0.097	0.296	0.217	0.412
Size of Single Farm Payments	0.907	3.406	0.120	0.263	1.657	4.630
Local Population Density	26.354	42.901	24.906	36.856	27.729	47.914
Area Population Density	23.553	26.101	22.959	25.465	24.118	26.688
Local Employment Growth	0.102	0.868	0.075	0.300	0.128	1.175
Area Employment Growth	0.072	0.156	0.062	0.155	0.082	0.156
Local Specialization	2.265	0.977	2.246	0.963	2.283	0.990
Area Specialization	2.445	0.543	2.413	0.545	2.476	0.539
Distance to STL	9.151	7.478	9.203	7.456	9.102	7.500

Source: Authors' computation based on the Farm Business Survey (REA) database (period 2002-09) and data from the population census for 1991 and 2001.

Table A2. Predicted probability of off-farm work (Pre-Reform) (average operator Pr(y/x)=0.14)

Total sample

	Pr(y=1) evaluated at		DPr(y=1)	Pr(y=1) evaluated at		DPr(y=1)	MargEfct
	x=min	x=max		x-1/2sd	x+1/2sd		
Gender (1=female)	**0.174**	**0.066**	**-0.108**				
Age	**0.286**	**0.046**	**-0.240**	**0.167**	**0.124**	**-0.043**	**-0.003**
Marital Status	**0.208**	**0.106**	**-0.102**				
Spouse working off-farm	**0.116**	**0.431**	**0.315**				
Number of young in HH	**0.141**	**0.594**	**0.454**	**0.133**	**0.156**	**0.023**	**0.100**
No. of Household members	0.134	0.235	0.101	0.139	0.149	0.010	0.011
No. of Unpaid Labor Units	**0.168**	**0.003**	**-0.166**	**0.164**	**0.126**	**-0.038**	**-0.066**
Hired Labor	**0.163**	**0.107**	**-0.056**				
Farm size	**0.154**	**0.005**	**-0.149**	**0.155**	**0.133**	**-0.022**	**0.000**
No. of Livestock Units per Hectare	0.143	0.360	0.217	0.142	0.146	0.004	0.001
Dairy	**0.162**	**0.076**	**-0.086**				
Size of Direct Payments	0.146	0.013	-0.133	0.148	0.141	-0.007	-0.002
Local Population Density	0.148	0.054	-0.094	0.147	0.141	-0.006	0.000
Area Population Density	0.141	0.177	0.036	0.143	0.146	0.003	0.000
Local Employment Growth	0.145	0.087	-0.058	0.145	0.144	-0.001	-0.002
Area Employment Growth	0.121	0.275	0.153	0.139	0.149	0.009	0.062
Local Specialization	0.142	0.158	0.016	0.143	0.145	0.002	0.002
Area Specialization	**0.197**	**0.076**	**-0.120**	**0.156**	**0.133**	**-0.024**	**-0.045**
Distance to STL	0.143	0.147	0.003	0.144	0.144	0.001	0.000

Smaller farms (ude<16)

	Pr(y=1) evaluated at		DPr(y=1)	Pr(y=1) evaluated at		DPr(y=1)	MargEfct
	x=min	x=max		x-1/2sd	x+1/2sd		
Gender (1=female)	**0.288**	**0.076**	**-0.212**				
Age	**0.655**	**0.014**	**-0.641**	**0.275**	**0.147**	**-0.129**	**-0.010**
Marital Status	**0.263**	**0.168**	**-0.095**				
Spouse working off-farm	**0.168**	**0.445**	**0.277**				
Number of young in HH	**0.200**	**0.480**	**0.280**	**0.194**	**0.217**	**0.023**	**0.075**
No. of Household members	0.205	0.207	0.002	0.205	0.205	0.000	0.000
No. of Unpaid Labor Units	0.215	0.109	-0.105	0.214	0.196	-0.018	-0.042
Hired Labor	0.213	0.160	-0.052				
Farm size	**0.265**	**0.000**	**-0.265**	**0.247**	**0.168**	**-0.080**	**-0.009**
No. of Livestock Units per Hectare	0.210	0.000	-0.210	0.223	0.188	-0.035	-0.009
Dairy	0.210	0.165	-0.045				
Size of Direct Payments	0.224	0.025	-0.199	0.219	0.191	-0.028	-0.112
Local Population Density	0.216	0.038	-0.178	0.214	0.196	-0.018	-0.001
Area Population Density	0.199	0.291	0.092	0.201	0.209	0.008	0.000
Local Employment Growth	0.215	0.170	-0.045	0.207	0.203	-0.004	-0.012
Area Employment Growth	**0.158**	**0.493**	**0.335**	**0.195**	**0.216**	**0.021**	**0.135**
Local Specialization	0.205	0.208	0.004	0.205	0.205	0.000	0.000
Area Specialization	0.240	0.142	-0.098	0.215	0.196	-0.019	-0.037
Distance to STL	0.205	0.206	0.002	0.205	0.205	0.000	0.000

Bigger farms (ude>16)

	Pr(y=1) evaluated at		DPr(y=1)	Pr(y=1) evaluated at		DPr(y=1)	MargEfct
	x=min	x=max		x-1/2sd	x+1/2sd		
Gender (1=female)	**0.082**	**0.038**	**-0.044**				
Age	0.089	0.058	-0.031	0.077	0.072	-0.006	0.000
Marital Status	**0.132**	**0.045**	**-0.087**				
Spouse working off-farm	**0.059**	**0.376**	**0.317**				
Number of young in HH	0.075	0.065	-0.009	0.075	0.074	0.000	-0.005
No. of Household members	**0.051**	**0.410**	**0.359**	**0.064**	**0.087**	**0.023**	**0.024**
No. of Unpaid Labor Units	**0.100**	**0.000**	**-0.100**	**0.092**	**0.060**	**-0.032**	**-0.049**
Hired Labor	**0.065**	**0.087**	**0.023**				
Farm size	0.073	0.125	0.053	0.073	0.076	0.004	0.000
No. of Livestock Units per Hectare	**0.072**	**0.822**	**0.750**	**0.069**	**0.080**	**0.011**	**0.002**
Dairy	**0.084**	**0.048**	**-0.037**				
Size of Direct Payments	0.076	0.012	-0.064	0.077	0.072	-0.004	-0.001
Local Population Density	0.071	0.248	0.177	0.072	0.077	0.006	0.000
Area Population Density	**0.093**	**0.003**	**-0.090**	**0.084**	**0.066**	**-0.018**	**-0.001**
Local Employment Growth	0.073	0.158	0.084	0.074	0.075	0.002	0.001
Area Employment Growth	0.079	0.063	-0.016	0.075	0.074	-0.001	-0.010
Local Specialization	0.074	0.080	0.006	0.074	0.075	0.001	0.001
Area Specialization	0.096	0.048	-0.049	0.079	0.070	-0.010	-0.018
Distance to STL	0.070	0.094	0.023	0.073	0.076	0.004	0.001

Table A3. Predicted probability of off-farm work (Post-Reform) (average operator Pr(y/x)=0.14)

Total sample

	Pr(y=1) evaluated at		DPr(y=1)	Pr(y=1) evaluated at		DPr(y=1)	MargEfct
	x=min	x=max		x-1/2sd	x+1/2sd		
Gender (1=female)	**0.156**	**0.088**	**-0.068**				
Age	**0.236**	**0.068**	**-0.169**	**0.154**	**0.122**	**-0.032**	**-0.002**
Marital Status	**0.175**	**0.104**	**-0.071**				
Spouse working off-farm	**0.117**	**0.396**	**0.280**				
Number of young in HH	**0.135**	**0.462**	**0.328**	**0.128**	**0.148**	**0.020**	**0.074**
No. of Household members	0.149	0.055	-0.095	0.144	0.132	-0.012	-0.013
No. of Unpaid Labor Units	0.149	0.031	-0.117	0.147	0.129	-0.019	-0.030
Hired Labor	**0.149**	**0.117**	**-0.032**				
Farm size	**0.146**	**0.010**	**-0.137**	**0.147**	**0.129**	**-0.018**	**0.000**
No. of Livestock Units per Hectare	**0.146**	**0.000**	**-0.146**	**0.157**	**0.120**	**-0.037**	**-0.010**
Dairy	**0.150**	**0.085**	**-0.065**				
Size of Single Farm Payments	**0.154**	**0.000**	**-0.154**	**0.169**	**0.111**	**-0.058**	**-0.017**
Local Population Density	**0.158**	**0.000**	**-0.158**	**0.154**	**0.122**	**-0.032**	**-0.001**
Area Population Density	0.132	0.215	0.083	0.134	0.141	0.007	0.000
Local Employment Growth	0.135	0.326	0.191	0.136	0.139	0.003	0.003
Area Employment Growth	0.150	0.092	-0.058	0.140	0.135	-0.005	-0.031
Local Specialization	0.144	0.105	-0.039	0.140	0.135	-0.005	-0.005
Area Specialization	**0.180**	**0.082**	**-0.098**	**0.148**	**0.128**	**-0.019**	**-0.036**
Distance to STL	0.134	0.150	0.016	0.136	0.139	0.003	0.000

Smaller farms (ude<16)

	Pr(y=1) evaluated at		DPr(y=1)	Pr(y=1) evaluated at		DPr(y=1)	MargEfct
	x=min	x=max		x-1/2sd	x+1/2sd		
Gender (1=female)	**0.269**	**0.130**	**-0.139**				
Age	**0.613**	**0.037**	**-0.575**	**0.282**	**0.166**	**-0.116**	**-0.009**
Marital Status	**0.271**	**0.170**	**-0.100**				
Spouse working off-farm	**0.187**	**0.452**	**0.265**				
Number of young in HH	0.216	0.405	0.190	0.210	0.229	0.018	0.054
No. of Household members	0.227	0.173	-0.054	0.224	0.215	-0.008	-0.010
No. of Unpaid Labor Units	0.228	0.095	-0.133	0.228	0.211	-0.018	-0.042
Hired Labor	0.224	0.199	-0.025				
Farm size	**0.311**	**0.000**	**-0.311**	**0.288**	**0.162**	**-0.126**	**-0.013**
No. of Livestock Units per Hectare	**0.230**	**0.016**	**-0.214**	**0.236**	**0.204**	**-0.033**	**-0.026**
Dairy	0.222	0.196	-0.026				
Size of Single Farm Payments	0.218	0.247	0.029	0.218	0.221	0.002	0.009
Local Population Density	**0.255**	**0.009**	**-0.247**	**0.246**	**0.194**	**-0.052**	**-0.001**
Area Population Density	0.216	0.263	0.047	0.217	0.222	0.005	0.000
Local Employment Growth	0.217	0.230	0.014	0.219	0.220	0.001	0.004
Area Employment Growth	0.231	0.171	-0.060	0.222	0.217	-0.005	-0.031
Local Specialization	0.233	0.146	-0.087	0.225	0.214	-0.011	-0.012
Area Specialization	**0.265**	**0.141**	**-0.124**	**0.232**	**0.207**	**-0.026**	**-0.047**
Distance to STL	0.228	0.195	-0.032	0.223	0.216	-0.007	-0.001

Bigger farms (ude>16)

	Pr(y=1) evaluated at		DPr(y=1)	Pr(y=1) evaluated at		DPr(y=1)	MargEfct
	x=min	x=max		x-1/2sd	x+1/2sd		
Gender (1=female)	**0.075**	**0.028**	**-0.047**				
Age	0.067	0.065	-0.002	0.066	0.066	0.000	0.000
Marital Status	0.071	0.060	-0.011				
Spouse working off-farm	**0.058**	**0.273**	**0.215**				
Number of young in HH	0.065	0.247	0.182	0.063	0.069	0.006	0.035
No. of Household members	**0.110**	**0.000**	**-0.110**	**0.086**	**0.050**	**-0.036**	**-0.037**
No. of Unpaid Labor Units	0.051	0.445	0.394	0.055	0.078	0.023	0.032
Hired Labor	**0.049**	**0.085**	**0.035**				
Farm size	**0.057**	**0.418**	**0.361**	**0.059**	**0.074**	**0.015**	**0.000**
No. of Livestock Units per Hectare	**0.068**	**0.005**	**-0.063**	**0.069**	**0.063**	**-0.007**	**-0.001**
Dairy	**0.076**	**0.039**	**-0.037**				
Size of Single Farm Payments	**0.084**	**0.000**	**-0.084**	**0.091**	**0.046**	**-0.045**	**-0.010**
Local Population Density	0.072	0.002	-0.070	0.071	0.061	-0.010	0.000
Area Population Density	0.069	0.038	-0.031	0.068	0.064	-0.004	0.000
Local Employment Growth	0.063	0.414	0.351	0.064	0.068	0.004	0.004
Area Employment Growth	0.089	0.018	-0.072	0.070	0.062	-0.008	-0.053
Local Specialization	0.073	0.034	-0.039	0.069	0.063	-0.006	-0.006
Area Specialization	0.070	0.059	-0.011	0.067	0.065	-0.002	-0.004
Distance to STL	0.055	0.124	0.070	0.061	0.071	0.010	0.001

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. 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.
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Website	www.factormarkets.eu
Partners	17 (13 countries)
EU funding	1,979,023 €
EC Scientific officer	Dr. Hans-Jörg Lutzeyer