FACTOR MARKETS

Comparative Analysis of Factor Markets for Agriculture across the Member States

245123-FP7-KBBE-2009-3

WORKING PAPER

No. 66, August 2013

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The Impact of CAP Payments on the Exodus of Labour from Agriculture in Selected EU Member States

ABSTRACT

This paper examines the determinants of exit from agriculture under the implementation of CAP payments in four selected EU countries (France, Hungary, Italy and Poland) in the period 2005-08. The study employs micro-data from the European Union Labour Force Survey and regional data from the Farm Accountancy Data Network. We differentiate among the different measures of farm payments, looking at the individual impact of Pillar 1 instruments, i.e. coupled and decoupled payments, and at those in Pillar 2, targeted at rural development. The main results suggest that total subsidies at the regional level are negatively associated with the out-farm migration of agricultural workers in the two New member states, Hungary and Poland, so that the CAP would seem to hinder the exit of labour from agriculture. Conversely, the non-significant results for the 'old' member states may be interpreted as the result of opposing effects of coupled payments and rural development support. The diverse impact of CAP on the likelihood of leaving agriculture in the four countries reflects the heterogeneity across European member states, due to different market and production structures, which does not allow a common and simple generalisation of the effect of the CAP on labour allocation.

Keywords: Common Agricultural Policy; Farm Exit; European Union

JEL code: J43, Q12, Q18

Available for free downloading from the Factor Markets (www.factormarkets.eu) and CEPS (www.ceps.eu) websites

ISBN 978-94-6138-355-6

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Factor Markets Working Paper No. 64/August 2013

1. Introduction

Launched in 1962, the Common Agricultural Policy (CAP) is the main agricultural policy of the European Union (EU), and takes up a significant share of the EU budget. As set out in the 1957 Treaty of Rome, the main objectives were to ensure a fair standard of living for the agricultural community; to raise the farm incomes of European farmers; to protect them from international competition and support internal prices. Since its creation, the CAP has undergone several reforms. In particular, the fairness and the efficiency of farm subsidies in Europe have often been questioned. One of the main reforms of the CAP is the (partial) decoupling of farm payments which, starting from 2003, were no longer to be linked to the level and type of production. This process was continued in the 2009 'Health Check' and to some extent it may have changed the incentives of farmers to supply labour on and off the farm. Since understanding the effects of the CAP is fundamental for the design of efficient policies, academics and policy communities have become increasingly interested in studying the impact of such EU policies on labour allocation and structural change.

Nonetheless, the empirical evidence on the impact of farm subsidies is rather mixed and inconclusive (Barkley, 1990; Goetz and Debertin, 1996; Mishra and Goodwin, 1997; Pietola et al. 2003; Ahearn et al., 2006; Benjamin and Kimhi, 2006; Key and Roberts, 2006; Breustedt and Glauben, 2007; Hennessy and Rehman, 2008; van Herck, 2009; Petrick and Zier, 2011; Olper et al., 2012). Direct payments and price support, which are assumed to increase the farm wage and thus the prospects of survival for farmers, are in fact found to have an ambiguous effect on their likelihood to work in agriculture and preserve their farming activities. Different explanations have been offered in the literature, in addition to the theoretical hypotheses of the different impact of coupled and decoupled payments.

Therefore, the objective of the study is to test the role of farm subsidies on labour allocation, and in particular to examine their impact on exit from agriculture. We differentiate among the different measures of the CAP, looking at the individual impact of instruments within Pillar 1, i.e. coupled and decoupled payments, and at the aggregate level of Pillar 2 payments, targeted at rural development support. The analysis is based on micro-data from the European Union Labour Force Survey (EU-LFS) where we control for selection bias in the decision to work in agriculture and examine the likelihood of leaving the farm sector. Due to the unavailability of data on wages and farm subsidies in the survey, we rely on the information provided by the Farm Accountancy Data Network (FADN) regional database. In previous research (Tocco et al., 2013) we emphasise the heterogeneous farm structures and diverse functioning of labour markets across EU member states (MS) and thus we refrain from pooling the individual observations into a unique dataset. Instead, we treat the selected countries as separate and run parallel estimations. The four selected countries comprise two EU-15 and two new member states (NMS), namely France, Italy, Hungary and Poland. The empirical analysis covers the period 2005-08.

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The remainder of the paper is structured as follows. Section 2 provides an overview of the existing literature on the impact of farm subsidies. Section 3 presents the empirical approach. Section 4 describes the dataset and the variables employed in the analysis. Section 5 discusses the estimation results. Section 6 concludes.

2. Empirical Evidence on the Role of Farm Subsidies

The literature on the impact of farm subsidies on labour allocation is quite extensive. Nonetheless, the empirical evidence is quite mixed and inconclusive, which implies that so far the effect of CAP payments is unclear. It is worth emphasising that there are several issues which must be considered from an empirical point of view. First of all, different methodologies have been employed according to the several research questions under investigation. In order to understand the role of farm subsidies on labour allocation we review those studies focusing on the individuals' decisions to work on and off the farm as well as those on the migration of labour out of agriculture.

Secondly, it is important to consider the type of data used in the estimations. Several studies employ micro-level data, focusing on the farm household/individual level, and others rely on macro data, at the regional/national level. Although there is no *a priori* better approach, both of them have some limitations. For instance, studies at the individual level seek to explain labour adjustment patterns as a function of some exogenous variables, mainly individual and farm-related characteristics, while they cannot take into account the changes in agricultural policy and general economic conditions. On the other hand, the aggregate level approach enables the researcher to examine the effect of policy changes over a longer period of time, whereas it ignores the individual decisions within the farm households. Nonetheless, the choice of the empirical approach is often determined by the availability of data and the specific objectives of the researcher.

Lastly, the different results found in the literature are also dependent on the measurement of farm payments. For instance, several studies analysing the impact of subsidies reveal non-significant results. A possible explanation is offered by Barkley (1990), who represents one of the first studies to examine the impact of farm payments on labour allocation. While examining the migration of labour out of agriculture in the US in the period 1940-85, he finds a negative but not statistically significant impact of government payments and argues that this may be a consequence of divergent effects of subsidies on the labour force. Whereas, on the one hand, income payments are expected to reduce out-farm migration, on the other hand, other farm subsidies, such as acreage set-asides, may reduce the need for those inputs complementary to land, resulting in an increase in the migration of farm labour.

The large body of literature which examines the impact of total subsidies on out-farm migration suggests mixed results (Barkley, 1990; Goetz and Debertin, 1996; Mishra and Goodwin, 1997; Pietola et al. 2003; Breustedt and Glauben, 2007). Farm payments are found to exert both positive and negative effects on the exit rates from agriculture. As argued by Goetz and Debertin (1996), there may be a negative effect of farm payments on the farm labour force, if farmers invest more heavily in physical capital and decrease the demand for labour due to the capital-labour substitution, or a positive effect, via higher land values, which would reduce farm consolidation. In their empirical work, the authors find a positive impact of government payments on the likelihood of ceasing agricultural employment in the US for the years 1980-90. Conversely, Breustedt and Glauben (2007) find a negative effect of the CAP on farm exit rates on a sample of 110 EU regions from 12 EU MS during the period 1993-97.

Since the diverse instruments of farm payments may play a different role in labour allocation, some studies have distinguished between coupled and decoupled payments (Ahearn et al., 2006; van Herck, 2009), while others have used more differentiated measures of farm payments, such as for the Pillar 1 and Pillar 2 of the CAP (Petrick and Zier, 2011; Olper et al., 2012).

In this context, Ahearn et al., (2006) is one of the first studies to examine both coupled and decoupled payments, following the 1996 policy change introduced by the Farm Act (FAIR) in the US. The authors argue that it is important to recognise the way these payments are viewed by the household, i.e. if considered as an increase in the farm wage (coupled) or as non-labour income (decoupled). Despite the theoretical distinction, they find a negative probability for all kind of payments on the off-farm participation of US operators, with no significant difference in the effect of payments type. By the same token, Hennessy and Rehman (2008) consider the role of government subsidies in the farm-household theoretical model and argue that the decoupling of direct payments implies a decrease in the returns to farm labour, which would suggest an increase in off-farm employment (substitution effect). However, the increase in total income following the received payments would relax the budget constraint, which may increase leisure time while reducing off-farm work (income effect). The authors find that, in a decoupled scenario, direct payments are likely to increase the participation of farmers in off-farm employment.

Conversely, van Herck (2009) does not find a statistically significant difference between coupled and decoupled payments of the CAP when looking at the farm exit decisions in a sample of 18 EU MS. The results suggest that both coupled and decoupled payments are positively associated with the probability of leaving agriculture. As argued by the author, although the amount of these payments is expected to increase farmers' income and their likelihood of remaining in agriculture, there are second-order effects that must be considered. The capitalisation of subsidies in farm input prices (Key and Roberts, 2006), such as land and fertiliser prices, if high, and the unequal distribution of payments over the farm population, may result in the decrease of the net income of those farmers receiving less than the average subsidy.

Petrick and Zier (2011) examine the entire portfolio of CAP measures in three East German states for the period 2000-06. While distinguishing the different instruments within Pillar 1 (coupled area payments, coupled livestock payments and decoupled direct payments) and Pillar 2 (development of rural areas, improving processing and marketing of agricultural products, investment aids, less favoured areas, and agri-environmental measures) they find a negative effect of all measures, except for the positive of agri-environmental measures, on farm employment. The contradictory effects of the different bundles of rural development measures also suggest a zero marginal employment effect of investment aids and transfers to less-favoured areas. According to the authors, the decoupling of payments independent from production levels implies that labour input can be reduced without risking the loss of farm payments, which result in the release of excess labour. Furthermore, the subsidies may have altered the input mix in production, as for instance allowing more labour-saving investments on credit-constrained farms. Olper et al. (2012) extend this empirical analysis and examine the different instruments of the CAP on the out-farm migration in a sample of 149 EU regions of the EU-15 over the period 1990-2008. The results suggest that CAP payments, as a whole, contribute to keeping labour in agriculture. Moreover, Pillar 1 payments, and especially coupled subsidies, seem to be the most effective in reducing out-farm migration.

With this inconclusive empirical literature in the background we test the impact of the different CAP measures on the likelihood of exiting farming. We use cross-sections of micro-data and compare the four selected EU countries, by running separate estimations. The methodology is discussed in the next section and the results of the empirical analysis follow.

3. Methodology

The main objective of the study is to explore the impact of CAP on labour allocation, and specifically whether farm payments prevent the out-farm migration of labour or contribute to the shedding of labour. The empirical analysis builds on the work of Tocco et al. (2013) and focuses on the binary decision of individuals to work in agriculture ($y_j^{agriempl}$) and,

conditional on this, examine the likelihood of their leaving the farm sector (y_j^{exit}).[1] Therefore, we employ a bivariate probit with selection (van de Ven and van Praag, 1981). This empirical approach allows the control of those unobserved characteristics that influence the choice of participating in agricultural employment and the following decision to exit agriculture. Hence, correcting for sample selection bias in the first stage enables us to obtain consistent and unbiased estimates. The model assumes that there exists an underlying relationship, or latent equation of the type

$$y_j^* = x_j\beta + u_{1j} \tag{1}$$

such that we observe only the binary outcome of exiting farm employment

$$y_j^{exit} = (y_j^* > 0) \tag{2}$$

However, the outcome variable is not always observed. The dependent variable for individual j is observed only if the individual was working in agriculture

$$y_j^{agriempl} = (w_j\Upsilon + u_{2j} > 0) \tag{3}$$

Therefore, the selection rule implies that $y_j^{exit} > 0$ if $y_j^{agriempl} = 1$ and missing otherwise. We assume that the errors of the two equations (u_1 and u_2) have zero means and unit variances, and we denote the correlation among the error terms by p

$$corr\ (u_1, u_2) = p \tag{4}$$

We test the hypothesis that $p = 0$. If the hypothesis is rejected (and thus $p \neq 0$) there is sample selection bias and standard probit techniques for y_j^{exit} yield biased results.

4. Data

The main data source used for the empirical estimation is the EU-LFS, which consists of harmonised micro data across the EU MS. The survey allows us to observe the same individuals across two consecutive periods (current period and one year prior to the survey) and contains several individual and family background characteristics, and employment information. The two dependent variables for the bivariate probit are dummies for the selection and outcome equation, respectively for the probability of working in agricultural employment (Agricultural employment = 1) and the probability of exiting farming activities (Exit agriculture = 1).

The independent variables include individuals' sex (Male = 1), marital status (Married = 1), age (five dummies for different age bands), level of educational attainment (three dummies for: Low, Medium, High education), the highest field of education or training completed (several dummies),[2] presence of children under 15 in the household (Children = 1),

[1] Nonetheless, whereas Tocco et al. (2013) examine the determinants of sequential labour decisions in three stages (1. work in agriculture, 2. leave the agricultural sector, 3. switch occupational sector), here we only consider the first two stages, as the type of exit (change occupational sector or leave the labour force) is not relevant for this analysis. Moreover, most of the labour market indicators and other regional variables were found to be significant determinants only for entering the non-farm economy (third stage) and therefore are omitted from the present analysis. This also helps to avoid multicollinearity with the policy data.

[2] The fields of education are the exclusion restrictions used to identify the selection model, and therefore enter the participation equation (selection probit) and are omitted in the outcome equation (exit farming).

professional status (three dummies for: Employee, Self-employed, Family worker). Moreover, we are able to match some regional data (at the European NUTS-2 level) based on the individuals' residence information. By these means we control for differences in the farm structure, labour market conditions, and policy influence. From the Farm Structure Survey of the Eurostat online (FSS) we extract information with regards to the economic size of farms (three dummies as shares of total holdings: <2 ESU, 2-8 ESU, >8 ESU), and the production structure (three dummies for typology of farming system as a share of total holdings: Crops, Livestock, Mixed System). We also control for the regional level of unemployment (%), from the Eurostat New Cronos Database.[3] The policy data are taken from the FADN database online and consist of the amount of total CAP payments, received by the 'average farm' at the regional level (measured in thousands of Euros per year).[4] Total CAP payments are defined as total subsidies on current operations linked to production excluding on investments (SE605, FADN database). These include: total subsidies on crops, total subsidies on livestock, other subsidies, total support for rural development, subsidies on intermediate consumption, subsidies on external factors, and decoupled payments. We are aware that the treatment of subsidies at the regional level may suffer from measurement error, as the marginal farm may not receive the same benefits of the average farm in the sample. Nonetheless, we are constrained in terms of data (as the EU-LFS does not provide information on the subsidies or wages) and the empirical results still prove to be insightful for discussion. Since the literature suggests diverse impacts of different policy instruments, we also control for the main measures of the CAP, namely total subsidies on coupled payments (crops and livestock), decoupled payments, and total support for rural development (which includes environmental subsidies, less favoured area and other rural development payments).

The regional nomenclature from the FADN database is different from the Eurostat NUTS-2 level, so that our working sample is quite different from Tocco et al. (2013). The countries in our analysis consist of two NMS, Hungary and Poland, and two EU-15, France and Italy.[5] Instead of pooling the data into a unique sample we want to control for differences at the national level (due to diverse labour market institutions and farm sectors) and thus we run separate estimations for each country. The period of analysis covers the years 2005-2008 and is a pooled cross section; hence, year dummies are included. Descriptive statistics of our working samples, namely the total sample and the agricultural sample, are included in the Appendix (see Tables A.1 and A.2).

5. Estimation Results

In line with the empirical approach, we estimated the selection equation for the participation in agricultural employment. The results of our estimate are included in the Appendix (Table A.3). For reasons of parsimony, we do not discuss the empirical results for this estimation, which is included mainly for methodological issues, i.e. control for selection bias. The significance of the selection term in Table 2 suggests that the proposed methodology is appropriate and estimating two individual probit models would have led to biased estimates. In this section, we firstly look at the impact of the total subsidies on labour allocation, and secondly, we control for the main CAP payments, namely Pillar 1 instruments (coupled and decoupled subsidies) and Pillar 2 payments.

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[3] For a detailed definition of these variables see Tocco et al. (2013).

[4] For the stratification of the FADN sample and clarification of the standard groupings and average farms see: (http://ec.europa.eu/agriculture/rica/diffusion_en.cfm).

[5] We matched the NUTS-2 regions with the FADN regional data: for France (21 regions), Hungary (7 regions) and Italy (21 regions). The regions in Poland were reduced from 16 to 4 (Pomorze and Mazury, Wielkopolska and Slask, Mazowsze and Podlasie, Malopolska and Pogórze) so that we lose some of the regional variation. Lastly, Slovakia was dropped from the analysis as the FADN database only records farm payments at the national level.

5.1 The impact of total subsidies

Table 1 summarises the results concerning the impact of total CAP payments on the likelihood of exiting the farm sector. For our purpose, we only report the general effect of the policy data, without including the full estimation results. We also omit the other control variables, which are instead discussed in the following sub-section.[6]

Table 1. The impact of CAP subsidies on farm exit

Country	Exit agriculture
France	NS
Hungary	-
Italy	NS
Poland	-

Note: The reported signs are those significant at the 10% level or below.

The negative signs for Hungary and Poland would suggest that total subsidies reduce the out-farm migration of workers, thus hindering the exit of labour from agriculture, contributing to job maintenance and farm survival, consistent with some previous empirical evidence (Key and Roberts, 2006; Breustedt and Glauben, 2007; Olper et al., 2012). The non-significant signs for the 'old' MSs may instead be the combination of opposing effects from different measures (see the discussion in Section 5.2 in regards to Italy).

Nevertheless, the individual impact of the different CAP measures should be controlled for to better understand what forces come into play. Therefore, in the next sub-section we examine the determinants of farm exit decisions, focusing on the main instruments of the CAP.

5.2 The impact of different CAP instruments on exiting farm employment

The estimations for the effect of different CAP instruments are generally not significant, although there are variations across MS (Table 2). The broad debate among academics and policy communities has focused on whether CAP payments keep more people in agriculture or whether they facilitate out-farm migration. Our results suggest that these policy variables influence the probability of working in a specific sector, i.e. agriculture, but conditional on this probability they become less relevant for the decision to exit or remain in the same sector. On the other hand, the decisions to leave the farm sector seem to be mainly driven by individual characteristics.[7] Nonetheless, it is worth remembering that these policy variables are measured as regional average farm receipts which may not necessarily be those received by the marginal farm.

The coefficient of coupled subsidies appears to be significant only for Italy and displays the expected negative sign. According to the literature, these payments increase agricultural output prices, and therefore agricultural income, and thus maintain jobs and provide incentives for farmers to remain in the sector (Hennessy and Rehman 2008). Therefore, this result is to be expected, as coupled subsidies increase the marginal value of farm labour, which is equivalent to an increase in the farm wage rate (income effect) (Donnellan and Hennessy, 2012). This finding is generally supported by several studies that find that coupled payments are expected to indirectly slow down the rate of out-farm migration due to higher

[6] The control variables are found to be generally robust to the different specifications. The full estimation results are available upon request.

[7] Locational and labour market conditions were not found significant for the decision of individuals to exit the sector (in comparison to maintaining farming activities), whereas they are certainly important for switching occupational sector and work in industry or services (see Tocco et al., 2013).

land values (Barkley, 1990), with a negative influence on the participation in off-farm employment (Mishra and Goodwin, 1997; Benjamin and Kimhi, 2006).

Conversely, decoupled payments are expected to have a different impact on labour allocation. First of all, these payments are independent of the level of production so that farms can reduce their labour input, and the output produced, without the risk of not receiving the subsidies. In this respect, Petrick and Zier (2011) found that the decoupling induced the shedding of excess labour. This would support the positive coefficient found for Hungary. Moreover, these subsidies can be considered as a source of exogenous household wealth which reduces the return to farm labour and increases the unearned income of farmers (Hennessy and Rehman, 2008). In particular, the authors find that farmers receiving decoupled payments allocate less time to farm work and more time to off-farm work or leisure, due to the wealth effect. Nonetheless, in our dataset we do not observe whether individuals hold a second job in the off-farm market which is a limitation of our analysis.

Furthermore, the payments for rural development show mixed results on the farm exit decisions across MS. The difference in the significance level and in the direction of results may suggest that the various Pillar 2 instruments for rural development may have contradictory effects. In this respect, the findings of Olper et al. (2012) suggest a negative effect of Pillar 2 policies when taken as a whole, but a heterogeneous effect across instruments (negative for agri-environmental and other payments and not significant for less favoured area and investment aids).

The other control variables confirm our previous evidence (Tocco et al., 2013). Overall, men and married individuals are generally less likely to leave agriculture. Age displays a non-linear function so that individuals in the youngest age groups (those aged 15-24 and 25-34) are more likely to exit farming, possibly due to better job opportunities in other sectors. Nonetheless, the highest exit rates are associated with the retirement of people, as displayed by the coefficient of those aged 55-64. The level of educational attainment is somewhat less significant, as individuals exiting farming may do so for different reasons, i.e. entering off-farm jobs or leaving the labour force.

Self-employed and family-workers are less willing to leave agricultural employment, due to ownership motives or family responsibilities, whereas employees are more likely to respond to economic stimulus. We expected higher levels of regional unemployment to be negatively associated with farm exits, following the assumption that agriculture plays a buffer role in hard times. Instead, the results show a positive relationship, which may be due to some endogeneity issue, and may suggest frictional unemployment.

Lastly, the regional farm size is not quite significant and seems to indicate that larger farms are associated with higher exit rates, whereas smaller farms prevent major outflows of labour. The type of production system also suggests that livestock activities are associated with lower exit rates in comparison to crop systems. This may reflect the higher sunk costs associated with quitting livestock production, but also the fact that crops require seasonal labour.[8]

[8] There seem to be some differences in the results in comparison to Tocco et al. (2013) with regard to the impact of farm size and production systems on the exit decisions of agricultural workers. This may be due to the introduction of policy data and the removal of other regional indicators, which may have introduced some collinearity.

Table 2. Results for the bivariate probit with selection: exiting farm employment

Variable	France	Hungary	Italy	Poland
Male	-0.178	-0.0708	-0.356***	-0.0159
	(0.120)	(0.0454)	(0.0298)	(0.0389)
Married	0.221**	-0.117***	-0.0775***	-0.155***
	(0.108)	(0.0352)	(0.0301)	(0.0360)
Age 15-24	0.616***	0.307***	0.214***	0.532***
	(0.195)	(0.0769)	(0.0580)	(0.0586)
Age 25-34	0.344**	0.328***	0.0697*	0.318***
	(0.155)	(0.0475)	(0.0368)	(0.0428)
Age 35-44	0.153	0.0958**	-0.00406	0.0722*
	(0.140)	(0.0440)	(0.0311)	(0.0409)
Age 55-64	0.740***	0.479***	0.335***	0.673***
	(0.131)	(0.0428)	(0.0321)	(0.0393)
Low education	0.169*	0.257***	-0.0236	0.00673
	(0.0987)	(0.0348)	(0.0328)	(0.0350)
High education	-0.0604	0.00606	0.298***	-0.0564
	(0.152)	(0.0612)	(0.0628)	(0.0695)
Children	-0.202	-0.0102	0.0109	0.0397
	(0.134)	(0.0415)	(0.0337)	(0.0381)
Female with children	0.198	0.0579	-0.0598	0.0133
	(0.201)	(0.0726)	(0.0476)	(0.0547)
Self-employed	-0.545***	-0.489***	-0.494***	-0.433***
	(0.154)	(0.0506)	(0.0419)	(0.0856)
Family worker		-0.197*	-0.444***	-0.218**
		(0.115)	(0.0738)	(0.0999)
Unemployment	0.00444	0.0373***	0.00595	0.0357***
	(0.0362)	(0.0115)	(0.00420)	(0.00862)
Farm size 2-8 ESU	0.408	-6.313	0.613**	0.188
	(2.338)	(3.943)	(0.258)	(0.325)
Farm size >8 ESU	-0.112	23.74**	-0.149	0.0863
	(1.169)	(11.01)	(0.192)	(0.495)
Livestock production	-0.234	-1.408***	0.189	-0.738***
	(0.385)	(0.536)	(0.169)	(0.282)
Mixed production	1.568	-1.025	-1.152*	-1.578**
	(1.274)	(1.601)	(0.682)	(0.765)
Year 2007-8	0.237	-0.230*	-0.0139	0.303***
	(0.197)	(0.125)	(0.0281)	(0.0866)
Coupled subsidies	-0.00445	-0.0175	-0.0276*	2.913
	(0.00825)	(0.0332)	(0.0166)	(1.874)

Table 2 (Continued)

Variable	France	Hungary	Italy	Poland
Decoupled payments	-0.00537	0.0659**	0.00122	-0.176
	(0.00901)	(0.0321)	(0.00522)	(0.113)
Rural development support	0.0127	-0.154***	0.0292**	0.138
	(0.0289)	(0.0381)	(0.0139)	(0.154)
Constant	-1.766	-1.518***	-1.635***	-1.729***
	(1.381)	(0.480)	(0.181)	(0.387)
Selection Term	0.299***	0.252***	0.421***	0.237***
	(0.0931)	(0.0503)	(0.0575)	(0.0526)
Number of observations	1,587	13,068	21,569	25,886

Notes: T-statistics in parentheses. Levels of significance: ***1%; **5%; *10%. For France, family worker predicts failure perfectly and was dropped (91 observations not used).

6. Conclusion

This paper has examined the impact of the CAP subsidies on labour allocation in four EU MS, focusing on the decision of individuals to exit the farm sector. Against the background of mixed evidence on the role of farm payments on labour supply and out-farm migration, stemming from different methodologies, datasets and country coverage, the main finding from this study reflects the complexity of the topic and suggests that there is no simple answer to the role of subsidies, but instead emphasises the heterogeneous results across MS. Nevertheless, to the extent that the 'average farm' does not differ too much from the marginal farm, some general conclusions can be drawn.

First of all, total subsidies at the regional level are found to be negatively associated with the out-farm migration of agricultural workers in the two NMS, Hungary and Poland, so that the CAP would seem to preserve jobs in the farm sector, and therefore implies farm survival. In this respect, the CAP is found to be effective in transferring income to farmers. An interesting finding points to the non-significant coefficient in the 'old' MS, Italy and France. This can be interpreted as a reflection of the opposite effect of the different measures of the CAP – specifically coupled payments and rural development support. Whereas the payments of Pillar 2 have a positive effect, coupled payments, as expected, are negatively associated with exit rates, as they increase the marginal value of farm labour and provide incentives for farmers to remain in the sector.

Based on the theoretical underpinnings on the role of subsidies, we expected different effects of coupled and decoupled subsidies on the out-farm migration of labour. Conversely, this study indicates that their impact is not quite statistically different. On the other hand, the mixed results for the Pillar 2 instruments across MS may be due to contradictory effects of different measures. Furthermore, only in the case of Hungary can we find a positive impact of decoupled payments which, being independent from the level of production may induce the shedding of labour.

Overall, unlike previous results from pooled countries, we find that there is no common trend across the four MS under analysis. The heterogeneity across European member states, due to different farm sectors as well as market and production structures, does not allow a common and simple generalisation upon the effect of the CAP on labour allocation. Therefore, the inconclusive empirical evidence so far now does not only reflect differences in methodologies but most importantly reflects differences across countries and the diverse impact of different instruments of farm payments upon their agricultural labour market.

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Appendix

Table A.1 Descriptive statistics of the total sample

	France (N = 48,775)		Hungary (N = 211,524)		Italy (N = 463,989)		Poland (N= 148,672)	
Variable	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Dependent = agricultural employment	0.03	0.18	0.06	0.24	0.05	0.21	0.17	0.38
Male	0.53	0.50	0.54	0.50	0.60	0.49	0.54	0.50
Married	0.52	0.50	0.61	0.49	0.65	0.48	0.74	0.44
Age 15-24	0.07	0.25	0.06	0.24	0.05	0.22	0.07	0.26
Age 25-34	0.24	0.43	0.25	0.43	0.21	0.41	0.26	0.44
Age 35-44	0.28	0.45	0.26	0.44	0.32	0.47	0.27	0.44
Age 45-54	0.28	0.45	0.30	0.46	0.29	0.45	0.30	0.46
Age 55-64	0.13	0.34	0.13	0.34	0.13	0.34	0.10	0.30
Low education	0.26	0.44	0.15	0.36	0.40	0.49	0.10	0.30
Middle education	0.45	0.50	0.66	0.47	0.45	0.50	0.70	0.46
High education	0.30	0.46	0.18	0.39	0.15	0.36	0.21	0.41
General	0.01	0.09	0.08	0.27	0.04	0.20	0.08	0.26
Teacher training & education science	0.01	0.08	0.06	0.23	0.03	0.17	0.04	0.20
Humanities, languages & arts	0.06	0.24	0.01	0.11	0.05	0.21	0.02	0.15
Social sciences, business & law	0.24	0.43	0.15	0.36	0.18	0.38	0.13	0.34
Sciences, maths & computer	0.06	0.23	0.02	0.13	0.04	0.19	0.04	0.20
Engineer, manufacturing & construction	0.22	0.42	0.38	0.49	0.15	0.35	0.36	0.48
Agriculture & veterinary	0.03	0.17	0.04	0.19	0.02	0.13	0.08	0.27
Health & welfare	0.07	0.26	0.05	0.21	0.03	0.18	0.04	0.19
Services	0.04	0.19	0.06	0.24	0.03	0.16	0.11	0.31
Other			0.00	0.02	0.05	0.21	0.00	0.05
None	0.26	0.44	0.15	0.36	0.39	0.49	0.10	0.30
Children	0.40	0.49	0.33	0.47	0.38	0.48	0.45	0.50
Female with children	0.19	0.39	0.14	0.34	0.15	0.35	0.20	0.40
Employee	0.90	0.30	0.88	0.32	0.75	0.43	0.75	0.44
Self-employed	0.10	0.30	0.11	0.32	0.23	0.42	0.21	0.41
Family worker	0.01	0.07	0.00	0.06	0.02	0.13	0.04	0.20
Unemployment	8.46	1.77	7.58	2.47	6.82	4.17	13.74	4.52
Farm size <2 ESU	0.12	0.06	0.88	0.04	0.33	0.08	0.67	0.13
Farm size 2-8 ESU	0.14	0.05	0.08	0.03	0.34	0.07	0.22	0.07
Farm size >8 ESU	0.74	0.09	0.04	0.01	0.33	0.11	0.12	0.08
Crop production	0.55	0.26	0.42	0.05	0.77	0.15	0.46	0.08
Livestock production	0.34	0.24	0.42	0.07	0.19	0.14	0.33	0.09
Mixed production	0.11	0.06	0.16	0.02	0.05	0.02	0.20	0.03
Year 2005-6	0.44	0.50	0.52	0.50	0.50	0.50	0.49	0.50
Year 2007-8	0.56	0.50	0.48	0.50	0.50	0.50	0.51	0.50
Coupled Subsidies	16.04	13.03	3.86	1.62	1.07	1.44	0.04	0.02
Decoupled payments	12.10	13.54	5.43	2.10	5.03	3.73	1.23	0.62
Rural development support	2.40	2.32	1.97	1.30	1.20	1.72	0.76	0.41

Table A.2 Descriptive statistics of the agricultural sample

	France (N = 1,587)		Hungary (N = 13,068)		Italy (N = 21,569)		Poland (N= 25,886)	
Variable	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Dependent = exit agriculture	0.12	0.33	0.11	0.31	0.12	0.33	0.06	0.23
Male	0.70	0.46	0.75	0.43	0.67	0.47	0.56	0.50
Married	0.59	0.49	0.66	0.47	0.72	0.45	0.78	0.42
Age 15-24	0.06	0.24	0.04	0.19	0.04	0.20	0.06	0.24
Age 25-34	0.16	0.37	0.18	0.38	0.15	0.36	0.18	0.38
Age 35-44	0.28	0.45	0.26	0.44	0.30	0.46	0.27	0.44
Age 45-54	0.31	0.46	0.35	0.48	0.31	0.46	0.34	0.47
Age 55-64	0.19	0.39	0.18	0.38	0.20	0.40	0.15	0.36
Low education	0.33	0.47	0.31	0.46	0.71	0.46	0.27	0.44
Middle education	0.55	0.50	0.62	0.49	0.26	0.44	0.70	0.46
High education	0.12	0.32	0.07	0.26	0.03	0.17	0.03	0.17
Children	0.34	0.48	0.32	0.47	0.37	0.48	0.49	0.50
Female with children	0.10	0.30	0.07	0.25	0.12	0.32	0.24	0.43
Employee	0.37	0.48	0.68	0.47	0.46	0.50	0.10	0.30
Self-employed	0.58	0.49	0.29	0.46	0.45	0.50	0.68	0.47
Family worker	0.06	0.23	0.03	0.16	0.08	0.27	0.21	0.41
Unemployment	8.05	1.61	8.21	2.08	8.35	4.61	13.63	4.16
Farm size <2 ESU	0.13	0.05	0.86	0.04	0.34	0.08	0.65	0.13
Farm size 2-8 ESU	0.14	0.05	0.10	0.04	0.35	0.07	0.23	0.07
Farm size >8 ESU	0.73	0.07	0.04	0.01	0.31	0.11	0.12	0.08
Crop production	0.46	0.25	0.43	0.04	0.80	0.16	0.46	0.09
Livestock production	0.44	0.25	0.40	0.05	0.16	0.14	0.33	0.10
Mixed production	0.10	0.04	0.17	0.02	0.04	0.03	0.21	0.03
Year 2005-6	0.52	0.50	0.53	0.50	0.52	0.50	0.53	0.50
Year 2007-8	0.48	0.50	0.47	0.50	0.48	0.50	0.47	0.50
Coupled Subsidies	15.30	10.43	3.95	1.79	0.83	1.30	0.04	0.02
Decoupled payments	8.54	10.43	5.21	2.17	4.26	3.05	1.11	0.54
Rural development support	2.76	2.57	2.00	1.28	1.13	1.70	0.70	0.37

Table A.3 Results for the bivariate probit with selection: participation in agricultural employment

Variable	France	Hungary	Italy	Poland
Male	0.0948**	0.421***	-0.00189	0.0215
	(0.0395)	(0.0141)	(0.00967)	(0.0173)
Married	0.000765	0.00565	0.0288***	-0.129***
	(0.0327)	(0.0118)	(0.00944)	(0.0159)
Age 15-24	0.171***	-0.278***	-0.0423**	-0.0105
	(0.0641)	(0.0257)	(0.0193)	(0.0287)
Age 25-34	0.0637	-0.213***	-0.0794***	-0.0529***
	(0.0467)	(0.0153)	(0.0115)	(0.0176)
Age 35-44	0.0556	-0.0727***	-0.0438***	-0.0371**
	(0.0413)	(0.0137)	(0.00959)	(0.0156)
Age 55-64	-0.0201	0.0490***	0.0680***	0.0465**
	(0.0444)	(0.0150)	(0.0108)	(0.0192)
Low education	0.433***	0.313	0.396***	0.639***
	(0.0426)	(0.309)	(0.0171)	(0.122)
High education	-0.356***	-0.357***	-0.479***	-0.803***
	(0.0462)	(0.0205)	(0.0184)	(0.0246)
General	0.139	-0.246	-0.251***	-0.751***
	(0.175)	(0.309)	(0.0280)	(0.123)
Teacher training & education science	0.148	-0.768**	-0.381***	-0.561***
	(0.271)	(0.314)	(0.0351)	(0.135)
Humanities, languages & arts	-0.199**	-0.871***	-0.215***	-1.022***
	(0.0953)	(0.322)	(0.0311)	(0.145)
Social sciences, business & law	0.0370	-0.329	-0.219***	-0.592***
	(0.0538)	(0.309)	(0.0202)	(0.123)
Sciences, maths & computer	0.00319	-0.484	-0.163***	-0.468***
	(0.0867)	(0.314)	(0.0295)	(0.127)
Engineer, manufacturing & construction		-0.259	-0.148***	-0.312**
		(0.309)	(0.0200)	(0.121)
Agriculture & veterinary	1.809***	0.937***	1.097***	0.697***
	(0.0510)	(0.309)	(0.0238)	(0.122)
Health & welfare	-0.443***	-0.829***	-0.386***	-1.249***
	(0.103)	(0.312)	(0.0410)	(0.133)
Services	-0.167*	-0.562*	-0.240***	-0.341***
	(0.0996)	(0.310)	(0.0328)	(0.122)
Children	-0.154***	-0.0340**	-0.0298***	-0.00378
	(0.0413)	(0.0137)	(0.0102)	(0.0163)

Table A.3 (continued)

Variable	France	Hungary	Italy	Poland
Female with children	0.107*	0.0724***	0.0900***	0.262***
	(0.0625)	(0.0232)	(0.0155)	(0.0237)
Self-employed	1.290***	0.708***	0.563***	2.083***
	(0.0326)	(0.0125)	(0.00749)	(0.0125)
Family worker	1.871***	1.545***	1.099***	3.027***
	(0.0866)	(0.0459)	(0.0170)	(0.0245)
Unemployment	-0.0376***	0.0543***	0.0391***	-0.0298***
	(0.0119)	(0.00354)	(0.00119)	(0.00369)
Farm size 2-8 ESU	0.307	2.514**	0.438***	1.911***
	(0.750)	(1.216)	(0.0882)	(0.141)
Farm size >8 ESU	1.515***	19.01***	0.227***	-0.414**
	(0.374)	(3.378)	(0.0593)	(0.207)
Livestock production	0.481***	-0.311*	0.168***	-0.109
	(0.120)	(0.178)	(0.0512)	(0.122)
Mixed production	-0.227	2.109***	-1.934***	3.928***
	(0.373)	(0.530)	(0.210)	(0.301)
Year 2007-8	-0.0792	0.0692*	0.00360	-0.167***
	(0.0602)	(0.0370)	(0.00913)	(0.0364)
Coupled subsidies	-0.0151***	0.0999***	-0.0799***	-0.0245
	(0.00238)	(0.0105)	(0.00524)	(0.770)
Decoupled payments	-0.0169***	-0.0407***	0.00266*	0.263***
	(0.00263)	(0.0101)	(0.00156)	(0.0453)
Rural development support	-0.0258***	0.0537***	0.0619***	-0.485***
	(0.00929)	(0.0118)	(0.00438)	(0.0618)
Constant	-2.991***	-3.716***	-2.499***	-2.305***
	(0.428)	(0.345)	(0.0459)	(0.190)
Number of observations	48,775	211,524	463,989	148,672

Notes: Standard errors in parentheses. Levels of significance: ***1%; **5%; *10%.
For France Engineer, manufacturing & construction was used as reference category due to differences in the sample.

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.
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