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The Role of Pluriactivity in Farm Exit and Labour Supply Decisions

ABSTRACT

Pluriactivity has been a topic of research in agriculture for the best part of a century. It is a term which has both broad and narrow definitions and hence is subject to multiple interpretations...This paper considers two forms of pluriactivity: within the farm gate pluriactivity, also commonly referred to as farm diversification, and beyond the farm-gate pluriactivity, also known as multiple job holding. Previous studies of pluriactivity have shown that it can inhibit the natural process of structural change in the farm sector, by allowing small and unprofitable farms to survive with the support of income from outside the sector. In this paper, two empirical models of pluriactivity are estimated using farm level data for Ireland. The first examines the impact of on-farm diversification on off-farm labour supply, while the second investigates the relationship between off-farm labour supply and farm exit which is specified in the context of retirement and non-succession. The result of the first model suggests that farms that engage in within the farm gate pluriactivity are less likely to engage in beyond the farm gate pluriactivity, in other words more diversified farmers are less likely to work off farm. The second model confirms previous findings in the literature that part-time farmers have a reduced probability of having a farm successor. While the model results are specific to the Irish case, they do provide some value insights into the impacts of pluriactivity on structural change in farming.

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1. Introduction

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 objective of this deliverable is to explore the issue of pluriactivity in agriculture. In particular, the role of pluriactivity in farmers' labour supply decisions and in turn on structural change in agriculture is examined. The paper begins by reviewing the broad concept of pluriactivity and outlining a number of interpretations of this somewhat ambiguous term. Following this, an extensive review of previous studies of pluriactivity in European farming is provided, with particular emphasis on the relationship between pluriactivity and structural change. A number of empirical models are estimated using farm level data from Ireland, and the relationship between pluriactivity, labour supply and farm exit is quantified and discussed.

2. Exploring the Concept of Pluriactivity

For close on a century pluriactivity has been a subject of academic interest (Fuguitt, 1961). The term pluriactivity can be interpreted in three broad ways: *within the farm gate*, *within the farm business* and *beyond the farm gate*. Thus the term is not particularly well defined and it is useful to explore its roots in order to provide it with some context. Fuller (1990) notes that the term pluriactivity has its origins in the French work pluriactivité, which can be taken to mean the combination of agricultural activity with other forms of gainful employment (MacKinnon et al. 1991; Evan and Ilbery, 1993). Sometimes, the term pluriacitivity can be used interchangeably with the term part- time farming, although it is also the case that pluriactivity can be thought to encompass both part-time farming and diversification (Evans and Ilbery, 1993).

Diversification in turn, can be seen to have differing interpretations in the literature. It can refer to the case where a farmer makes a decision on whether to have one or more agricultural outputs from his/her farm. In this regard diversification can be said to be minimal when the farm operates on the basis of a single system, whereas the maximum levels of diversification would be where there is farming of several enterprises to the point where no single enterprise can be considered dominant. An extreme example of monoculture could be the farms in the Corn Belt of the US. Many European farms, and certainly, many farms in Ireland, would reflect some degree of diversification.

Diversification can be achieved by producing different crops in alternate parts of the farm year (Metcalf, 1969) or by producing multiple crops simultaneously, so called mixed farming (Shucksmith et al 1989). The first interpretation of pluriactivity mentioned earlier, the "within the farm gate" concept, refers to farm enterprise diversification. This can involve the operation of multiple land based farm activities. For example, where a farm simultaneously operates livestock, crop and forestry enterprises it may be considered pluriactive by this

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definition. For the remainder of the paper, we will use the term 'within the farm gate' pluriactivity interchangeably with the term 'farm diversification'.

Finally, with the advent of increasing job opportunities in the non-agricultural economy, diversification can be achieved via activities which do not constitute part of agriculture (Newby, 1998). These non-farming activities can be loosely related to agriculture and take place within the farm homestead. The "within the farm business" concept refers to business diversification and includes the operation of a business that is associated with the farm but is not a traditional land using activity. Examples in this category include small scale food processing, agritourism, wood processing, handicrafts and alternative energy generation.

Alternatively, the diversification can be completely discrete forms of employment, epitomised by the so called "off farm job". This form of the pluriactivity concept, looks beyond the farm gate, and includes off-farm activities which we interpret here as non-farm gainful employment. This can refer to both paid and self employment.

It is worth noting that the European Commission (EC 2008) tends towards a narrow definition of pluriactivity which excludes multiple agricultural enterprises as a form of diversification. It prefers to consider a farmer as pluriactive if he carries out any activity other than farm work for remuneration, be it on the holding itself (farm diversification), on another holding, or as an employee in a non-agricultural enterprise. In their interpretation diversification includes other gainful activities that do not comprise any farm work and does not explicitly consider the adoption of multiple agricultural enterprises on the farm as a form of diversification.

Notwithstanding the above considerations, for the purposes of this study we confine our interpretation of pluriactivity to the within the farm gate and beyond the farm gate concepts. While farm business diversification (the operation of non agricultural activities on the farmstead) is a valuable and interesting concept it tends to be relatively less common in Ireland than in other EU Member States for regulatory and cultural reasons.

3. Previous Studies of Pluriactivity

This section of the paper discusses how pluriactivity can affect structural change in farming. The impact of pluriactivity, interpreted here as "beyond the farm gate" or the holding of "the off-farm job", on exit from and entry to farming is discussed and the relevant literature is reviewed.

3.1 Pluriactivity: Off-farm labour supply and structural change in farming

Farmers' labour allocation decisions have implications for structural change in farming. Tweeten (1984) contended that the size of farm in which increasing economies of scale exist has increased and therefore there is a continual impetus for larger farms. Smaller farms can only survive if they can use income from outside the sector to pay for the way of life enjoyed within agriculture just as they would for any other consumptive good, a point also noted by Kimhi and Nachlieli (2001). They observed that the natural process of structural change in farming is often inhibited, as farmers choose to supplement low farm income with off-farm earnings rather than leave the sector. In other words, off-farm employment enables farm families to remain on the land and to retain an effective link with agriculture even where the returns to farming may not be considered viable. Off-farm employment by farm operators appears to be a feature of permanent restructuring within the agricultural sector throughout the developed world, (Pfeffer 1989). Farmers' labour allocation decisions pose considerable implications for the future structure of farming. The trend to a binomial distribution of farm size, with significant numbers of both very large and very small farms, is supported by pluriactivity or multiple job holdings. Small farms can survive on a part-time basis while full-time farms need to continuously grow to prosper in the sector.

Research conducted by Kimhi (1998) found that the natural pace of structural change in the farming sector has slowed because of the shift to part-time farming. He presents evidence that when farm incomes fall below feasible levels, instead of exiting the sector farmers support their waning businesses with income from outside the sector. In other words, pluriactivity can facilitate the continuation of economically non-viable farms.

While pluriactivity may inhibit structural change, by allowing economically non-viable farms to survive, it is important to consider whether this is simply a temporary phenomenon, i.e. part-time farming may be a step on the way out of farming. One of the most important questions regarding pluriactivity is whether the phenomenon of part-time farming is a stable situation or just a step on the way out of agriculture. A number of studies have examined the effect of farmers' off-farm work status on their planned or actual exit decisions. Weiss (1997) found that the off-farm job status as well as the number of hours worked off the farm, had a statistically significant positive effect on the probability of the farmer exiting the sector. Similar patterns were found in a study of US farmers (Roe 1995). Conversely, Kimhi and Bollman (1997) found that the exit probability decreases with the extent of off-farm employment in both Israel and Canada. A review of the literature presents conflicting evidence on the impact of pluriactivity on long-term survival of the farm. It is therefore interesting to consider the processes of entry to and exit from farming in more detail, in order to gain a better understanding of how pluriactivity may influence these processes.

3.2 Pluriactivity: Studies of Farm Exit and Entry Decisions

The processes of entry and exit play a powerful role in the analysis of competitive industries in standard microeconomic text books, but there has been relatively little empirical study of the process in the farming sector, (Gale 2002). In comparison to the number of reports on the effect of policy change on commodity markets for example, agricultural economists have paid very limited attention to the economic determinants of farm entry and exit and the effect of policy on those processes. The available empirical literature on farm entry and exit typically applies one of two approaches: empirical studies at the farm-household level and studies focusing on the adjustment of farm labour at the aggregate level.

Many studies of farm exits conclude that age related variables are the most significant explanatory factors. Gale (2002) arrived at a similar conclusion using age cohort analysis. He followed the same cohorts through time and identified the age at which farmers typically exited the industry. He found that farmer numbers were in net decline because young farmers were not entering the industry at the same rate as those retiring. Another study by Gale (1993) discusses the uniqueness of the entry and exit processes in the farming sector. He describes farming as a closed industry, dominated by families, where entry is only through inheritance. He notes that entrants to farming are usually drawn from a limited pool of young men raised on farms, an argument also supported by Gasson (1986). He claims that entry and exit in farming are almost entirely driven by demographic influences and that the number of potential new entrants may instigate inertia in the change process and lead to declining farmer numbers even when economic conditions are favourable.

Glauben et al (2002) have made similar conclusions. They investigated the relationship between farm exits and various farm, family, and regional characteristics during the period of 1991 to 1999. Using county-level data for 326 regions in western Germany, econometric estimations indicated that exits from farming are strongly influenced by farm and family characteristics. In particular, farm exits were closely related to age, retirement and succession considerations. Hennessy (2005) also used age cohort analysis and census data to show that the majority of exits from farming in Ireland are due to retirement and non-succession. Given that a number of studies have suggested that the majority of farm exit occurs due to retirement and non-succession, this will be the focus of this paper. In particular, we will examine the impact of pluriactivity by the current generation of farmers on the likelihood of the succession by the next generation.

There is a vast literature on the issues of farm inheritance and succession. The themes explored include the importance of the decisions regarding inter-generational transfer, the influence these decisions have on the development and performance of the farm business, the optimal timing of the transfer, the various methods of transfer in different countries and the factors that influence succession generally. Relatively few studies have examined the impact of pluriactivity on the probability of succession. Kinsella et al. (2000) identified very few empirical studies available to support the presence of generational continuity on pluriactive farms (for exceptions see Gidarakou 1990 and Jervell 1999). Kimihi and Nachlieli (2001) showed that part-time farming by the current generation reduced the probability of succession. Glauben et al. (2009) found in the case of German farm households that the non-agricultural education level of the farm operator significantly delays the transfer of ownership to a successor, but no significant relationship was found between the off-farm employment of the operator and the probability of succession.

4. Empirical question

Two models concerning pluriactivity are developed in this paper. The first model relates to the determinants of off-farm labour supply. In this model, we are primarily concerned with identifying the potential role of farm diversification, one of our pluriactivity measurements, as a determinant of off-farm labour supply. The second model investigates the factors driving farms to exit agriculture due to the absence of a potential successor from their existing workforce. In particular, the impact of beyond the farm gate pluriactivity, or multiple job holding, on farm exit is estimated. The first model with respect to off-farm labour supply relies on precisely the same methodology as described in deliverable 11.2 (Loughrey et. al., 2013). These models are estimated using data from Ireland.

The added value of the labour supply model in this paper is that we include farm diversification or 'within the farm gate' pluriactivity as an independent variable among the regressors. This farm diversification variable is calculated by identifying the share of gross output that is attributed to farm enterprises other than the main enterprise on the farm. The estimation of the farm diversification variable is made in the following:

$$Farm\ Diversification = 100 - \left(\frac{Gross\ Output\ of\ main\ Farm\ Enterprise}{Gross\ Output\ of\ all\ Farm\ Enterprises}\ x\ 100\right) \quad (1)$$

The second model with respect to farm exit is less demanding econometrically than the off-farm labour supply model, but there is overlap in the methods applied. The first step of the farm exit model is the requirement to define whether or not a farm is on the path to exit. We summarise our criteria in the following:

$$\begin{gathered} Path\ to\ Farm\ Exit\ if\ Operator \geq 55\ Years\ Old\ and\ Potential\ Successor = 0 \\ Non\ Farm\ Exit\ if\ Farm\ Operator \geq 55\ Years\ Old\ and\ Potential\ Successor = 1 \\ Non\ Farm\ Exit\ if\ Farm\ Operator < 55\ Years\ Old \end{gathered} \quad (2)$$

The above criteria stipulates that a farm is on the path to exit where the farm operator is 55 years old or greater and where no potential successor can be found from among the existing farm workforce. A potential successor is defined as somebody working as unpaid labour on the farm for more than 100 hours per annum and is aged between 16 and 45 years old. Alternatively, a farm is not on the path to exit where there is a potential successor and the operator is at least 55 years old or where there the operator is simply less than 55 years old. There are many cases of farm operators aged between 40 and 55 with no potential successor available, but there still remains some time before this becomes an urgent problem. In many cases, the children in the household, where that is relevant, are likely to be too young for decisions to be made about their future succession of the farm.

The econometric analysis for the farm exit model relies on a cross-sectional probit model rather than the panel probit model used in the off-farm labour supply. The main task in the farm exit model is to model whether or not the farm is on the path to exit in the following:

$$Prob\ (O_i = 1) = F(\beta' X) \tag{3}$$

where F is the normal probability distribution function over the closed interval, [0,1], or $0 \leq F\ (\beta X') \geq 1$ to satisfy the probability properties. From the estimated coefficients, the probability of farm exit can be found. The probability of the farm being on the path towards exit is estimated as:

$$P^* = \exp\ (\beta_0 + \beta' X) \tag{4}$$

Where P^* measures the probability of participation. We find the residuals v by subtracting the predicted value p^* from the reported off-farm participation p:

$$v = p - p^* \tag{5}$$

4.1 Data

In this section, we describe the data source used to perform the analysis i.e. the Teagasc National Farm Survey. O'Brien and Hennessy (2006) described the objectives of the National Farm Survey (NFS) as being to

1. Determine the financial situation on Irish farms by measuring the level of gross output, costs, income, investment and indebtedness across the spectrum of farming systems and sizes,
2. Provide data on Irish farm incomes to the EU Commission in Brussels (FADN),
3. Measure the current levels of, and variation in, farm performance for use as standards for farm management purposes, and
4. Provide a database for economic and rural development research and policy analysis.

To achieve these objectives, a farm accounts book is recorded for each year on a random sample of farms, selected by the Central Statistics Office, throughout the country. For 2011, there are 1,022 farms included in the analysis, representing 105,535 farms nationally. The Teagasc NFS micro data spans the period from 1996 to 2011. The panel is unbalanced in the sense that there is some attrition from year to year as farmers leave the sample and are replaced by other farms. The attrition rate is relatively low however and a sizeable proportion of the farms are contained in the dataset for all of the years concerned. New farmers are introduced during the period to maintain a representative sample and the sample size is usually kept to between 1000 and 1100 farms. The Teagasc NFS data provides vital information on the reported number of hours devoted to labour on each farm.

The data for the panel analysis off-farm labour supply model covers the period from 2002 to 2009 and therefore includes three years prior to the decoupling of direct payments in 2005, a policy arising from the Luxembourg Agreement, i and the four years immediately after the decoupling policy was implemented. The data for the cross-section farm exit model are from 2011. We use approximately the same list of variables for both models and the mean values for these variables are presented below in Table 1.

Table 1. Mean Value Statistics for Labour Supply and Farm Exit Model Data

	OFF-FARM LABOUR SUPPLY MODEL 2002-2009		FARM EXIT MODEL 2011		
Variable	Off-Farm Pluriactive	Full-Sample	Farm Exit Path	Off-Farm Pluriactive	Full-Sample
Farm Exit Path (0,1)	N/A	N/A	1	0.2653	0.3680
Off-Farm Pluriactive (0,1)	1	0.3629	0.2311	1	0.3205
Off-Farm Pluriactive Hours	1,572.35	570.65	274.12	1,361.26	436.31
On Farm Pluriactive Measure i.e. Farm Diversification	12.0257	16.8419	N/A	N/A	N/A
Age	48.98	54.35	64.45	49.91	55.14
Sex (=1 male; 2 female)	1.0343	1.0479	1.0223	1.0195	1.0355
Specialist Dairy	0.0541	0.1571	0.0739	0.0384	0.1486
UAA (ha)	27.4662	36.7169	32.7972	31.413	40.3539
Spouse (=1 if work off-farm)	0.4191	0.3167	0.1693	0.4495	0.3236
Married (=1 if married)	0.7449	0.6730	0.6571	0.7442	0.7095
Number of young in the family farm	0.8318	0.6278	0.0530	0.6121	0.4695
Number of family members living in the farm	3.6214	3.2889	2.1038	3.3444	2.9695
Hired (=1 if hired workers)	0.1097	0.1827	0.1373	0.1214	0.1855
Number of bovine on UAA	1.2609	1.3637	1.1722	1.1201	1.2531
Decoupled payments	7,237	9,059	11,485	11,264	14,499
Coupled Income	2,636	7,780	3,876	3,049	9,840
Mean Number of Farms each Year	330	1,184	312	264	1,049

Source: Teagasc National Farm Survey using authors own calculations, Hennessy et al. (2013).

The mean values include both the dependent and independent variables from our analysis. The values are presented for each model as the year of data coverage differs between models. The model of off-farm labour supply refers to the period 2002 to 2009, while the model of farm exit refers to the year 2011. As in the case of the analysis conducted in deliverable 11.2 (Loughrey et al 2013), we provide the values for the entire sample and for the sub-sample of farm operators engaged in off-farm employment. In the case of the farm exit model, we provide the mean values for those farms on the path to farm exit.

In terms of the off-farm labour supply model, the list of variables correspond to those provided in deliverable 11.2 with one exception. In this deliverable, we investigate the relationship between farm diversification and off-farm pluriactivity. We therefore include the measure of farm diversification as an independent variable and find that the mean value for this variable is quite low at 16.84 for the entire sample and only 12.03 for the farm operators engaged in off-farm pluriactivity (employment). The lower value for diversification among farmers engaged in off-farm pluriactivity suggests that a trade-off may exist between farm diversification and off-farm pluriactivity.

In terms of the farm exit model, the data refers to 2011. We find that 36.8 per cent of farms are on a path to exit in that particular year. This percentage is much lower among those operators engaged in off-farm employment at 26.5 per cent. This low percentage is partly a product of the criteria used to classify farms as being on a path to exit or otherwise. Farm operators can only be classified as being on a path to exit if the operator is older than 55 years

old. The average age of those with off-farm employment is 50 years old in 2011. The average age for farm operators on a path to farm exit is 65 years old. Therefore, we should not expect a relatively high percentage of farmers to be simultaneously engaged in off-farm employment and on a path to exit.

The proportion of farmers engaged in off-farm pluriactivity is somewhat lower in 2011 relative to previous years with only 32.05 per cent of farm operators engaged in off-farm employment in comparison to a 36.29 per cent average from 2002 to 2009. Among the subset of farmers engaged in off-farm pluriactivity, the average number of off-farm labour hours is approximately 200 hours per annum lower in 2011 relative to the average over the 2002 to 2009 period. These trends reflect the sharp downturn in the Irish economy post 2007. This decline in off-farm labour among operators contrasts with the trend among spouses where off-farm participation rates are slightly higher in 2011 relative to the preceding years. There is an increased dependence therefore on the income of spouses within farm families in Ireland.

With respect to the farm level variables, we find that the proportion engaged in specialist dairy farming is much lower than average among those farms on a path to exit. Only 7.4 per cent of exiting farms can be classified as specialist dairy. Previous studies of succession have shown that larger and more profitable farms are more likely to have a successor, see Hennessy and Rehman (2007) for a review of the literature. It is therefore unsurprising, given the superior profitability of specialist dairy farming relative to other enterprises, that few specialist dairy farms are on a path to exit. In addition, we find that average farm size is approximately 8 hectares lower among those farms on the path to exit relative to the full sample. Both decoupled payments and coupled farm income are lower than average on exiting farms. These statistics are entirely intuitive given that farms with low or negative profitability are less desirable for potential successors to acquire. It also reflects that profitable farms (i.e. those with a positive farm income following the deduction of decoupled subsidies) tend to employ on average more labour than non-profitable farms and can therefore draw on their existing workforce for future successors.

In terms of the demographic variables, the average age of the farm operator is much greater among those farms on the path to exit. The number of young people aged 15 or less is much lower on exiting farms and household size is well below average, at 2.1 individuals per household on exiting farms.

4.2 Model results

In this section, we present the results for both the off-farm labour supply model and the farm exit model.

Off Farm Labour Supply Model

In Table 2, we present the off-farm labour supply model results both in terms of the participation decision and the number of off-farm labour hours.

Table 2. Results for Off-Farm Labour Supply Model

DEPENDENT VARIABLE	Off-Farm Participation		Number of Hours	
Farm Diversification	-0.0193*** (0.00)	-0.0190*** (0.00)	-0.0234** (0.01)	-0.0300** (0.01)
Age	0.366*** (0.05)	0.349*** (0.05)	0.456** (0.21)	0.597*** (0.22)
Age Squared	-0.00482*** (0.00)	-0.00462*** (0.00)	-0.00771*** (0.00)	-0.00955*** (0.00)
Sex	-0.197 (0.34)	-0.224 (0.34)		
System	-1.499*** (0.19)	-1.449*** (0.19)	-2.553** (0.99)	-2.977*** (1.00)

Size	-0.0264*** (0.00)	-0.0264*** (0.00)	-0.0250 (0.02)	-0.0325* (0.02)
Spouse (=1 if work off-farm)	-0.0372 (0.13)	-0.0251 (0.13)	-0.801*** (0.25)	-0.798*** (0.25)
Married	0.690*** (0.20)	0.709*** (0.20)	-0.197 (0.61)	0.0152 (0.61)
Number of Young in the Family	-0.231*** (0.07)	-0.242*** (0.07)	-0.139 (0.17)	-0.216 (0.17)
Number of Family Members in the Farm	0.186*** (0.05)	0.183*** (0.05)	-0.210 (0.13)	-0.145 (0.13)
Hired (=1 if presence of hired workers)	-0.107 (0.12)	-0.109 (0.12)	-0.220 (0.21)	-0.281 (0.21)
Number of Livestock Units per UAA	-1.178*** (0.13)	-1.182*** (0.13)	-0.824 (0.68)	-1.210* (0.69)
Decoupled Payments	-0.157*** (0.05)		0.0993 (0.10)	
Coupled Income		-0.0288 (0.02)		-0.145*** (0.06)
2003	0.0929 (0.13)	0.0893 (0.13)	0.0872 (0.21)	0.109 (0.21)
2004	0.381*** (0.13)	0.372*** (0.13)	0.356 (0.28)	0.486* (0.29)
2005	0.835*** (0.15)	0.597*** (0.14)	0.615* (0.37)	0.875** (0.38)
2006	0.974*** (0.16)	0.688*** (0.14)	1.020** (0.43)	1.246*** (0.43)
2007	0.968*** (0.16)	0.694*** (0.14)	1.267*** (0.44)	1.540*** (0.45)
2008	1.221*** (0.17)	0.922*** (0.15)	1.517*** (0.55)	1.816*** (0.56)
2009	0.846*** (0.17)	0.528*** (0.15)	0.957** (0.41)	1.058*** (0.41)
Mills Ratio			0.607 (0.67)	1.081 (0.69)
_cons	-5.88*** (1.05)	-5.54*** (1.04)	13.37*** (4.02)	10.70*** (4.14)

Level of Significance: *p<0.10, **p<0.05, ***p<0.01

The above results suggest that farm diversification has a negative relationship with the supply of off-farm labour, both in terms of the participation decision and the number of hours supplied. This implies that a trade-off exists between farm diversification and off farm employment at the farm level. The negative association between farm diversification and off-farm employment is intuitive on a number of fronts. Farmers, as in the case of other workers, face limitations in the number of different activities that they can successfully practice during any given year. The difficulties associated with combining off-farm and farm work can potentially be reduced through a concentration of farm activity in one enterprise to simplify the managerial requirement/time allocation to farm work. Low levels of diversification and the presence of off-farm employment appears to be most common among non-dairy cattle farmers and tillage farmers.

While the tendency towards the avoidance of diversification as a strategy to simplify farm work may explain much of the behaviour among the non-dairy cattle farms with respect to off farm labour supply, there is likely to be many other factors at play in the case of tillage farms, where the farm income risk of the tillage enterprise, which is greater than in the case of non-dairy cattle farms, must be considered. Recent trends suggest that income derived from off-farm employment can offer a more predictable income stream than the income derived from risky farm enterprises, notwithstanding the many losses in off-farm employment of recent years. Average farm income net of decoupled payments on tillage farms fell from a profit of approximately €20,000 in 2007 to a loss of €6,700 in 2009 but recovered subsequently. Fluctuations in average income have been much less dramatic for the non-dairy cattle farms in the post-decoupling period (Connolly et al.,2010). The choice between farm diversification and off-farm employment could therefore be interpreted as an income risk management decision for tillage farmers.

Another intuitive result from the probit analysis is that the household size variable (i.e. number of family members) becomes significantly positive in the participation decision after the inclusion of the farm diversification variable. The interaction between household size and farm diversification can perhaps be explained by the greater scope for larger households to partake in multiple enterprises. The workload of different enterprises can therefore be divided between household members in larger households. Most of the other independent variables have the expected signs. The impact of age appears to be non-linear, as suggested by the results obtained in deliverable 11.2, while the presence of a specialist dairy system, the farm size variable and the number of bovine per hectare, are all found to be negatively associated with the off-farm participation decision.

In terms of the main policy variable, we find that decoupled payments have a significant negative effect on the participation decision, but are not a significant determinant of hours supplied off-farm. The significance of decoupled payments in reducing off-farm participation did not appear in the results of deliverable 11.2, as that research excluded the farm diversification variable and used the number of livestock units rather than the livestock units per hectare as explanatory variables. The latter appears to be the most important factor. The number of livestock units is highly correlated with the size of the direct payment over the relevant eight year period and can potentially mask the significance of decoupled payments. The results show that coupled income has a negative effect on the supply of off-farm labour hours but is insignificant in terms of the participation decision.

The time dummies suggest a positive time trend over much of the period. The time coefficients reach a peak in 2008 and subsequently decline in 2009 as the effects of the economic crisis took hold. The growing significance of the time trend appears to coincide, to some extent, with the introduction of the decoupled direct payments in 2005. In the participation equation, the sign of the time dummies contrasts with that of the decoupled payments variable. It is not clear therefore that the time dummies are capturing the impact of the introduction of decoupling and may simply be capturing other changes across agriculture or in the wider economy.

Farm Exit Model Results

In the farm exit model, we utilise a similar list of variables to those included in the off-farm labour supply model. In the case of the off-farm labour supply model, a panel probit is utilised, whereas the farm exit model is a cross-section based probit model using data from one year. In terms of the variables under study, the main difference between the farm exit model and the labour supply model is that the off-farm employment variables are included as regressors in the farm exit model, rather than as dependent variables.

The probit results of the farm exit model are presented in table 3. These show that off-farm pluriactivity is positively associated with the probability of a farm being on the path to exit. This positive relationship with off-farm labour activity did not appear likely from the summary statistics in table 1 which showed that only 23.1 per cent of exiting farms have off-farm employment. If we confine our analysis however, to farmers aged 55 and over, we find that the exiting farms have much higher rates of off-farm labour participation than the non-exiting farms (23.1 per cent versus 15.8 per cent). The positive relationship between off-farm employment and farm exit implies that off-farm employment is becoming a path to farm exit rather than a strategy to remain within agriculture. Our results, therefore, conform to those of Roe (1995) and Weiss (1997), in that both of those studies also found a positive association between off-farm employment and the probability of farm exit.

In terms of the other farm level variables, we find that few are statistically significant. The number of livestock units per hectare variable is significantly negative but only at the ten per cent level, while farm size is negative and significant at the ten per cent level, but only with the inclusion of coupled income as another independent variable. Neither decoupled payments, nor coupled income, are found to be significant determinants of farm exit in general.

The household-level variables turn out to be very significant determinants of farm exit. As expected, age is positively associated with the probability of farm exit, although it appears to be non-linear as age squared is significant and negative. The number of young people aged less than 15 years old in the household appears to increase the probability of farm exit occurring. However, this result is largely a product of the criteria used to define farms as being on a path to exit or otherwise. Many of the young people aged less than 15 years old could potentially take over the management of the farm, but our criteria claims that they are too young to be categorised as potential successors. Larger household size significantly reduces the probability of a farm exit, which makes clear intuitive sense, while marriage is found to be an insignificant factor.

Table 3. Results for Farm Exit Probit Analysis

DEPENDENT VARIABLE	FARM EXIT			
Off-Farm Pluriactivity (0,1)	0.359** (0.16)	0.350** (0.16)		
Off-Farm Pluriactive Hours			0.0277** (0.01)	0.0271** (0.01)
Age	0.898*** (0.09)	0.899*** (0.09)	0.910*** (0.09)	0.911*** (0.09)
Age Squared	-0.007*** (0.00)	-0.007*** (0.00)	-0.007*** (0.00)	-0.007*** (0.00)
Specialist Dairy	0.0779 (0.19)	-0.00892 (0.17)	0.0775 (0.19)	-0.00557 (0.17)
UAA (ha)	-0.0026* (0.00)	-0.00180 (0.00)	-0.00266* (0.00)	-0.00186 (0.00)
Spouse working off-farm	-0.0275 (0.14)	-0.0211 (0.14)	-0.0259 (0.14)	-0.0195 (0.14)
Married	-0.0409 (0.16)	-0.0403 (0.16)	-0.0520 (0.16)	-0.0510 (0.16)
Number of young in HH	0.471*** (0.12)	0.470*** (0.12)	0.470*** (0.12)	0.469*** (0.12)
Household Size	-0.428*** (0.06)	-0.429*** (0.06)	-0.427*** (0.06)	-0.428*** (0.06)
Hired Workers (1,0)	0.0445 (0.14)	0.0531 (0.15)	0.0508 (0.14)	0.0592 (0.15)
Number of bovine Per UAA	-0.189* (0.11)	-0.185* (0.11)	-0.190* (0.11)	-0.187* (0.11)
Decoupled payments (in €10,000s)		-0.0509 (0.06)		-0.0493 (0.06)
Coupled Income (in €10,000s)	-0.0194 (0.03)		-0.0185 (0.03)	
_cons	-29.09*** (2.91)	-29.09*** (2.91)	-29.45*** (2.93)	-29.45*** (2.94)
N	1,049	1,049	1,049	1,049

Level of Significance: *p<0.10, **p<0.05, ***p<0.01

5. Conclusions

This paper has outlined three alternative forms of pluriactivity and provides econometric analysis with two of these alternatives. The paper investigated the contribution of 'within the farm gate' pluriactivity towards off-farm labour supply decisions in Ireland and the contribution of 'beyond the farm gate' pluriactivity towards the probability of farm exit in Ireland. These represent major topics central to the future structure of agriculture and the health of rural labour markets in the EU. While the analysis is confined to the case of Ireland, there are many useful insights provided that can be of relevance to the situation in other EU member states.

The results of the model suggest that "within the farm gate" pluriactivity has a significant and negative effect on off-farm labour supply. In other words, operators of more diversified farm businesses are less likely to engage in off-farm pluriactivity. This results is somewhat intuitive and in keeping with previous findings. Diversified farm enterprises are likely to have a higher labour requirement, thus reducing the potential supply of labour to off-farm activities. Furthermore, the literature refers to off-farm pluriactivity, or multiple-job holding, as a risk diversification strategy. Given that diversified farms already have more diverse income sources, they are less likely to engage in such risk management strategies.

The second model supports the findings of previous studies that pluriactivity, or multiple-job holding, is positively associated with farm exit. Farmers with off-farm employment have a reduced probability of having a farm successor. This result suggests that pluriactivity is a short-term farm survival strategy and while it may prolong the farming life of the current generation, it does not guarantee the long-term sustainability of farming for future generations.

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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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EU funding	1,979,023 €
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