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The effect of farmer attitudes on openness to land transactions: evidence for Ireland

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Abstract. Ireland suffers from very low levels of farmland mobility by European standards. This paper examines the role of attitudes in farmers' openness toward land transactions using a nationally representative survey of Irish farmers across the major farm systems. The results show that attitudinal factors are a significant predictor of openness to land mobility, both on the supply and demand side of the market. Additionally, there appears to be a greater demand amongst farmers for temporary land transactions such as land leasing arrangements than is currently seen in at market level.

Keywords: land markets, attitudes, Ireland.

1. INTRODUCTION

Land mobility is becoming an increasingly important issue for European agriculture. The enhanced market orientation of European agriculture and reduced reliance on subsidies requires farmers to be more efficient in their use of factors of production. This is coupled with European farmers getting older on average and the need amongst young European farmers for access to land (Davidova & Thomson, 2014; Zondag, 2015). Access issues are further complicated by the increasing land concentration in Europe, with more land being held by fewer farmers (Kay et al., 2015; van der Ploeg et al., 2015).

Agricultural land transactions in Europe occur within a range of national institutional and regulatory environments (Ciaian et al., 2010; Ciaian et al., 2012; Needham et al., 2011). One consequence of these diverse land governance frameworks is that land sales and land rental markets may operate uniquely from country to country. Despite an integrated agricultural market and the longstanding Common Agricultural Policy, the share of rented land varies between 20 and 80 per cent across the EU (Ciaian et al., 2010). Preferences for land ownership over land rental or vice versa have been linked to capital market imperfections, farm profitability and government regulations (Swinnen et al., 2016).

At an EU policy level, tension exists between encouraging land mobility so as to enable the structural change required for farms to reach an eco-

nomically viable size and protecting the family farming model which accounts for 97 per cent of European farms (Davidova & Thomson, 2014; Hennessy, 2014). Enabling land to change hands but also maintaining local connections to rural areas requires a nuanced policy response. Individual member states have tried to balance these policy priorities by giving young, local farmers first refusal when land becomes available locally or by providing brokerage type services between young and retiring farmers (Ingram & Kirwan, 2011; Piet et al., 2012).

In this context, the abolition of the quota on milk production in 2015 presents an opportunity for structural change in European agriculture (Dervillé et al., 2016; Groenveld et al., 2016). The abolition of quota means that for farmers looking to increase production, land rather than quota rights will be the scarcest production factor (Boere et la., 2015). The potential for farmers to adapt to a post-quota landscape depends on many factors including demographics, socio-economic characteristics and the availability of inputs (Chevalier et al., 2012; Kempen et al., 2011). Land is an input of particular importance, especially in an Irish context. Irish dairy farming depends upon a grass-based rather than feed-based production system, meaning a sufficient supply of land is necessary to increase dairy production (Dillon et al., 2008). However, Ireland suffers from very low levels of land mobility by European standards (Ciaian et al., 2010). This means that accessing extra land for dairy farming may prove difficult. Despite efforts from policymakers to encourage long-term leasing arrangements, most rented land in Ireland is accessed through short-term, 11-month "conacre" contracts, unsuitable for the long-term infrastructural provisions that are required by dairy farmers (O'Neill & Hanrahan, 2012).

Irish land markets have traditionally been quite static, with land rarely changing hands. The dominant means of transfer of ownership is through non-market arrangements, usually inheritance, which is often attributed to the strong emotional attachment to land in Ireland (Donnellan et al., 2008). Rented land (both conacre and long-term leasing) only accounts for 18% of Utilisable Agricultural Area (UAA) in Ireland (Geoghegan & O'Donoghue, 2018). Due to the illiquid land market in Ireland, little information exists about what drives agricultural land transactions. This is especially true in relation to the supply of land. This study attempts to fill this information gap by examining the attitudes of Irish farmers to agricultural land mobility.

Given the lack of information about the characteristics of farmers who participate in land markets, an ex-ante approach is proposed to determine which types of farmers are open to land transactions. Previous research has concentrated on the use of stated intentions surveys to accomplish this task by asking what the farmer will do in the future (Breen et al., 2005; Lobley & Butler, 2010). However, given the static history of the Irish farmland market and stable policy conditions, it is not anticipated that many Irish farmers outside the dairy sector intend to change their current land allocation. Therefore, a more exploratory analysis is required to identify farmers who would be open to land market participation.

This study therefore aims to ask three main questions:

- Are farmers open to entering the land market? Generally speaking, farmers can either supply or demand land. This study will focus on farmers' openness to selling or leasing out land on the supply side and buying or leasing in land on the demand side. This contributes to the literature by quantifying land demand and supply in a context where market information is either missing or incomplete.
- What distinguishes famers who are open to entering the land market from those that are not? In addition to agronomic and socioeconomic differences, do farmers interested in land transactions approach farming from a different attitudinal standpoint than farmers uninterested in land mobility?
- Given the desire of policymakers to encourage long-term leasing amongst Irish farmers, are there differences between farmers interested in leasing and those interested in permanent transactions such as buying and selling?

This paper is structured as follows. Section 2 looks at the policy context of land mobility in greater detail, paying specific attention to the Irish situation. Section 3 deals with the methodology and data used in the study. Section 4 looks at the results of logistic regressions examining farmers' openness to entering the land market while Section 5 provides a discussion of the results and their impact on policy.

2. POLICY CONTEXT AND RELATED LITERATURE

A lack of land mobility has long been seen as an impediment to structural change in Irish agriculture (Commins, 2001; Inter-Departmental Committee on Land Structure Reform, 1978; Maguire, 1983). Currently, the issue of land mobility is of interest to policymakers in light of public policy commitments to increase the output of Irish agriculture in the coming years (DAFF, 2010; DAFM 2015). One particular commitment is to increase dairy output by 50% by the year 2020, with

sectoral growth expected to continue beyond that date[1]. Achieving this target, as well as future growth, will require the acquisition of additional land by dairy farmers (Dillon et al., 2008; Geoghegan & O'Donoghue, 2018; Läpple & Hennessy, 2012).

Currently, cattle farming is the dominant form of agriculture in Ireland, accounting for 57% of land (Geoghegan & O'Donoghue, 2018). Dairy farming accounts for 14.9% of agricultural land, with sheep farming taking place on 12.3% of land. Despite making up the largest share of farmland usage in Ireland, the average cattle farm has consistently returned negative market incomes over recent years and is dependent upon subsidies for survival (Hennessy & Moran, 2016). Only dairy farming has been consistently profitable, on average, over recent years. Land rental market simulation modelling by Loughrey and Hennessy (2019) suggests that a land market based solely on farm profit maximisation would lead to significant increases in farm size concentration with dairy and tillage farms growing at the expense of cattle and tillage.

Most Irish farms are owner-occupied, with the land owner generally being the farm operator (Donnellan et al., 2008). Farm ownership generally transfers through inheritance, with a single family member usually inheriting the intact farm structure. As a result, farmland rarely comes onto the open market. Land mobility outside of intra-family transfer is dependent upon land rental and sales markets. Attempts have been made at a policy level to increase land mobility in Irish agriculture, most notably the introduction of tax exemptions to incentivise the long-term leasing of land. Traditionally, land has been rented in Ireland on a short-term, 11-month basis. To encourage longer term leasing agreements, tax incentives were first introduced in 1985. These incentives allowed income derived from the long-term leasing of land (minimum of five years) to be exempt from income tax up to specified limits. Over time, these exemption limits have increased, with higher limits being added for leases of longer periods. By 2015, up to €40,000 per year can be earned free of income tax for leases of 15 years or longer. Other policy measures to encourage land mobility have been introduced including stamp duty exemptions for young farmers acquiring land, the promotion of farm partnerships and capital gains relief to encourage land consolidation (Macra na Feirme, 2015; DAFM, 2018).

Studies concerning land mobility in Ireland have mostly focused on the succession and inheritance aspect of land transfer (Hennessy & Rehman, 2007; Kennedy, 1991). It has been found that policy instruments incentivising either the early retirement of older farmers or the installation of younger farmers on farms have had limited success in increasing the level of land mobility (Bika, 2007; Gillmor, 1999). Land mobility studies in Ireland outside succession and inheritance processes have been relatively rare. Conway (1986) studied land leasing practices in the west of Ireland and found that although potential lessees were willing the pay more for land than the prevailing rate, potential lessors were generally not interested in leasing out land as long as they were able to continue farming the land themselves. Jenkins (1997) found in a study of leasing activity in the south-east of Ireland that commercial tillage[2] and non-local[3] farmers were predominant in the rental market, with land being supplied by older farmers operating smaller farms.

Bogue (2013) found that three-quarters of farmers with no successor would consider renting out land on either a long or short-term basis when they themselves were no longer able to farm at their current level. This compared with 28% of farmers who would consider selling their land in the same situation. Banovic et al. (2015) found general support for policy measures incentivising land mobility amongst Irish farmers but also found that surveyed farmers were reluctant to take advantage of the policy measures themselves.

O'Neill and Hanrahan (2012) examined Irish farmers' land market decisions from the perspective of the decoupling of agricultural support payments from agricultural production. Following decoupling, Irish farmers are required to maintain the area of land on which they claim their single payment in a state fit for agricultural production although actual production is not required. The authors found that decoupling led to a modest reduction in net land rental on average but a lack of information on consolidation, where famers whose land rental agreements had expired could transfer payments from areas where they no longer rented to land that they still possessed, made the true impact of decoupling on land decisions difficult to assess.

Due to the low number of transactions in Irish land markets, as well as the lack of literature in the area, little information exists about the characteristics and attitudes of Irish farmers who enter the land market. Therefore, this study includes a wide range of factors which may drive willingness to enter the land market. As well as structural and socio-economic factors, farmer attitudes are considered. Farmer behaviour has been shown to be

[1] The 50% increase is compared to the output of the average of total production between 2008 and 2010. This target was achieved in 2018, two years ahead of schedule.

[2] Specialist tillage farmers for who tillage accounts for at least two-thirds of the farm's total standard gross margin.

[3] Greater than 10 kilometres away.

affected by a multiplicity of farming goals and attitudes (Willock et al., 1999a). There is a large literature on the attitudes and objectives of farmers and the impact of these on farming behaviour with farming attitudes being identified as important to risk aversion, innovation, diversification, off-farm work, environment, production, management, legislation, stress, pessimism and satisfaction toward farming (Willock, 1999b provides a review of the literature). Non-economic objectives such as farmer lifestyle have also been shown to strongly affect farmer decisions (Howley et al., 2015; Marr et al., 2019). Studies related to attitudes of farmers toward land have tended to focus on land use, especially in terms of environmental issues (Mills et al., 2013; Wilson, 1996). Given the absence of information about farmers in the Irish land market, these factors will provide a sense of what drives farmers in their consideration of land transactions.

3. CASE STUDY AND METHODOLOGY

This paper uses a nationally representative survey to examine the willingness of Irish farmers to engage in a land transaction. Given the binary nature of this proposition (the farmer either does or does not want to engage in the transaction), a logit model is utilised. Four logit models are used to examine the willingness of farmers to lease land in, lease land out, buy land and sell land. One difficulty with interpreting non-linear models such as the logit is that unlike linear models, an explanatory variable's coefficient does not equal its marginal effect. A given change in an explanatory variable x will usually have less effect when the response probability $P(y = 1|x)$ is near the extreme values of zero or one as compared with middle values. Therefore, this study uses odds ratios to interpret the marginal effects of the explanatory variables. Odds ratios in logit models can be interpreted as the effect of a one unit change in x in the predicted odds ratio with the other variables in the model held constant. The odds of $P(y = 1|x)$ increase multiplicatively by $e^{\beta}$for a one unit increase in x, holding all other variables constant.

In order to determine the attitudinal orientation associated with farmers in the sample, a set of attitudinal statements was included as part of the survey questionnaire. Principal Component Analysis (PCA) is used to identify underlying structural relationships between farmer responses to these attitudinal statements. PCA finds the linear combination that explains the maximum amount of variance among the observed variables – called the "first principal component". It also finds another, orthogonal (uncorrelated) linear combination that explains the maximum amount of remaining variance ("second principal component"), and so on until all variance is explained (Hamilton, 2013). PCA thus serves as a data reduction technique, allowing the analysis of the attitudinal statements to be simplified. Each principal component has an eigenvalue, which represents the standardised variance explained by the component. Principal components with values of less than one eigenvalue explain less than the equivalent of one variable's variance so are set aside for purpose of analysis (Abdi & Williams, 2010). Following the PCA, varimax orthogonal rotation is used to further simplify the factor structure.

4. DATA

This paper's analysis of farmer attitudes to land mobility is based on a survey of 837 Irish farmers in 2014 and 2015. The survey used random probability sampling to survey a representative number of farmers from each county in Ireland. In order to achieve a representative geographical spread, a starting point was randomly selected in each county with every third farmer being selected to participate in the study. The survey continued in each county until a quota of respondents in each county was reached. Quota sampling set demographic quotas on the sample based on known population distribution figures. The quotas used here were based on known population distribution figures in relation to specific farm systems (dairy, cattle rearing, cattle other, sheep, tillage and mixed) taken from Central Statistics Office data (CSO, 2012)

The respondents were asked questions based on three different areas: current farm characteristics; attitudes to land, farming and future plans; and knowledge about land-based policy initiatives. The survey also contained 15 attitudinal questions using a four-level Likert scale ranging from "strongly disagree" to "strongly agree". The respondents could also choose a "don't know" option. There is little consensus regarding the correct number of response options or whether an odd number of response options should be used in order to allow a neutral, midpoint response (Sturgis et al., 2014). In the context of this study, it has been found that 4-point scales (as used here) yield similar levels of reliability compared to 5-pont scales which would contain a midpoint (Alwin, 2007). Neutral, midpoint responses can also represent hidden "don't know" answers (Sturgis et al., 2014). Therefore, it was decided to use a 4-point scale with an additional "don't know" option.

Table 1. Mean scores and percentage agreement with attitudinal statements.

	Mean scores	Percentage completely agreeing
It is important not to leave farm land idle	1.50	55.4
It is important for me to pass on my land in as good a shape or better than I received it	1.46	53.4
I enjoy farming much more than I would other potential sources of employment	1.32	48.1
Farming is a more rewarding job in terms of quality of life, independence and lifestyle than it is in terms of money	1.20	44.6
It is important not to be afraid of adopting new farming practices	1.15	32.4
I have to keep my farm running to ensure I have something to pass on to my children/next generation	1.13	42.1
To be successful in farming it is important for me to adapt and use new technologies (whether agri or non-agri technologies)	1.10	33.5
It is important to visit other farms to look at their methods	1.03	36.2
I don't think it is a good idea to take too many risks when it comes to farming	1.00	30.5
It is important for me to be respected by other farmers	1.00	30.6
I am good at finding different types of information to help me run my business	0.97	28.5
Agricultural land in Ireland is under-utilised	0.48	20.2
I am cautious about adopting new ideas and farm practices	0.37	16.6
My economic future on this present farm is bright	0.36	16.9
It makes more sense for me to join an agricultural scheme if my neighbours are also joining	0.13	17.4

The statements drew on previous work examining Irish farmers' attitudes toward farming decisions (Howley & Dillon, 2012; Howley et al., 2015), as well as input from experts. The attitudinal statements are listed in Table 1, as well as the mean scores and percentage of respondents completely agreeing with of each statement. Mean scores were computed by assigning a score to each level of agreement (2 for "strongly agree", 1 for "agree", -1 for "disagree" and -2 for "strongly disagree") and averaging the scores of the participants for each statement.

Four principal components with eigenvalues above one were generated by the PCA and rotation process, representing different attitudes toward farming among the respondents. These attitudes are related to the importance of innovation in farming, optimism about the future of agriculture, the non-economic benefits of farm work and conservatism regarding the farm business. A description of the attitudinal variables is available in Table 2. The factor loadings for each attitudinal statement onto the four principal components can be found in Table 3.

Respondents were asked about their openness to four forms of land transaction:

i. Land purchase;
ii. Land sale;
iii. Land lease in;
iv. Land lease out.

Respondents replied either "Yes" or "No" in terms of whether they were ever willing to engage in each form of transaction. Of the 837 farmers surveyed, 47% were willing to buy land, while 26% were willing to sell. In terms of leasing, 51% were willing to lease in land, while 29% were willing to lease out land. A logistic regression model is used to examine the probability of a farmer being open to each land transaction. The dependent variable is the willingness to engage in the land transaction (purchase land, sell land, lease land in, lease land out).

Besides the attitudinal variables described previously, explanatory variables utilised in the model include variables representing the farmer's age, plans for future farm production, whether the farmer has children or not, the presence/absence of a successor to take over the farm business, whether the farmer has an off-farm job or not, market farm income, value of entitlements, land prices, the percentage of household income derived from the farm business. Farm structure and agronomic variables such as farm size, farm system, soil type and stocking rate are also included (see Table 4). The final specifications of the regression models are shown in Tables 5 and 6. In most cases, respondents chose from a range of values rather than state exact values, so variables based on instances where respondents chose from a range of variables are treated as categorical variables. For categorical variables such as age and farm size, the reference categories are the categories most frequently chosen by respondents. For age, this is the 51-64 years category and for farm size, the 20-49 ha category.

Table 2. Description of attitudinal variables.

Attitudinal variable	Description
Innovative orientation	Farmers with a high ranking in this variable acknowledge the importance of technology and new ideas with regard to farming. They agree strongly with statements such as "It is important not to be afraid of adopting new farming practices" and "I am good at finding different types of information to help me run my business".
Pleasure of farming orientation	Farmers with a high ranking in this variable emphasise the non-economic benefits of farming, especially compared to non-farming employment. They are also concerned with their farming legacy. They agree strongly with statements such as "Farming is a more rewarding job in terms of quality of life, independence and lifestyle than it is in terms of money" and "It is important for me to pass on my land in as good a shape or better than I received it".
Conservative orientation	Farmers with a high ranking in this variable prefer to rely on traditional farming practices and dislike change. They agree strongly with statements such as "I don't think it is a good idea to take too many risks when it comes to farming" and "I am cautious about adopting new ideas and farming practices".
Agri-optimistic orientation	Farmers with a high ranking in this variable are optimistic about the future of agriculture and enjoy being farmers. They agree strongly with statements such as "My economic future on this present farm is bright" and "I enjoy farming much more than other potential sources of employment".

Table 3. Factor loadings of attitudinal statements.

Statement	Pleasure of farming	Innovative	Agri-optimistic	Conservative
Agricultural land in Ireland is under-utilised	0.1666	0.3447	0.2091	0.0107
I enjoy farming much more than I would other potential sources of employment	0.4027	0.0196	0.5615	0.0332
I am good at finding different types of information to help me run my business	0.1075	0.4731	0.5335	0.0634
My economic future on this present farm is bright	0.0619	0.285	0.662	0.0321
To be successful in farming it is important for me to adapt and use new technologies (whether agri or non-agri technologies)	0.1398	0.5872	0.2708	0.036
I have to keep my farm running to ensure I have something to pass on to my children/ next generation	0.5969	0.2275	0.2029	0.0479
I am cautious about adopting new ideas and farm practices	0.0407	0.0712	0.1231	0.7262
It is important for me to be respected by other farmers	0.0744	0.2416	0.3484	0.5341
It makes more sense for me to join an agricultural scheme if my neighbours are also joining	0.0508	0.2087	0.4206	0.4901
Farming is a more rewarding job in terms of quality of life, independence and lifestyle than it is in terms of money	0.5927	-0.119	0.3865	0.0128
It is important for me to pass on my land in as good a shape or better than I received it	0.6827	0.2444	0.1274	0.0055
It is important to visit other farms to look at their methods	0.1252	0.7124	0.1445	0.1457
It is important not to be afraid of adopting new farming practices	0.1569	0.7693	0.0685	0.0285
It is important not to leave farm land idle	0.6557	0.3514	0.0997	0.0135
I don't think it is a good idea to take too many risks when it comes to farming	0.2029	0.0144	0.1156	0.6099
Initial eigenvalues	2.29	2.23	1.73	1.55

Farm income and CAP entitlements payment data was collected as part of the survey but about 30% of the sample decided not to answer. In order to include farm income data, the missing information was replaced using farm income information from the 2014 Teagasc National Farm Survey (Hennessy & Moran, 2014), a yearly, nationally representative survey of Irish farmers which is Ireland's contribution to the Farm Accountancy Data Network (FADN). For CAP payments data, the missing data was replaced by assigning average per hectare CAP payments by farm system from the 2014 NFS in place of the missing values. Since per hectare CAP payments are closely related to farm system in Ireland, this seemed the most appropriate solution. Average land value and rental prices were sourced for the time period from the Irish Central Statistics Office (CSO) for land prices and Eurostat for land rental values, which are based on data from FADN. The data was available at the NUTS3 regional level (8 regions in Ireland) for land values and NUTS2 level (3 regions) for rental prices.

Table 4. Independent variables of land mobility model.

Variable	Description	Mean/ Mode[1]	Standard Deviation
Innovative orientation (Innovative)[2]	Factor variable measuring degree to which farmer feels technology and new ideas are important.	0	1
Pleasure of farming orientation (Pleasure of Farming)[2]	Factor variable measuring degree to which farmer enjoys farming as opposed to other occupations.	0	1
Agri-optimistic orientation (Agri Optimistic)[2]	Factor variable measuring degree to which farmer feels optimistic about the future of their farm.	0	1
Conservative orientation (Conservative)[2]	Factor variable measuring degree to which farmer is cautious about risk-taking and new ideas.	0	1
Farm Size[3]	Number of hectares farmed in 2014 (<10 ha, 10-19 ha, 20-49 ha, 50-74 ha, 75–99 ha, 100-149 ha, 150+ ha)	20-50ha[1]	N/A
Soil Quality[4]	Description of soil type on land (good soil, medium soil, poor soil)	Good[1]	N/A
Increase Future Production	Plans for farming over the next five years (aim to increase production, maintain current levels of production)	0.17	0.38
Decrease Future Production	Plans for farming over the next five years (aim to decrease production, maintain current levels of production)	0.09	0.28
Diversify Future Production	Plans for farming over the next five years (aim to increase diversification, maintain current levels of production)	0.09	0.28
Stocking Rate	Number of livestock units (LUs) per hectare	1.5	1.76
Farm System[5]	Main farm activity (dairy, cattle rearing, cattle other[6], tillage, sheep, mixed[7], other)	Cattle other[1]	N/A
Age	Age in years (<35 years, 35-44 years, 45-50 years, 51-64 years, 65+ years)	51-64*	N/A
Children	Does the farmer have any children (Yes, No)	0.71	0.45
Successor	Has the farmer identified a successor (Yes, No)	0.43	0.50
Household Income from Farming	Percentage of overall yearly household income derived from farming (0-25%, 26-50%, 51-75%, 76-100%)	76-100%[1]	N/A
Market Farm Income	Farm income after costs minus subsidies	2,996	10.680
Off-farm Job	Does the farmer have an off-farm job (Yes, No)	0.33	0.47
Entitlements Value	Value of farm CAP entitlement payments	10,282	14,212
Rent Price	Average regional per hectare farmland rental price	252	35
Land Price	Average regional per hectare farmland price	16099	4221

[1] Mode.
[2] Attitudinal variables have mean zero as each variable is standardised to mean zero as part of the PCA process.
[3] Farm size share by percentage: <10ha – 6%, 10-19ha – 20%, 20-49ha – 44%, 50-74ha – 15%, 75-99ha – 9%, 100-149ha – 4%, 150+ha – 2%.
[4] Soil quality is self-reported but definitions of each soil type were provided to aid respondents.
[5] Farm system share by percentage: dairy – 22%, cattle rearing – 14%, cattle other – 29%, tillage – 11%, sheep – 15%, mixed – 5%, other – 3%.
[6] Cattle other refers to cattle finishing farms where cattle are fattened up in preparation for slaughter.
[7] Mixed refers to farms that combine grazing livestock and field crops.

5. RESULTS

Four logistic regression models were created using the available data. The dependent variable in each case was willingness to engage in the stated land transaction. Two models analysed farmers' attitudes to the leasing of land. 417 farmers were open to leasing in land while 245 farmers were willing to lease out land. The results from these two models are presented in Table 5. Two models analysed farmers' attitude to permanent land transactions. 447 farmers were open to buying land while 218 farmers were willing to sell land. The results from these two models are presented in Table 6.

Attitudinal variables

The attitudinal variables derived from the PCA analysis were found to have a statistically significant impact on a farmer's willingness to enter the land market. The attitudinal orientation "Innovative" has a positive impact on a farmer's willingness to lease land. For every one unit increase in the orientation, the probability of leasing out land increases by a factor of 1.29 and of leasing in land by a factor of 1.21. The "Pleasure of Farming" variable has a negative impact on willingness to sell land. Additionally, it is positively correlated with a willingness to buy and lease in land.

Table 5. Factors related to the probability farmers are open to leasing land.

Lease Out	Coef.	Std. Err.	Odds Ratio	Lease In	Coef.	Std. Err.	Odds Ratio
Innovative	0.25***	0.09	1.29		0.19**	0.09	1.21
Pleasure of Farming	-0.13	0.08	0.88		0.18**	0.08	1.20
Conservative	-0.03	0.09	0.97		-0.21**	0.08	0.81
Agri-Optimistic	-0.13	0.09	0.88		0.21**	0.09	1.24
Good Soil	0.43	0.35	1.53		-0.45	0.32	0.64
Medium Soil	0.65*	0.35	1.92		-0.35	0.32	0.70
Cattle Rearing	0.18	0.25	1.20		0.25	0.26	1.28
Dairy	-0.79**	0.33	0.45		0.39	0.32	1.47
Tillage	-0.63**	0.30	0.53		0.29	0.29	1.34
Sheep	-0.70***	0.27	0.49		0.02	0.26	1.02
Mixed	-0.96**	0.44	0.38		-0.91**	0.41	0.40
Farm Size <10ha	0.08	0.40	1.08		-0.69	0.44	0.50
Farm Size 10-19ha	0.42*	0.23	1.52		-0.20	0.24	0.82
Farm Size 50-74ha	0.37	0.27	1.44		0.27	0.27	1.31
Farm Size 75-99ha	-0.11	0.41	0.89		0.31	0.40	1.36
Farm Size 100-149ha	0.59	0.54	1.80		-0.17	0.55	0.85
Farm Size >150ha	-0.23	0.96	0.79		0.22	0.98	1.24
Stocking Rate	-0.02	0.05	0.98		0.38***	0.09	1.46
Age <35	-1.11**	0.46	0.33		0.93**	0.40	2.52
Age 35-44	-0.03	0.25	0.97		0.01	0.25	1.01
Age 45-50	-0.28	0.27	0.75		-0.27	0.25	0.76
Age >65	0.21	0.21	1.23		-0.64***	0.21	0.53
Children	0.14	0.20	1.15		0.40**	0.20	1.49
Successor	-0.40**	0.18	0.67		-0.44**	0.18	0.64
Increase Future Production	-0.18	0.24	0.84		0.77***	0.24	2.16
Decrease Future Production	0.81***	0.28	2.26		-0.54*	0.33	0.58
Off-Farm Job	-0.11	0.21	0.89		0.53**	0.22	1.70
Household Income from Farming ≤ 25%	0.31	0.29	1.36		0.16	0.30	1.17
Household Income from Farming 26-50%	-0.04	0.25	0.96		-0.35	0.25	0.70
Household Income from Farming 51-75%	0.36	0.28	1.43		-0.52*	0.29	0.59
Farm Income	0.02*	0.01	1.02		0.02	0.01	1.02
Entitlements Value	0.01	0.02	1.01		0.02	0.02	1.02
Rent Price	0.00	0.00	1.00		-0.01***	0.00	0.99
Constant	-1.86**	0.78	0.16		2.83***	0.76	16.94
Pseudo R2	0.08***				0.19***		
AIC	999.13				1007.94		
BIC	1159.95				1168.75		
Observations	837				837		

Note: *** p<0.01, ** p<0.05, * p<0.1.

The "Conservative" variable is negatively related to the willingness to buy and lease in land while the "Agri-Optimistic" orientation is positively related to leasing in and buying land while negatively related to selling land.

Farm structure and agronomic variables

Of the farm system variables employed in the analysis, cattle rearing, cattle other, and mixed and dairy enterprises proved to be significantly related to willingness to enter the land market. In the "Lease Out" regression, dairy, tillage, sheep and mixed enterprise farmers were significantly less likely to be willing to lease out

Table 6. Factors related to the probability farmers are open to selling/buying land.

	Sell Land			Buy Land		
	Coef.	Std. Err.	Odds Ratio	Coef.	Std. Err.	Odds Ratio
Innovative	0.12	0.09	1.12	0.01	0.09	1.01
Pleasure of Farming	-0.25***	0.08	0.78	0.24***	0.08	1.27
Conservative	0.00	0.09	1.00	-0.23***	0.08	0.80
Agri-Optimistic	-0.19**	0.09	0.83	0.16*	0.09	1.17
Good Soil	-0.05	0.33	0.95	-0.05	0.32	0.95
Medium Soil	0.28	0.33	1.32	0.01	0.32	1.01
Cattle Rearing	-0.01	0.27	0.99	0.44*	0.26	1.55
Dairy	0.10	0.33	1.10	0.53*	0.31	1.70
Tillage	-0.14	0.32	0.87	0.33	0.30	1.39
Sheep	-0.18	0.27	0.83	-0.10	0.25	0.90
Mixed	-1.67***	0.59	0.19	-0.08	0.38	0.92
Farm Size <10ha	-0.04	0.41	0.96	-1.36***	0.47	0.26
Farm Size 10-19ha	0.03	0.25	1.03	-0.50**	0.24	0.60
Farm Size 50-74ha	0.04	0.28	1.04	-0.04	0.27	0.96
Farm Size 75-99ha	-0.04	0.41	0.96	0.23	0.40	1.25
Farm Size 100-149ha	0.04	0.54	1.04	-0.40	0.56	0.67
Farm Size >150ha	-2.04*	1.22	0.13	0.07	1.00	1.07
Stocking Rate	0.05	0.05	1.05	0.18***	0.07	1.20
Age <35	-0.28	0.41	0.75	1.37***	0.41	3.94
Age 35-44	0.32	0.25	1.38	0.56**	0.25	1.75
Age 45-50	0.56**	0.26	1.75	0.25	0.25	1.29
Age >65	-0.15	0.23	0.86	-0.50**	0.21	0.61
Children	0.14	0.21	1.15	0.63***	0.20	1.88
Successor	-0.50***	0.19	0.61	0.32*	0.17	1.37
Increase Future Production	-0.04	0.24	0.96	0.68***	0.25	1.98
Decrease Future Production	0.62**	0.30	1.86	-0.49	0.32	0.61
Off-Farm Job	-0.15	0.22	0.86	0.52**	0.22	1.69
Household Income from Farming ≤ 25%	0.22	0.30	1.25	0.17	0.29	1.19
Household Income from Farming 26-50%	0.43*	0.26	1.53	-0.08	0.25	0.92
Household Income from Farming 51-75%	0.41	0.30	1.51	-0.01	0.28	0.99
Farm Income	0.00	0.01	1.00	0.00	0.01	1.00
Entitlements Value	0.03*	0.02	1.03	0.03	0.02	1.03
Land Price	-0.00***	0.00	1.00	0.00	0.00	1.00
Constant	-0.72	0.54	0.49	-1.24**	0.51	0.29
Pseudo R2	0.08***			0.18***		
AIC	950.86			1018.68		
BIC	1111.68			1179.49		
Observations	837			837		

Note: *** p<0.01, ** p<0.05, * p<0.1.

land than the reference category of cattle other farmers. Stated differently, cattle rearing and cattle other farmers were significantly more willing to lease out land compared to all other farm systems. However, farm system was not significantly related to willingness to lease in land. Mixed farmers were significantly less willing to sell land than other farmers while dairy and tillage farmers were significantly more willing to buy land, albeit at the 10% significance level.

In general, significant effects for farm size were limited to either very small or very large farms. Farms under 20 hectares were the least likely to be willing to buy land compared with the most common farm size category. Farms of over 150 hectares were less willing to sell land

than the most common farm size category. Stocking rate was a significantly related to land demand. In terms of leasing in land, an increase of one LU/ha increased the probability of being willing to lease in land by a factor 1.46. An increase of one LU/ha increased the probability of the farmer being open to buying land by a factor of 1.20.

Soil quality was also included as an explanatory variable in each regression model. Three soil categories were used: good, medium and poor. The good and medium categories were included as dummy variables, with poor quality soil acting as the reference category. Soil quality was a significant explainer of willingness to enter the land market in the "Lease Out" model, with farmers on medium quality soil being significantly more open to leasing out land than those in the reference category.

Demographic variables

Age effects relating to willingness to enter the land market can be seen amongst the youngest and oldest categories of farmers. The youngest category of farmers (those under the age of 35) was significantly more willing to lease in and buy land compared to older farmers. Additionally, the youngest farmers were significantly less willing to lease out land. Farmers in the oldest age category (65 years and older) were significantly less likely to demand land either through leasing or purchase. Farmers in the 45-50 years were more likely to be willing to sell land than any other age category.

The presence of a farm successor was a significant explanatory variable in all four models. Having a successor was associated with farmers being significantly less likely to be willing to lease out or sell land, compared with farmers without a successor. Having a successor decreased the likelihood of being willing to lease out land by a factor of 0.67 and sell land by a factor of 0.61, compared to farmers without a successor. Interestingly, farmers with a successor were more likely to be willing to buy land but significantly less likely to be willing to lease in land than those without a successor.

Farmers with children were significantly more willing to demand land than farmers without children. Farmers with children were more likely to be willing to lease in land by a factor 1.49 and more likely to be willing to buy land by a factor of 1.88, compared with farmers without children.

Financial variables

Farmers were asked what percentage of household income is made up of farm income. Responses were divided into four categories: 0-25%, 26-50%, 51-75% and 76-100% of household income coming from farm income. The reference category was farmers for whom 76-100% of household income came from their farm (the most common response). Farmers in the 51-75% farm income category were less likely to be open to leasing in land than those who rely on farm revenues for over 75% of household income, while those in the 26-50% farm income category were more open to selling land.

Farmers with an off-farm job were significantly more likely to be open to leasing in and buying land than farmers without off-farm employment. Farmers with off-farm jobs were more likely by a factor of 1.70 to be open to leasing in land and by a factor of 1.69 to buying land than those without off-farm jobs. Market farm income is positively associated with willingness to rent out land while subsidy income from entitlements was positively correlated with selling land at the 10% significance level. Agricultural land prices and land rents at the regional level are also modelled. Regional farmland prices are significantly negatively correlated with a willingness to sell land while regional land rent prices have a negative relationship to willingness to rent land in.

6. DISCUSSION

This study examined the extent to which Irish farmers would be willing to enter the agricultural land market. The results show that about half of farmers in the sample are open to buying or leasing in land while about a quarter of farmers sampled are open to selling or leasing out land. The results also show distinct profiles emerging for farmers demanding land, through either leasing in or purchase and farmers open to supplying land, whether through leasing out or sale.

Farmers demanding land are more likely to have a high ranking on the "Pleasure of Farming" and "Agri-Optimistic" attitudinal orientations and a low ranking on the "Conservative" orientation. They are also more likely to have children, be planning to increase farming activity in the next five years and have an off-farm job. They are more likely to be under 35 years of age and a have a high stocking rate. They are less likely to have farms of less than 10 hectares and be over 65 years of age.

The issue of agricultural land demand, especially in how it relates to young farmers, has arisen in recent years in the context of increasing farmland concentration in Europe (Conway et al., 2020; van der Ploeg, 2015). A reduction in farm numbers by approximately 3.8 million and an increase in farm size by about 36% was seen in the EU between 2005 and 2015 (Eurostat,

2017). These results confirm the desire of young, optimistic farmers to access land but whose ability to do so may be hampered in a competitive land market (Zagata et al, 2017).

Farmers open to supplying land are more likely to rank high on the "Innovative" orientation for leasing out and rank low on the "Pleasure of Farming" orientation for selling. They are more likely to be intent on decreasing farming in the next five years and are less likely to have a successor. They are also more likely to be only somewhat dependant on farm income, receiving greater than 25% but less than 50% of total household income from farming.

Farmers ranking high in the "Pleasure of Farming" orientation value the lifestyle benefits of farming over any pecuniary benefits associated with the profession. Farmers have been found to have a multiplicity of motivations for why they farm, many of which are non-economic in nature (Howley et al., 2015; Key & Roberts, 2009). For these farmers, land may not be seen as an economic resource but as a source of utility in and of itself. Therefore, it is not surprising that farmers with a high ranking in this orientation are opposed to releasing land and are open to increasing their land stock.

The finding that farmers with a high ranking in the "Innovative" orientation are more open to supplying land, both through leasing and sale, suggests that these farmers are less constrained by traditions of keeping land "in the family name". They may see land as just another input in the agricultural production process. Innovative farmers in the Irish context may be thought about as generating new combinations of existing resources (Bender & Laestadius, 2005).

The positive effect of having children and having a designated successor on willingness to buy land (and lease in land for the "Children" variable) fits in with the farm life cycle concept (Calus et al., 2008; Potter & Lobley, 1992). This farm life cycle concept suggests that a farm can be in one of three stages: growth, maturity or decline. Younger farmers are expected to grow, while older farmers are expected to be in the maturity or decline stages. However, farmers with a successor do not enter the decline stage but rather are more likely to want to grow the farm in order to leave a legacy for their successor (Calus et al., 2008; Inwood & Sharp, 2012). The finding that farmers with successors are more willing to buy land but are significantly less likely than farmers without successors to want to lease in land may be related to the lack of trust amongst Irish farmers in the leasing system (Banovic et al., 2015; Bogue, 2013).

Farmer age effects align with previous studies, with younger farmers most likely to want to add land, while farmers who are older are significantly less likely to want to increase their farm size (Gale, 1994; Lobley & Butler, 2010; Katchova & Ahearn, 2015; Weiss, 1999). Older farmers were not significantly more likely to want to lease out or sell land than average aged farmers, supporting the theory that older Irish farmers want to maintain land within the family unit rather than sell or lease it out to others (Banovic et al., 2015).

Farmers with off-farm jobs are more likely to want to add land through lease or purchase than full-time farmers. There is evidence in the literature that off-farm income may help to prevent farm exit by stabilising income (Breustedt & Glauben, 2007; Kimhi, 2000). Farmers in the study with off-farm employment are younger than full-time farmers (45% aged 50 and younger vs. 31% for full-time farmers) and may have difficulty accessing land in a manner similar to other young farmers across the EU (Zondag et al., 2015). Therefore, they may be aiming to increase land holdings going forward. Also, there may be a wealth effect for farmers with off-farm jobs with farmers using their off-farm income in order to acquire more land through increased credit capacity or ability to pay higher rents.

Regional farmland prices were negatively related to willingness to sell, a finding contrary to standard economic theory. It must be stated that Irish farmland markets are extremely local so prevailing regional prices would not be as significant to farmers' decision-making regarding land as the local market. Farmers may also be anticipating increasing land prices in the future. Irish farmland prices are heavily influenced by non-agricultural factors (Geoghegan & O'Donoghue, 2018), so increasing property prices in Ireland following the 2008 economic crash may be influencing farmers not to sell land until prices peak.

The openness of cattle farmers to leasing out land may be related to the difficult financial conditions facing cattle farmers in Ireland. Widespread protests amongst cattle farmers over low beef prices broke out during the collection of the survey which may have led to cattle farmers being particularly pessimistic when surveyed.[4] As a result, cattle farmers may have felt more open to leasing out land at this time.

The factors that significantly influence farmers' openness to temporary land transactions such as leasing also seem to significantly influence permanent transactions such as buying and selling. However, there are some notable exceptions to this finding. Cattle farmers are open to leasing out land but not selling land while dairy farmers are open to buying land but not leasing

[4] 496 of the study's participants were surveyed in winter 2014, of which 196 were cattle farmers.

in land. Cattle farmers' openness to leasing out may, as previously stated, have reflected particularly poor economic conditions at the time the survey was conducted. Their willingness to lease out rather than sell land may reflect a desire to reclaim the land for their own farming purposes once economic conditions for cattle farming improved.

7. CONCLUSIONS AND POLICY RECOMMENDATIONS

The aim of the study was to explore Irish farmers' attitudes towards land mobility and to build a profile of farmers who would be open to partaking in land transactions. Despite previous evidence that Irish farmers are reluctant to enter the land market (especially to supply land), this study shows that a considerable number of farmers are open to the possibility. It is important to understand what motivates farmers who are open to trading land. This is especially true in the absence of market data, as is the case in Ireland. This paper suggests that farmer attitudes are an important motivating force behind farmers' willingness to enter land markets. Farmers are not motivated solely by profit maximisation, as evidenced by the significance of the "Pleasure of Farming" and "Conservative" variables. Additionally, there appear to be a group of farmers amongst whom the traditional attachment to land is not as prevalent, as evidenced by the willingness of "Innovative" farmers to supply land through leasing. Therefore, policymakers must take account of these attitudes when designing policies to enable a more dynamic land market. Such policies should not just focus on economic incentives to encourage land mobility but also on encouraging discussion between farmers, successors, potential farmers, policymakers and agricultural professionals (farm advisors, solicitors, accountants etc.) so as to take less tangible factors such as attitudes and motivation into account.

Together with the economic and socio-demographic information presented here, a picture emerges of the types of farmer policymakers can target with land mobility policies. Young, optimistic farmers with higher than average stocking rates and plans for increasing production in the near future appear to be most likely to demand land. Innovative cattle farmers who are somewhat but not totally dependent on farm income and are planning to decrease farm activity in the near future are most likely to supply land. Policies that can both identify and mediate between these groups should be considered by policymakers. This can be done by policymakers engaging with farming organisations, through the organisation of information events and by aiding organisations such as the Land Mobility Service that facilitate land mobility (Macra na Feirme, 2019). Additionally, the promotion of joint farm ventures (JFVs) such as cooperatives, farm partnerships, share farming and contract rearing must be maintained (Cush & Macken-Walsh, 2016).

There is a similar level of openness amongst farmers to both permanent and temporary land transfer options. This is contrary to conventional thinking that Irish farmers are reluctant to take part in temporary land transactions such as land leasing. This shows that there may be greater demand amongst farmers for land leasing arrangements than is currently thought by policymakers. As a result, policies that can promote and facilitate such leasing arrangements should be encouraged. Since financial incentives in the form of tax breaks already exist, institutional solutions such as the establishment of intermediary entities to connect potential lessors and lessees or informational campaigns advertising the benefits of leasing may be appropriate.

Although numerous farm and farmer characteristics are examined in relation to openness to land transactions in this study, factors related to the socio-economic environment around the farm are considered outside of the scope of this paper. Such factors include social and identity pressures (Ní Laoire, 2005), local labour market conditions (Cavicchioli et al., 2019) and gender (Balaine, 2019). Further research examining the intersection between farm characteristics, farmer attributes and socio-economic conditions is required.

It should be noted that being open to land transactions does not necessarily mean that farmers will partake in a transaction in the future. This study does not examine the prices farmers are willing to pay and willing to accept for land. Although farmers may be willing to engage in land transactions, a mismatch between the prices farmers are willing to pay and willing to accept for land will prevent transactions from taking place. Therefore, further research is required to examine the extent of price mismatches and how they affect land markets in Ireland.

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