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Characteristics, intentions and expectations of new entrant dairy farmers entering the Irish dairy industry through the New Entrant Scheme

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ABSTRACT

As part of the gradual expansion and abolition of EU milk quotas, the Irish government has approved the allocation of milk quota to a small number of new entrants to dairy production. The objective of this study was to describe the characteristics of new entrant dairy farm businesses developing within the Irish dairy industry in terms of geographical distribution, planned production system characteristics and intended operational scale and expected profitability based on an analysis of successful applications and business plans to the Irish New Entrant Dairy Scheme over a 3 year period. A total of 230 applications and business plans of entrants who received up to 200,000 litres of milk quotas through the New Entrant Scheme from 2009-2011, were analysed for the effects of region, age, household income, previous dairy experience, and education on overall business plan expectations. The results show that a youthful, highly educated and highly resourced group of new farmers are using the New Entrant Scheme to enter the Irish dairy industry. Applicant age has a significant impact on available investment equity and expectations, as younger entrants have less owned resources, are increasingly reliant on additional borrowing and have significantly increased expectations for the productive capacity of their potential farm businesses when compared to older entrants. The majority of new entrants are not planning to solely rely on new dairy enterprises and are instead maintaining reduced alternative enterprises or off-farm work. The results provide a further indication that quota abolition is likely to result in an increased regional polarisation of milk production within Ireland with increased intensity of production within traditional milk production areas in the south.

KEYWORDS: new entrant dairy farmers; pasture-based; characteristics; expectations; Ireland

1. Introduction

The introduction of milk quotas as part of the European Union (EU) Common Agricultural Policy (CAP) in 1984, constrained milk supply and provided stable and high milk prices for EU producers (Whetstone, 1999). Prior to the introduction of milk quotas, Irish milk production was growing by 7% per annum through increases in herd size and improved management to increase individual animal performance (CSO, 2011). The introduction of EU milk quotas curtailed this expansion and severely restricted industry development. While Irish milk production has remained stagnant since 1985, milk production in other countries such as New Zealand has increased by 77% in the last 20 years (Dillon *et al.*, 2011). It is now generally accepted that while milk quotas protected and supported milk production in less competitive dairy regions, as a social policy, this was achieved at the expense of the expansion potential of more efficient producers. (IPTS, 2009). The policy restricted the entry of new younger dairy farmers while maintaining existing smaller scale producers (Dillon *et al.*, 2005). Consequently, the CAP Health Check review in 2008 resulted in a decision to abolish milk quotas by 2015.

The temperate climate of Ireland is condusive to high productivity grassland swards and provides Irish dairy farmers with a cheap high quality food source (Dillon *et al.*, 1995, McCarthy *et al.*, 2011). Consequently, comparatively lower costs of milk production have been reported in Ireland in comparison with other countries (Boyle, 2002, Dillon *et al.*, 2006). More recent studies have concluded that EU milk quota removal will result in a proportionately larger expansion in milk production in Ireland (Lips and Rieder, 2005, DAFM, 2010). However, regional variation in profitability and competitiveness of milk production systems within Ireland may influence the geographical location of and potential

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for industry expansion within Ireland post-EU milk quotas. Brereton (1995) observed that the Irish grass-growing season ranged from 240 to 340 days per annum with a longer growing season occurring in the south of Ireland. Similarly, Ryan (1974) also observed significant regional and soil type effects on pasture productivity with DM production reduced by up to 25% on poorly drained soils where impeded drainage resulted in a shorter grazing season and reduced sward productivity (Brereton and Hope-Cawdrey, 1988). Brereton (1995) suggested that regional variation in pasture growth (11-15 tonnes DM/ha/yr) is large enough to impact the technical and economic efficiency on Irish farms and should be considered in terms of the development of future low cost systems of production. National Farm Survey statistics (Hennessy *et al.*, 2011) reveal that, while the average net profit return to owned resources on Irish dairy farms was [4]€711 /ha at a milk price of 30.6 cent per litre (c/l) in 2010, profitability is very sensitive to soil type and ranged from €841/ha on very good soils to €190/ha on poorer wetter soils. Regional variation in milk expansion post quota abolition has been suggested by O'Donnell *et al.* (2010) who hypothesised that future expansion in milk production in Ireland would originate from southerly areas with more favourable grass production characteristics and lower milk production costs are incurred. The same study also observed that location, farm size, age and succession were important influential factors which motivate producers to expand production in the future, while milk price volatility was the major deterring consideration amongst those not planning to expand.

The abolition of quotas will be preceded by a gradual increase in quota to member states (2% in 2008, and a further 1% per annum thereafter) to allow for a 'soft-landing' for dairy economies (IPTS, 2009). As part of this overall quota expansion, the Irish government also decided to offer one quarter of the 1% increase in total quota on a permanent basis to new entrants to the Irish dairy industry. The quota application process called for each successful new entrant applicant to provide a detailed 5 year business plan incorporating physical and financial plans in addition to information on the location of their planned enterprises. As the first opportunity for new entrants to join the Irish dairy industry since the introduction of milk quotas, this group of new dairy producers represent the initial evolution of the dairy industry in Ireland post milk quotas. This unique group are capable of providing a unique opportunity to examine the characteristics of new dairy producers entering the industry.

The objective of this study is to describe the characteristics, intensions and expectations of new entrant dairy farm businesses developing within the Irish dairy industry, in terms of geographical distribution, planned production system characteristics and operational scale and expected profitability based on an analysis of successful applications to the Irish New Entrant Dairy Scheme over a 3 year period.

[4] At the time of writing (January 2013), €1 was approximately equivalent to £0.82 and $US1.31.

2. Materials and methods

Data

The applicants for the 2009, 2010 and 2011 milk quota allocations were obliged to submit an application form detailing relevant experience and educational qualifications with an accompanying 5-year business plan and a map of the proposed dairy holding to the Department of Agriculture Food and the Marine (DAFM). The 5-year business plan included an audit of existing resources, stock requirements, the source and nature of planned capital expenditure in addition to expected income and expenditure for each year of the plan (DAFM, Accessed October 2010). There are a total of 230 successful new entrants selected over the initial 3 years of the programme based on supplying adequate information. The information submitted by successful applicants was used to describe the expectations of new entrants to the dairy industry over the five initial years of these new businesses.

Data handling

A total of 50 key variables describing the characteristics of new entrants and their future dairy farm plans were generated from the application forms and business plans data (see Table 1). New Entrants characteristics were categorized according to region, age, other income, previous dairy experience and educational qualifications.

Statistical analysis

Each continuous variable generated in this analysis was screened for normality using Proc UNIVARIATE (SAS, 1999). The effect of region, age, other income, previous dairy experience and educational qualifications on the collated continuous data derived from the submitted business plans and application form (farm size, cow numbers, etc.) were analysed using a generalized linear model (SAS, 1999) according to the following model:

$$R_{ijklmn} = \text{mean} + R_i + A_j + H_k + D_l + E_m + RA_{ij} + RH_{ik} + RD_{il} + RE_{im} + RAHE_{ijklm} + e_{ijklmn}$$

Where R_{ijklmn} is the result for a farmer in the region i, within the age category j, with household income k, with previous dairy experience l and educational qualifications m; R_i is the effect of the ith region of production (i= SE, SW and BMW); A_j is the age category (j= under 30, 31-40, over 40); H_k is the other income available (k=1-3); D_l is the previous dairy experience (l=1-4); E_m is the educational qualification (m=1-3) and e_{ijklmn} is the residual error term. The effects of region, age category, other income, previous dairy experience and educational qualifications were tested for significance using the residual mean square as the error term. For binary variables, chi square analysis was performed using Proc FREQ (SAS, 2006).

GIS mapping

Each application provided ordinance survey maps and land ownership or land lease documentation which included the folio numbers and Land Parcel Identification Scheme (LPIS) numbers. The geographical distribution of the new entrant farms was conducted

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Table 1: Key New Entrant characteristics variables created from the dataset

Variable	*No. of descriptors*	*Data used to create the variable*
Region	*3*	South Eastern (*SE*) counties (Kilkenny, Tipperary, Wexford, Waterford, Wicklow and Carlow); South Western (*SW*) counties (Cork, Kerry, Limerick and Clare); Border Midlands and Western (*BMW*) counties (Galway, Mayo, Sligo, Roscommon, Leitrim, Monaghan, Cavan, Longford, Louth, Offaly, Westmeath, Laois, Meath, Dublin and Kildare)
Age	*3*	*Under-30*, *30-40*, and *Over-40*
Other income	*3*	*full-time dairying* (i.e. no other sources of income); *working spouse*; *another source of income* (which includes another farm enterprise as well as part- or full-time off-farm work)
Previous dairy experience	*4*	From a dairy home farm; those with long term certifiable experience working on dairy farms; those with shorter term or unverifiable experience; no dairy experience
Educational qualifications	*3*	Base requirement 180-hour Agricultural Certificate; a 2 year Advanced Agricultural Certificate; Bachelors degree
Farm descriptors	*8*	previous farm enterprise; total land in holding; land area owned; land area leased; amount of farms with single land block (around the parlour); percentage owning land; leasing; or both owning and leasing land
Expected stock and productivity	*7*	dairy cow herd size; stocking rate; milk yield per cow (kg/cow); milk yield per ha (kg/ha); milk solids per cow (kg/cow); milk solids per hectare (kg/ha); milk volume per farm (kg)
Expected income and profit	*12*	farm income (employed spouse, other enterprise, off-farm job, or none); percentage in receipt of Single Farm Payment (SFP); value of SFP received; other grants received; existing stock value; savings; percentage with existing debt; percentage seeking debt financing; total capital borrowed; total loan commitments outstanding
Planned expenditure	*11*	milking equipment; stock; buildings; roadways; machinery; water; reseeding; fencing; planning; electricity; total expenditure
Expected efficiency	*5*	profit per litre (c/l); profit per hectare (€/ha); profit per kg milk solids (fat kg plus protein kg) (€/kg MS); profit per farm (€/farm); profit per cow (€/cow)

using ArcGIS v 9.3 (ESRI, Redlands, CA, USA). New dairy farm co-ordinates were mapped against the existing national distribution of specialist dairy farms in addition to the existing density of dairy and non-dairy stock within Ireland at an electoral divisional (ED) level. A point density method was used to geographically map the farms, by creating a geographical area of Ireland divided into 300 cells, and each of these cells is given a neighbourhood or fixed radius and to measure only within that radius; the more farms within a given neighbourhood, the higher the point density. If there are no points (or new farms) within a neighbourhood, then that neighbourhood will represent no data or have a zero point density. The Average Nearest Neighbour Distance tool was used to locate areas of farm clustering or if several new entrant farms are located in the one area. It calculates an index based on the average distance between each farm (feature) and its neighbouring farm (feature), and the distances are then averaged for the neighbourhood being examined. The farms (features) are considered clustered if the average for a hypothetical random distribution is greater than the average distance, and dispersed if the hypothetical random distribution is less than the average distance. The distance observed divided by the distance expected equals the ratio by which the index can be expressed.

3. Results

New entrant profile

The general characteristics from the business plans and applications of 230 new farmers under the New Entrant Scheme are represented in Table 2. Year of application (2009, 2010 or 2011) had no effect on the expectations of the new entrant farmers. The average new entrant applicant is 36 years of age (ranging from 21 to 62 years), while 97% are male. There was a large variation in knowledge and experience of dairy farming evident from the dataset. As the 180hour Agricultural Cert is a minimum prerequisite for Irish dairy farmers to establish land ownership and join the scheme, all applicants have obtained this minimal formal agricultural education. In addition to the minimum requirements, a further 72% of applicants have completed a 2 year Advanced Agricultural Certificate in agriculture, while a further 21% have achieved a Bachelors degree level qualification. Fifty-eight percent of new dairy entrants are originating from previously beef enterprises, with 22% of all new entrants planning to become exclusively dairy farmers within 5 years. In terms of dairy experience, 44% of new entrants have a close relative in dairying (such as a parent, sibling or uncle) while a further 20% had no experience in dairy farming at the time of applying for milk quota under the New Entrants scheme, with the remainder having either

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Table 2: General characteristics of New Entrants to the Irish dairy industry (2009-2011)

Age (yrs)	36 (range 21-62)
Proportion with relative already in dairy (%)	44
Proportion of farms previously in dairy (%)	35
Proportion with dairy experience (%)	80
Education (%)	
180 hour Agricultural Certificate	7
Advanced Agricultural Certificate	72
Bachelors degree in Agriculture	21
Previous Enterprise (%)	
Beef	58
Mixed	25
Other	16
Total land (ha)	58.08 (range 20-199)
Land leased/rented (ha)	23.09 (range 0-151)
Land owned (ha)	34.90 (range 0-107)
Expected production	
Herd size (No. cows)	71
Stocking rate (livestock units/ha)	1.73
Milk yield (kg/cow)	4,954
Milk fat plus protein yield (kg/ha)	654
Expected profitability	
Gross output (c/l)	30
Costs of milk production per litre (c/l)	25
Net profit per litre (c/l)	5
Net profit per ha (€/ha)	428

worked as dairy farm labourers or as work experience students on a dairy farm at some point during their agricultural education.

The average new entrant has a substantial land block of 58.1ha (ranging from 20-199 hectares) and of which 60% is owned. The potential land base available to the new dairy farmers is extensive with an expected average stocking rate of 1.73 LU/ha, withstanding 71 cows. The predicted production expected by the new entrant businesses is 654kg MS/ha (fat plus protein kg) and an average milk yield of 4,954kg per cow. Almost 40% of new entrants have existing loan commitments while seventy-nine percent are hoping to secure loan finance as they develop their dairy farm, within a projected full set-up investment cost of €190,114 or €2,677/cow. The average new entrant farmer expects to produce an average of 352,360 litres of milk at an average production cost of 25 c/l and an average gross output of 30 c/l (including a 27 c/l milk price and a further 3c/l from sales of dairy stock). The expected profitability of a new entrant dairy farms is 5 c/l, equivalent to €428/ha and €248/cow.

GIS mapping and regional distribution

The majority of new dairy farms (80%) are located in the south of Ireland (Figures 1, 2 & 3). Figure 1 demonstrates the density distribution of new entrant dairy businesses in comparison to the density of specialist dairy farms in Ireland by their respective county and region. In addition, figures 2 and 3 highlight the new entrant distribution in contrast to the density of both dairy and cattle populations, respectively. The effect of region on the characteristics, resources and expectations of new entrants is outlined in Table 3. Region has no effect on the size of the farm or the level of experience of applicants. Similarly, total SFP and other grant receipts are comparable for all regions; however, the value of existing owned stock is lower in the SW (€45,405) when compared to the BMW and SE regions (€73,513 and €69,397 respectively). While region has no effect on the expected total level of capital investment required, the level of borrowings required to finance expansion was lowest in SW (€62,831) and highest in SE (€106,092) while BMW was intermediate (€91,854). Region had no significant effect on production (planned herd size, stocking rate or the level of milk production per cow) and financial (net profit per litre and per hectare) expectations.

The effect of age

The effect of new entrant age on existing resources and planned milk production characteristics and expectations are outlined in Table 4. The proportion of new entrants below 30 years of age (U-30), from 30-40 years of age (30-40) and greater than 40 years of age (O-40) was 26%, 45%, and 29%, respectively. While the total land area planned for dairying was unaffected by age, the area of owned land increased with increasing age (21, 35, and 47 ha for U-30, 30-40, and O-40, respectively). Age has a significant impact on the level of available equity for investment in dairy set-up. Only 63% of the U-30 group had an SFP income in comparison to 89% and 97% for 30-40 and O-40, respectively. Consequently, older new entrants have a significantly larger SFP (€18,874 and €24,925 for 30-40 and O-40, respectively) in comparison to U-30 (€10,246). New entrant age had no effect on either the level of required borrowing or the total level of capital investment planned. There was also no significant age effect on the planned herd size during the first 5 years, however stocking rate and milk solids output expectations were lower ($P<0.01$) for older applicants (30-40 and O-40). Age had no effect on the expected profitability from milk production in terms of either profit per litre or profit per hectare.

The effect of other income

Sixty-six percent of new entrants have another income source originating from either the continuation of alternative agricultural enterprises or an off-farm job, a further 12.2% have a working spouse, while only 21.8% of the new entrants intend to be full-time specialist dairy farmers with no other additional income. There was no significant effect of other income on the value of existing savings or levels of SFP or other grant awards received. Similarly, other income had no effect on planned investment in milking facilities, stock or other infrastructure, nor on total planned expenditure or business development. Farms planning to be specialist dairy production units expect to have higher ($P<0.05$) stocking rates (1.94 LU/ha) and milk output (5,094 kg milk/cow and 747kg MS/ha) compared to either those with other income sources (4,932 kg milk/cow and 630 kg MS/ha) or a working spouse (4,838 kg milk/cow and 657 kg MS/ha). Full-time specialist dairy farmers also expect to achieve higher profits per litre (9 c/l) and per hectare (€733/ha) compared to either those

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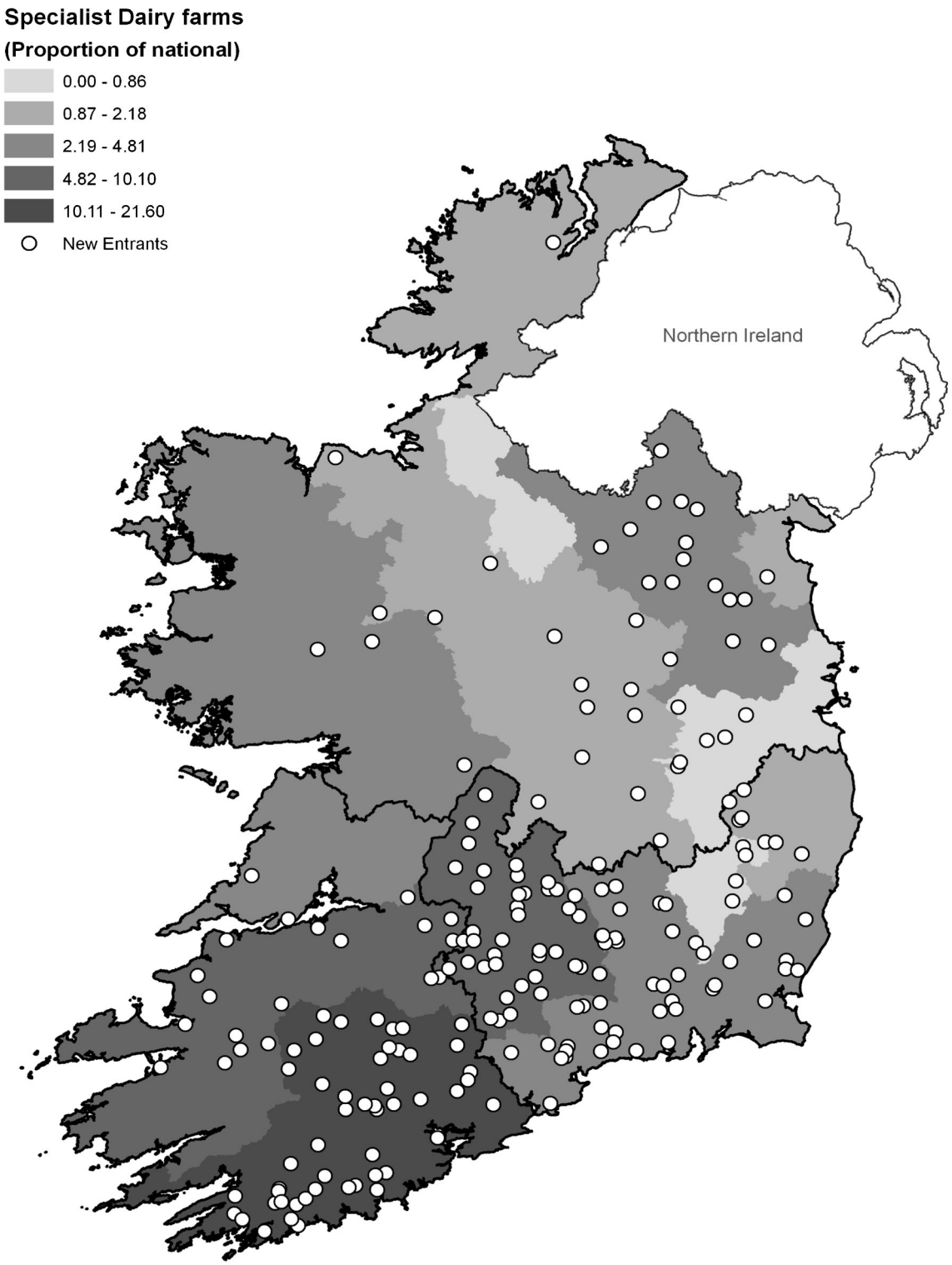

Figure 1: Regional distribution (South East, South West and Border Midlands and West) of new entrant farmers in contrast to the national proportion of specialist dairy farms in Ireland

with a working spouse (3 c/l and €231/ha, respectively) or those with an alternative income stream (5 c/l and €358/ha, respectively).

The effect of knowledge and experience

The majority of new entrants to dairying have gained dairy experience on their home family dairy farms (38%) or as dairy farm labourers (42%) while 20% have no previous experience of dairying. New entrant farm system productivity expectations were unaffected by educational qualifications or the level of previous dairy experience. Similarly, both the planned level of capital investment and the profitability expectations per litre and per hectare are similar for all new entrants irrespective of their level of dairy experience or educational qualification.

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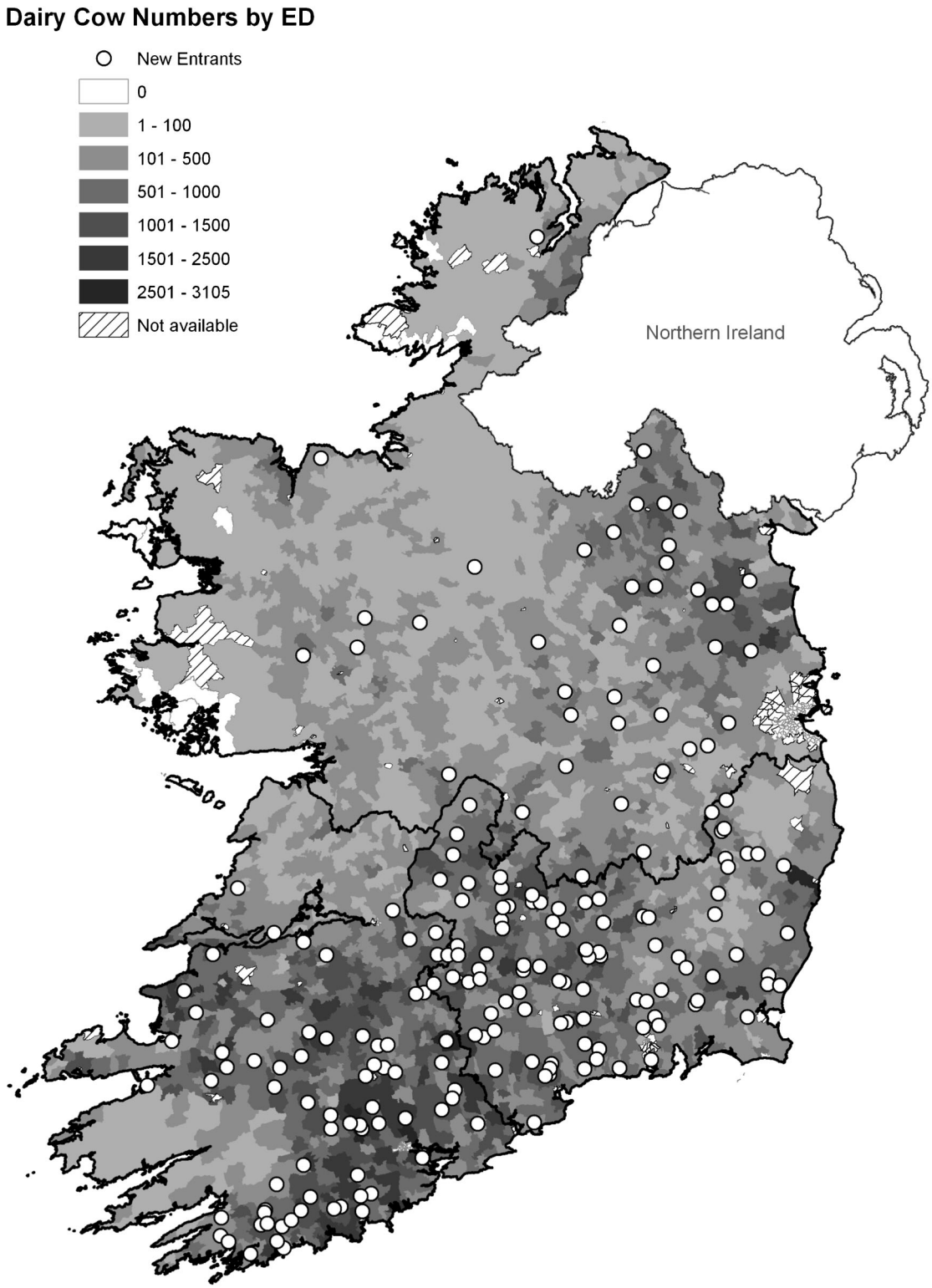

Figure 2: The distribution of new entrant dairy farms in contrast to the density of dairy cows in Ireland by Electoral District (ED)

4. Discussion

The development of a farm business plan is an essential process to help farmers to focus on the necessary factors for business success, by defining realistic goals to create a viable future enterprise (Johnson and Morehart, 2006). While the analysis of actual farm financial results of new entrants provide the ultimate measure of business success, an analysis of business plans of over 230 successful new entrant dairy farmers highlight the available resources, knowledge and experience and expectations of those entering the Irish dairy industry. The importance of personal attributes (knowledge and experience, education) and expectations in motivating farmers to make significant changes to their farming activities has been widely recognised (Sumner and Leiby, 1987, Gloy *et al.*, 2002, Lockheed *et al.*, 1980, Kumbhakar *et al.*, 1991). This study indicates that the

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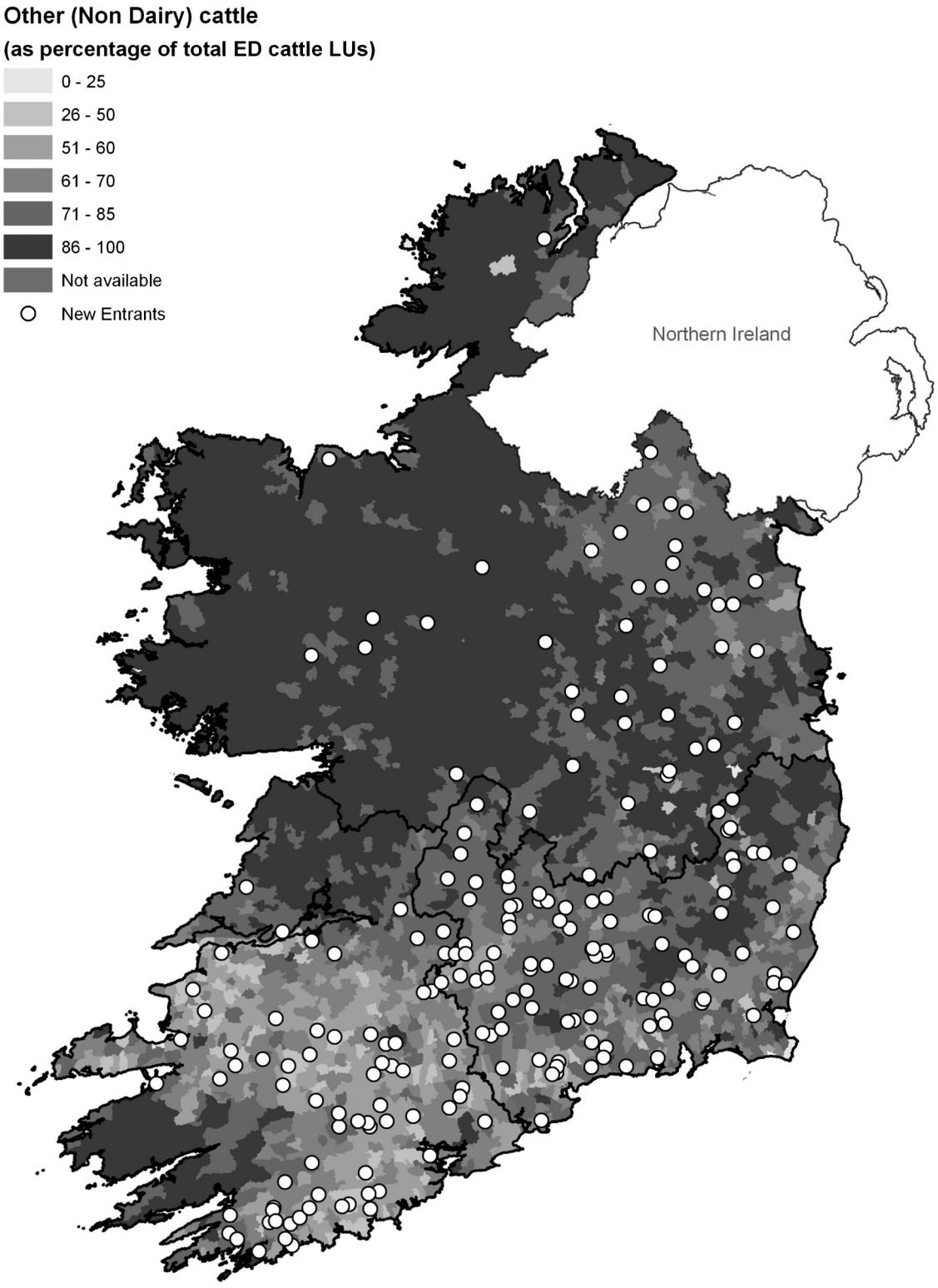

Figure 3: The distribution of new entrant dairy farms in contrast to the density of non-dairy cattle in Ireland by Electoral District (ED)

New Entrant Scheme has successfully motivated new dairy farmers to make a monumental change in their lives and set-up their new dairy enterprises. The current evaluation of new entrants to the Irish dairy industry provides a unique opportunity to identify the characteristics and expectations of new dairy farmers in addition to the potential evolution of the industry post EU milk quota removal in 2015.

The BMW region of Ireland, while representing 47% of the national land mass, currently accounts for just 25% of national dairy production (CSO, 2010). Shalloo (2004) estimated that the profitability of milk production in the BMW region is reduced by 38% to 58% of that possible on drier southern soils based on a comparative analysis of milk production results. Consistent with these findings, O'Donnell *et al.* (2010) concluded,

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Table 3: The effect of region on the characteristics and expectations of new entrants to the Irish dairy industry

	BMW	SE	SW	s.e	P-value
Regional Distribution (%)	18.8[a]	45.9[b]	35.4[b]		***
Total land (ha)	61	60	53	3.3	
Land leased/rented (ha)	20	24	24	3.0	
Land owned (ha)	41	37	30	3.3	
Proportion with dairy experience (%)	67	83	83		
Available equity (€'s)					
Stock	73,513[a]	69,397[ab]	45,405[b]	7694.3	**
Single farm payment	19,256	19,929	16,453	2,057.6	
Other grants	5,121	3,832	4,850	571.5	
Financing expectations (€'s)					
Capital borrowing	91,854[ab]	106,092[a]	62,831[b]	10,070.3	*
Total investment	204,803	199,209	166,329	15,255.7	
Production expectations					
Herd size (No. cows)	73	71	68	2.8	
Stocking rate (livestock units/ha)	1.66	1.70	1.82	0.071	
Milk yield (kg/cow)	4,903	4,941	5,001	57.1	
Milk fat plus protein yield (kg/ha)	633	645	685	32.6	
Profit expectations					
Net profit per litre (c/l)	0.04	0.06	0.05	0.013	
Net profit per hectare (€/ha)	283	472	430	92.5	

[a,b,c]means with different superscripts are significantly different ($P<0.05$)

Table 4: The effect of applicant age on the characteristics and expectations of new entrants to the Irish dairy industry

	Under-30	30-40	Over-40	s.e	P-value
Proportion of new entrants (%)	25.8[a]	45.4[b]	28.8[a]		***
Proportion with dairy experience (%)	86.40	81.70	71.2		
Total land (ha)	51	60	61	3.3	
Land owned (ha)	21 [a]	35 [b]	47 [c]	3.1	***
Available equity (€'s)					
Single farm payment	10,246 [a]	18,874 [b]	24,925 [c]	1,920.6	***
Other grants	2,935 [a]	4,471 [b]	5,717 [b]	547.7	**
Financing expectations (€'s)					
Capital borrowing	94,796	84,003	88,882	10,074.6	
Total expenditure	189,869	178,475	203,739	14,991.0	
Production expectations					
Herd size (No. cows)	71	70	70	2.8	
Stocking rate (livestock units/ha)	1.95 [a]	1.68 [b]	1.64 [b]	0.068	**
Milk yield (kg/cow)	4,943	4,920	5,015	55.8	
Milk fat plus protein yield (kg/ha)	756 [a]	645 [b]	587 [b]	30.3	**
Profitability expectations					
Net profit per litre (c/l)	0.08	0.04	0.05	0.013	
Net profit per hectare (€/ha)	565	369	383	90.1	

[a,b,c]means with different superscripts are significantly different ($P<0.05$)

based on an attitudinal survey of existing milk suppliers, that future expansion in milk production would mostly occur in the south of Ireland. Similarly, the results of this study indicate that despite having a lower spatial density of specialist dairy farms, only a small minority (19%) of new dairy farms are to be located within the BMW region. As Figures 1, 2 and 3 demonstrate, these results provide a further indication that quota abolition is likely to result in an increased intensity of milk production within the already heavily concentrated traditional milk production areas in the south and east of Ireland.

Previous studies indicate that farmer expectations are intrinsically linked to prevailing industry and wider economic conditions in addition to market sentiment (Kelly *et al.*, 2012) however, there was no year of application effect on biological or financial expectations of new entrants in this study despite relatively large variation in actual milk prices during the study period (23.3 c/l in 2009, 30.8 c/l in 2010 and 35.5 c/l in 2011; CSO, 2011). The overall level of farm performance expectations of new entrants (4,954 kg of milk per cow with an average production cost of 25 c/l) are consistent with existing dairy industry performance norms (5,075 kg milk per cow and with production costs of 23c/l; (Hennessy *et al.*, 2011)) while an average expected milk price of 28 c/l is consistent with overall industry expectations (Binfield, 2008). The analysis of new entrant farmer credentials indicates that a young and highly educated group of new farmers are using the New Entrant Scheme to enter the Irish dairy industry. With an average age of 36 years, this group of new dairy farmers are very young compared to either the existing demographic of dairy farmers (49 years) or the overall population of beef and mixed enterprise farmers (54 years) from which these new entrants originate (Hennessy *et al.*, 2011). In contrast to the findings of Mishra *et al.* (2009) who reported lower levels of

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available equity and higher debt-to asset ratios amongst newly establishing farm business set-ups in the United States, the results of this study indicate that newly establishing dairy farmers in Ireland have considerable owned resources and equity from which to establish these new dairy units (with average decoupled EU payments of €22,992 in comparison to €19,488 for the average existing dairy farmer; (Hennessy *et al.*, 2011)).

The impact of farmer age and experience on the expectations and likely performance of these new farm businesses is inconsistently reported in the literature. Within this study, applicant age has a significant impact on the resources and equity available in addition to the expected subsequent production. According to Davis *et al.* (2013) younger farmers will have a longer planning horizon than older farmers resulting in heavier investment in farm business growth. Although having less equity (savings, sales from previous enterprises, EU farm payments) and other assets (particularly owned land) and therefore requiring additional borrowings, younger new entrants (under-30 group) had significantly higher expectations for the productive capacity of their potential farm businesses. Mishra *et al.* (2009) similarly observed that younger farmers in the United States starting a new enterprise have fewer assets and concluded that, as younger farmers also have less experience at resource allocation, the financial performance of businesses run by younger farmers would be reduced. Summer and Leiby (1987) also found that older people tend to have fewer borrowings, and concluded that lower costs of borrowing result in larger farms and faster business growth. In contrast with these general findings, other studies have observed superior rates of technical development and adoption amongst younger farmers (Solano *et al.*, 2003, Connolly and Woods, 2010) which may compensate for their inferior financial position. Zepeda (1990) reported that younger farmers were 11 times more likely to adopt new technology resulting in superior technical performance. The results of the current study indicate that by initially setting-up with fewer financial assets, the overall profitability expectations of younger entrants are similar to older entrants due to superior farm productivity expectations.

Ninety-three percent of new dairy entrants have at least two years of formal 3rd level agricultural education and so it is unsurprising that the business plans reveal that new entrants intend to become relatively large scale and efficient producer's post-EU milk quota removal. In comparison with the average specialist dairy farmer who currently milks 57 cows on 50 hectares (Hennessy *et al.*, 2011), the average new entrant is planning to milk 71 cows on 58 hectares. The positive expectations of highly educated new entrants are consistent with the findings of Lockheed *et al.* (1980) who observed that a farms productivity increases for every extra year spent in formal agricultural education. Similarly, other authors have observed that educational qualifications have a positive effect on the financial performance of the dairy farm (Mishra *et al.*, 2009) resulting in increased technology adoption and improved on-farm technical efficiency (Kumbhakar *et al.*, 1991). The increased incidence of other income among new dairy farm businesses (78%) within this study is indicative of the elevated educational status of this group (Mishra *et al.*, 2009) while the reduced productivity and profitability expectations of farm businesses with a lesser reliance on dairy farm income is also consistent with previous findings (Foster and Rausser, 1991).

5. Conclusion

The analysed business plans and applications of over 230 successful new entrant dairy farmers highlight the existing resources, education, experience and expectations of those entering the Irish dairy industry in the lead up to EU milk quota abolition. The results show that a youthful and highly educated group of new farmers are using the New Entrant Scheme to enter the Irish dairy industry, and intend to develop larger scale and more efficient dairy farms post-EU milk quotas. Applicant age and other income has a significant impact on available equity and expectations of entrants as younger and specialised dairy entrants have less owned resources and significantly greater expectations for the productive capacity of their potential farm businesses when compared to older entrants or those with alternative income sources. The results also indicate that, with 81% of new entrants to dairying located in the south of Ireland, quota abolition is likely to result in an increased regional polarisation of milk production within Ireland with increased concentration of production in traditional milk production areas in the south and east of Ireland.

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