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Policy Incentives and the Organic Value Chain in Ireland

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ABSTRACT

Merged administration data are utilized to study farms that have converted to organic beef production in Ireland, to draw lessons for future CAP scheme design. Results show the complex structure of organic farms with lower cattle age progression than in non-organic systems, suggesting leakage to conventional agriculture. There is also a flow of animals as they age from poorer land in the West to better Eastern areas that are more suitable for finishing, however the flow is less for organic farms. Additionally, there is less specialisation on organic farms as more animals are finished, so leakage is less than expected.

***Keywords**: Organic beef; value chain issues; leakage; specialisation*

1. Introduction

Sustainable intensification (SI) of agricultural production has become a priority issue for policymakers and international development agencies (Herrero and Thornton, 2013). One of the approaches to accomplishing the dual challenge of increasing agricultural production while reducing its environmental impact is based on increasing the efficiency of agricultural production relative to both resource use and the unintended environmental outcomes (Bennett et al., 2014). This can involve agro-ecological approaches which have multi-dimensional impacts, such as the conversion from conventional to organic farming. With lower inputs, agro-ecological approaches can reduce costs, which may result in a proportionally lower output impact. Additionally, organic farming has a lower carbon footprint (Casey and Holden, 2006) and can have a positive ecological impact through improved soil quality and lower intensity farming (Tuomisto et al., 2012). In response, there has been an important focus across EU Member States (MS) in relation to increasing the proportion of farm land under organic production as part of the recent Common Agricultural Policy's (CAP) Rural Development Programme (RDP).

Although the EU has ambitious growth targets for organic food production, actually delivering on the potential will require more detailed plans to be developed by producers, processors, government agencies and related organisations. Such plans will need to be grounded in a clear and comprehensive understanding of the individual components that comprise the sector, how they interact, how and where value is created.

"Value chains, refer to the array of activities that are carried out in order to bring a product or service to the market, from initial conception all the way through to the commercialisation process" (De Backer & Miroudot, 2013). Value chain analysis can therefore provide a holistic perspective of a country's engagement in a global industry by focusing on the sequences and overlaps of tangible and intangible value-adding activities, thereby

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offering economic insights on issues such as industry structure, governance, value creation, and the key actors and institutions that make up the industry (Gereffi & Fernandez-Stark, 2011).

In this paper we employ a mapping approach taken from the global value chains literature to understand the structure of the organic value chain and in particular to understand value chain imbalances that may result from policy incentives, using Ireland as a case study. We utilise a unique dataset that links administrative data on animal movements and organic conversion data, to study the farms across the value chain that have converted to organic production. Given the fine spatial resolution of this data and given that organic farms and market outlets are remotely located (resulting in relatively high transport costs), we examine whether there are spatial value chain issues.

2. Policy Context

EU policy

The EU organic sector has seen rapid growth in recent years, due in large part to the positive economic, environmental and social benefits for farms and farmers producing organic food. Studies explicitly comparing organic and conventional farming have shown that farm management systems employed in organic production can positively influence farmland ecology and biodiversity in particular (e.g. Chamberlain et al., 1999 and Rundlöf et al., 2008). The use of legume and species-rich legume leys which are recommended as part of organic farming standards helps maximise synergies between agricultural productivity, economic viability and other ecosystem services (Döring, 2013; Rochon et al., 2004).

In general, farming practices promoted by organic production contribute to improving soil and water quality, to mitigation and adaptation to climate change and to the improvement of the state of biodiversity e.g. by crop rotation, use of organic fertilisers, improvement to soil organic matter and by eschewing the use of synthetic plant protection products or synthetic fertilisers. In addition, organics farmers can also benefit in a social context from the formation of organic producer groups and marketing networks.

According to European Commission (EC, 2014), the area under organic production grew by about 500, 000 hectares per year over the previous decade to cover 6.2% of European UAA, representing a total area of 11.1 million hectares in 2015. This area is cultivated by almost 185,000 farms, which are generally larger farms and are managed by younger farmers. Permanent pasture makes up the largest share of the organic area (58%), followed by cereals (20%) and permanent crops (15%). The most important types of organic animal production at European level (after poultry) are sheep (42%) and cattle (34%) (EC, 2014; EC, 2016).

This increase has been achieved largely through adoption at national level of Organic Action Plans (OAPs) for organic food and farming. OAP priorities include increasing the competitiveness of EU organic producers by increasing awareness of incentives, addressing technical gaps in organic production, increasing information on the organic production sector, as well as on the market and trade, and increasing consumer confidence in organic food and farming. According to Schmid et al (2015), the development of OAPs has gained momentum as a mechanism for achieving a more integrated and balanced approach to organic policy-making in different European countries and at EU level.

Irish policy

Under the Organic Farming Action Plan (2012-2015) and Rural Development Programme (RDP 2014-2020), the proportion of land under organic production in Ireland has increased from 1% to 2% of UAA within the last 5 years with the long-term aim of achieving 5% organic production (DAFF, 2010). Most of the organic production in Ireland is focused on organic beef production, consistent with the dominant agricultural sector.

The Food Harvest (FH2020) agricultural strategy (DAFF, 2010) highlighted opportunities for growth in relation to import substitution in areas where Ireland is under-producing at present and large export markets such as the UK and Germany. The report added that "with a current organic market exceeding €2 billion, the UK provides significant export opportunities".

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Adoption studies undertaken in Ireland show that "higher organic production payments" and "higher prices for products" are the two main drivers of adoption of organic farming for conventional farmers (Läpple and Donnellan, 2008; Läpple and Kelley, 2010). Thus, in order to grow the sector and to assist in reaching the 5% UAA target, it was considered that particular emphasis needs to be placed on these main drivers. According to the Organic Production Census (Clavin, 2012), growth in the organic sector in Ireland has been steady but slow in recent years.

As the organic supply base in Ireland is relatively fragmented, the establishment of "producer groups" has facilitated co-operation amongst suppliers, enhancing the marketing of "niche" products through short supply chains and improving seasonal continuity of supply to both domestic and export markets. Latest figures show the organic retail food market in Ireland is now worth over €136 million annually and the EU organic food is worth €24 billion (2014) and has more than doubled in size over the last 10 years (Bord Bia, 2015).

Irish Beef Sector

Beef production remains the leading enterprise on Irish farms. Close to 28,000 mixed farms are involved in some aspect of the beef supply chain and approximately 68,000 farms specialise in beef production (Agri Aware, 2013). According to the Department of Agriculture, Food and the Marine (DAFM), there are three categories of beef producers– suckler producers, fatteners and cattle finishers – serviced by over 70 auction marts around the country (DAFM, 2015; IFA, 2013).

The Irish beef processing industry is made up of around 30 large-scale, DAFM-supervised private processing facilities which are approved to export from Ireland to the UK, Continental Europe and other international markets. These facilities process animals that move from the organic value chain to the conventional value chain. However, only a very small part of the processing sector processes organic animals.

In recent years the Irish beef processing industry has undergone a transformation, switching from being a commodity business with heavy reliance on supports and intervention, to a focus on supplying differentiated and premium product such as fresh, chilled beef to more upmarket, quality and safety-conscious retail and food service customers across the UK and Continental Europe (Agri Aware, 2013).

Irish Organic Beef Sector

Organic beef farming in general requires many of the same inputs as conventional beef farming, which include stock, feed, veterinary services, land, with chemical fertilisers and synthetic plant protection products. There is a large degree of heterogeneity in both the organic and conventional beef industry in terms of specialisation (in the production of a particular age-class of animal compared to non-specialised farms that keep animals from birth to finishing), intensification, breed, production systems, and types of animals – such as suckler cows, calves, heifers, young cattle, bulls and steers. This results in significant variation in costs across farms.

The increase in number of organic herds and organic bovine numbers of OFS participants since 2007 is presented in Table 1. According to DAFM, in mid-2015 there were approximately 1,400 organic cattle farms in Ireland. In total there were over 59,000 organic cattle, including approximately 19,000 suckler cows. This represents an increase of 65% in cattle farms and an increase of 100% in cattle numbers since 2008.

Table 1. Number of Organic Bovines and Herds of OFS Participants 2007 – 2016

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
No. of bovines	350	5,661	6,147	26,355	34,353	40,107	-	35,437	-	59,000
No. of herds	6	121	152	650	825	907	-	566	-	1,400

Source: Value for Money Review (DAFM, 2014)[2] & DAFM (pers.comm)

While the majority of beef supplied to the organic market is from steers and heifers, in recent years a market has emerged for calves (organic veal). Premium prices of 15 to 20% have generally been achievable for organic beef in recent years. The majority of organic beef is supplied directly from individual farms with 85% of

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finished cattle supplied from farms finishing less than 20 cattle, compared to 73% of national finishers. In 2015, a new organic beef producer group comprising of 30 members is supplying approximately 1,500 cattle per year. Approximately 70% of organic beef is exported to countries including the U.K., Germany, Scandanavia, France and the Netherlands. According to processors, the demand for Irish organic beef will continue to rise, especially in mainland Europe. Organic cattle farmers can also buy and sell cattle through farm to farm sales and through a series of approximately 20 dedicated organic mart days held at 8 locations mainly in the border, mid-east and west regions.

Table 2. Scale of organic and national finishing farms in Ireland (2012)

Cattle finished/farm	0-20	21-40	41-60	61 - 80	81-100	>100
% of organic finishers	85%	9%	3%	<1%	<1%	>1%
% of national* finishers	73%	13%	5%	3%	2%	4%

Source: Clavin, 2012 *national = conventional and organic

Sectoral and Value Chain Challenges facing the Irish Organic Beef Sector

A particular concern of this policy supported value chain is one of imbalance. For example, farmers who have suckler cows (animals that are owned to produce progeny, rather than for meat or milk) have been more likely to convert to organic farming than other beef farmers because of their relatively extensive nature. Relatively few tillage farmers convert to organic production, which has resulted in higher costs for purchasing supplementary grain, especially for specialised cattle finishers. Thus, relatively few beef finisher farms have converted to organics, potentially resulting in leakage from the organic value chain when young animals are sold from suckler farms to finisher farms. Lastly there are relatively few organic processing plants which have resulted in delays in processing animals for up to 6 months.

There is a concern however in relation to the structure of the value chain. Anecdotal evidence indicates that organic conversion has been skewed across the value chain, with a disproportionately high proportion of suckler farms that breed animals, while relatively few farms finish animals for the market. This could result in a situation where animals that are reared organically could enter the conventional food chain if there are insufficient numbers of farmers at the finishing stage of the value chain. Similarly, relatively few tillage farmers have converted to organic production, which may result in supply gaps for organic winter forage. Lastly there are relatively few processors that currently process organic meat.

The objective of this paper is to understand the characteristics of the organic value chain within Ireland and to consider a number of issues such as the spatial concentration, leakage and imbalance in relation to the value chain. As a result of this differential response across the value chain, there is a risk of significant leakage, with sub-optimal production of organic meat relative to the investment made. This may result in risks to the long term viability of the incentive scheme and more widely, for supports for organic farming. In the next section, we examine the theory behind the GVC methodology to analyse and develop a greater understanding of the challenges facing the Irish organic sector from a multi-dimensional value chain perspective.

3. Theoretical Framework

Value Chains

With the vast majority of Irish organic beef being exported, the sector interacts with a global value chain. Global Value Chain approaches (Gereffi et al., 2005) can be used to map and identify cross-value chain issues, reflecting the increasing fragmentation of processes involved in the production and supply of goods, both within and across countries. Bolwig et al. (2010) employed a global value chain method to highlight the multiple impacts of value chains on for example poverty, gender and the environment.

Gereffi & Lee (2012) traced the emergence of global value chains (GVC) to the 1960s when globalisation elevated competition between firms from the local to the international stage, leading to a change in production methods as firms looked for ways to reduce production costs by outsourcing different segments of the production process overseas. De Backer & Miroudot (2013) describe a slightly different path to the creation of the GVC concept, citing Bair (2005) in tracing it back to the idea of "commodity chains" that

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appeared towards the end of the 1970s. The basic approach was to identify all the various inputs and transformations necessary to develop a final product and to map the chain of processes involved. The idea of a "global commodity chain" was later introduced by Gary Gereffi, where he mapped the apparel commodity chain across countries: from the raw materials, such as cotton, wool or synthetic fibres, to the final products in the form of garments. De Backer & Miroudot (2013), note that in the 2000s there was a shift in terminology to the "global value chain," arising from the analysis of trade and industrial organisation as a value-added chain.

The concept of value chains therefore is broadly defined as the full range of activities and processes that are needed to bring a product from conception through the intermediary stage of production to delivery to final consumers. Leading on from this definition, a global value chain can be simply explained as "the sequence of all functional activities required in the process of value creation involving more than one country" (Banga, 2013, p.6).

There is an extensive literature in relation to organic value chains. Some papers have considered the short supply chain from farmer to consumer (Marsden et al., 2000). Raynolds (2004) considered the spatial dimension of global organic value chains. Other parts of the organic literature consider attitudes and inter-personal interaction across actors in the value chain such as drivers of value based consumption (Connell et al., 2008) or social relations between actors (Jarosz, 2000) or knowledge, relative power and innovation in the value chain (Morgan and Murdoch, 2000). Some parts of the literature focus on segments of the value chain such as the attitudes of consumers (Fotopoulos and Krystallis, 2003; Squires et al., 2001).

Global Value Chain Methodology

According to Gereffi & Fernandez-Stark (2011), the Global Value Chain (GVC) framework offers insights into the way global industries are organised through the study of the structure and dynamics of different players involved in a given industry, helping to identify changing production patterns, connecting activities across multiple countries and actors within a single industry, and clarifying roles across countries.

The methodology is increasingly being adopted by a range of institutions and governments as a component in the understanding of the different layers of global industries, where actors seek to identify a country's or firm's best position in the GVC as well as the most competitive business functions. The goal is to inform the development of programmes and policies to add value and ultimately, to promote economic development. Although dairy and beef commodities and value-added products such as organic produce are traded globally, and whole value chains are truly global in nature, this paper will focus on the value chain activities as they pertain to Ireland to facilitate domestic decision making.

There are four basic elements that the GVC methodology investigates[3]:

- Input-output structure
- Geographical scope
- Governance structure
- Institutional context

Input-Output Structure

The aim of this step of the analysis is to gain general knowledge about the industry in question and then map the entire input-output process involved in bringing a product or service to the market, from conception to end use by final consumers. The input-output structure is typically represented as a set of value chain "boxes" demonstrating the flow of goods and services including, for example, research and development, inputs, processing, marketing, distribution and sales (Figure 1).

Figure 1.Generic Industry Value Chain Segments

[3] This description is largely based largely on the work of Gereffi & Fernandez-Stark (2011).

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Source: adapted from Gereffi & Fernandez-Stark (2011); Le Heron et al. (2010); Sturgeon et al., (2013); USAID (2007).

It is also important to develop a contextual understanding of the type of firms involved in the industry, including their global reach, size, and ownership. By identifying the firms in the chain it is also possible to develop insights into the prevailing governance structure within the chain.

Geographic Scope

Beef supply chains in Ireland both in the conventional and organic sectors, are fragmented in different regions, specialising in areas of competitive advantage. Suckler farms, where calves and the suckler cows are fed off grass tend to be concentrated in areas with poorer land along the North and West coasts. Conversely finishing systems which feed more grains tend to be located on bigger farms along the East coast. Within the GVC methodology, geographic scope can be assessed by identifying the lead firms in each part of the value chain for a given industry and the presence of these leading firms within particular countries or regions.

Governance Structure

Analysing the governance structure involves developing an understanding of how a value chain is controlled and co-ordinated, focusing on the distribution of power between firms. Governance of value chains can be described as "producer-driven" or "buyer-driven" chains. Producer-driven chains are typically vertically integrated along all segments of the supply chain and associated with high-tech sectors such as infant milk formula industries. Because technology, research and development are such critical parts of such industries, lead firms are most likely to control the design and production of products. Production in buyer-driven chains, on the other hand, can be completely outsourced and controlled by retailers and branded marketers (De Backer & Miroudot, 2013). The beef value chains, both in the organic and conventional sectors can be considered producer led. Given the bulky nature of products, most of the value chain (processing and chilling for export) is located within Ireland, with limited live exporting.

Institutional Context

The institutional framework identifies how local, national and international conditions and policies impact on each stage of the value chain (Gereffi & Fernandez-Stark (2011). Within this framework, the ability for a firm to enter into the global value chain depends to a large extent on three separate dynamics at the local level: economic (for example, labour costs and access to finance); social (such as availability of labour and relevant skills); and institutional (such as the tax structure, subsidies or policies that may promote or hinder industry development). Analysing the local dynamics in which a value chain is embedded can be achieved by mapping all the relevant industry actors in the value chain and their main role in the chain.

The organic beef sector and more widely the agricultural sector is characterized by very heavy state involvement, whether in terms of animal and environmental regulations, organic certification or direct payments.

An additional element of analysis often included as part of the GVC methodology is referred to as upgrading, which describes the dynamic movement within the value chain by examining how producers shift to higher value stages of the chain. Within the organic sector, there is a greater degree of farmer led processing and direct marketing than in the conventional sector, both selling meat products and higher value added consumer products in farmers markets and directly to consumers.

4. Data and Methodology

In order to understand the structure of the organic beef value chain in Ireland, we need data in relation to the location of animal numbers for organic and non-organic farms by area. The Bovine Animal Identification System (AIM) was established by the Irish Department of Agriculture, Food and the Marine (DAFM) to support

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the safety of beef products through animal identification and traceability systems. The system tags all animals, provides a bovine passport, and stores a bovine herd register by farm on a computerised database. For the purpose of this paper, we utilise the 2014 Animal Identification and Movement System (AIMS) database. The AIMS database contains the number of animals by age for each registered herd number in the country and is used to trace animal movements for cattle. The main purpose is to reassure consumers that the food they eat can be traced back to its source.

In order to determine whether a farm is organic or not, we draw upon DAFM data in relation to organic status as determined by receipt of Organic Farming Scheme (OFS) subsidy payments under the RDP within the Organic Census. Farms are categorized as either Organic or Non-Organic and are recorded using a farm identification number. For the purposes of this paper we utilize data on "in-conversion" and organic herds registered with DAFM on January 1 2016. Using herd numbers to match and merge the AIMS and the Organic Census observations, we produce a database of animals with organic status, by type and age.

Utilising the value chains framework as previously discussed, we capitalize on the longitudinal and spatial data available to us to track animal movements from organic and non-organic farms across the value chain, including new entrant farms in the most recent CAP programme. This allows us to develop a better understanding of (a) whether farmers adjusted their structures to reflect value chain gaps and (b) whether the impact was spatially concentrated i.e. do farmers adjust more in areas with a smaller spatial concentration or does this merely result in greater value chain imbalance?

Summary Statistics

In this paper, we are primarily interested in mapping the component of the value chain that exists within Ireland. To do this, we frame the Irish organic sector information presented earlier within the global value chain context as discussed. A map of the organic beef value chain in Ireland is presented in Figure 2.

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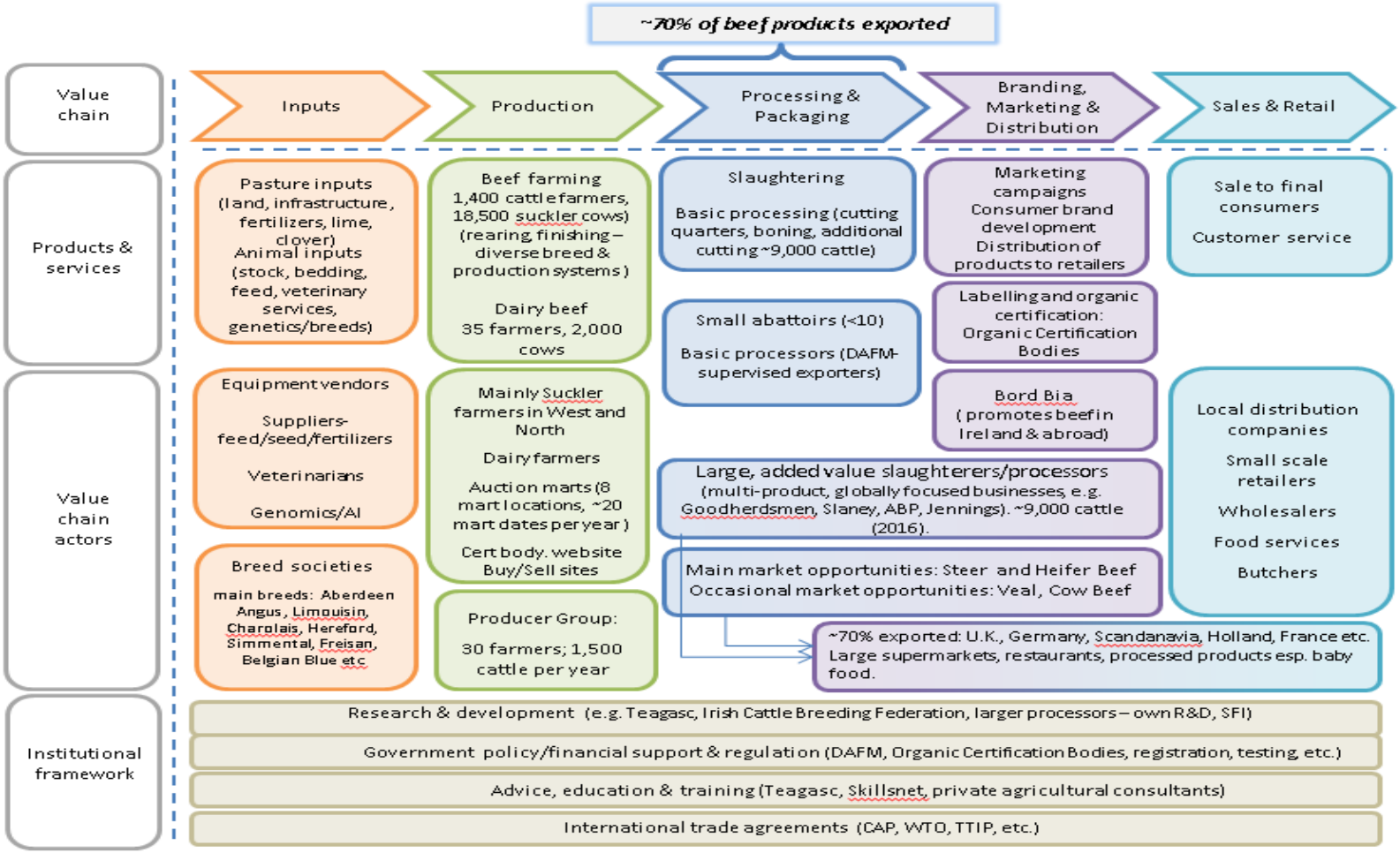
Figure 2.Irish Beef Organic Value Chain Map



Source: Authors

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Table 3 describes the spatial distribution of Organic and Non-Organic farms. Areas with a higher share of Organic farms include the Border, Midlands, Mid-West and Western regions. These are areas that are almost entirely less favoured areas (LFA[4]s), with poorer agronomic conditions, soils, and with typically lower returns from agricultural land use. Due to difficult environmental conditions, farming tends to be more extensive with lower stocking rates in these areas. Higher value, more intensive systems such as Dairy and Tillage, tend to be located on the better soils in the South East, Mid East and South-West.

Table 3. Regional Distribution (%) of Organic and Non-Organic Cattle

	Non-Organic (%)	Organic (%)
[5]Border	12.9	16.0
Dublin	0.3	0.2
Mid-East	7.9	7.3
Midlands	11.4	16.6
Mid-West	14.5	16.2
South-East	19.3	14.3
South West	20.4	11.5
West	13.2	17.9

Source: Authors: AIMS & Organic Census

5. Results

Structure of the Organic Value Chain

The structure of cattle farms is complex. In Table 4 we report the distribution of animals by age. The share of farms with dairy cows is much lower amongst organic farms at 3%, than for non-organic farms at 17.4%. This in itself does not make much difference as the share of suckler (beef) cows is higher for organic at 31.5%. Dairy cows give birth to calves with the aim of producing milk for sale from the cow, replacement animals for future milk production, and meat from progeny not used for milk production. Suckler cows on the other hand, give birth to calves with the aim of producing milk from the cow for the calves, and replacement animals for future animal production and meat. In total, 33.2% of non-organic and 34.5% of organic animals are either dairy or suckler cows.

Table 4. Value Chain Distribution of Animals by Age

Total	Dairy Cows	Suckler Beef Cows	Cattle 0-1 Years	Cattle 1-2 Years	Cattle 2+ Years	Total
Non-Organic	1,096,643	999,610	1,801,962	1,653,309	768,752	6,320,276
Organic	1,743	18,531	17,225	13,871	7,487	58,857
Distribution	%	%	%	%	%	%
Non-Organic	17.4	15.8	28.5	26.2	12.2	100.0
Organic	3.0	31.5	29.3	23.6	12.7	100.0

Source: Authors: AIMS and Organic Census

[4] 4 In accordance with Council Directive 75/268/EEC of 28 April 1975 on mountain and hill farming and farming in certain less favoured areas (LFA),

[5] Region 1 - Border: Louth, Leitrim, Sligo, Cavan, Donegal, Monaghan.
Region 2 – Dublin
Region 3 – Mid-East: Kildare, Meath, Wicklow
Region 4 – Midlands: Laois, Longford, Offaly, Westmeath
Region 5 – Mid-West: Clare, Limerick, Tipperary NR
Region 6 – South- East: Carlow, Kilkenny, Wexford, Tipperary SR, Waterford
Region 7 – South-West: Cork, Kerry
Region 8 – West: Galway, Mayo, Roscommon.

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A slightly higher share of animals on organic farms are aged 0-1 years (29.3%) compared with 28.5%, while the share of animals aged 1-2 years is lower at 23.6% compared with 26.2%. This is despite a higher share of animals that produce off-spring, and a lower share of dairy animals in which more animals aged 1-2 are categorized as dairy or suckler. There are fewer animals aged 1-2 on organic farms, which may reflect a leakage from organic to conventional farming. Conversely for animals aged over two years, there is a higher share amongst organic farms at 12.7% compared with 12.2% for conventional farms, reflecting a more extensive rearing system, with a lower usage of imported grains for finishing.

The distribution of animal shares and types of animals across the farms in our dataset is presented in Figure 3. For suckler cows we notice a uni-modal distribution for organic farms and a bi-modal distribution for non-organic farms. From the data we know that 90% of organic farms contain suckler cows, compared with 28% of all cattle farms. The mode for organic farms and the second mode for non-organic farms is about 25%-55% of cattle on the farm. Farms with animals aged 0-1 exhibit a similar distribution, which is unsurprising as off-spring are typically held until at least 6 months.

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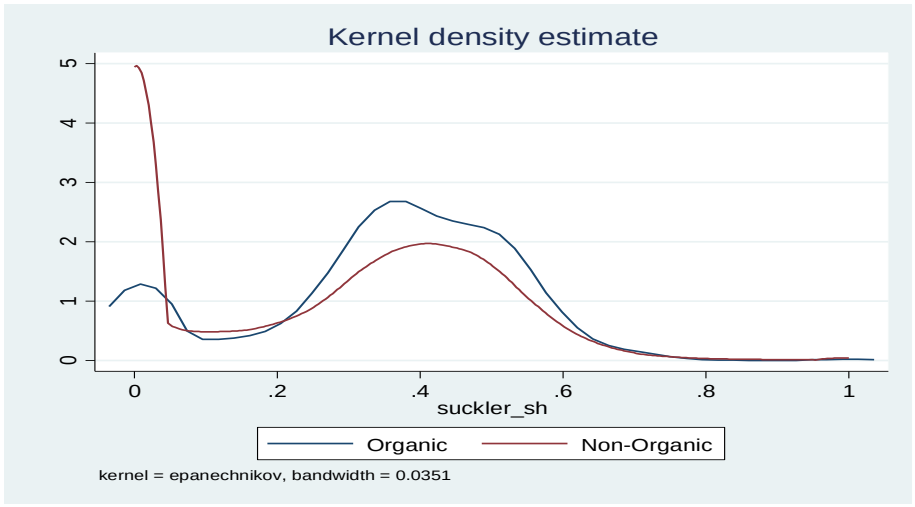
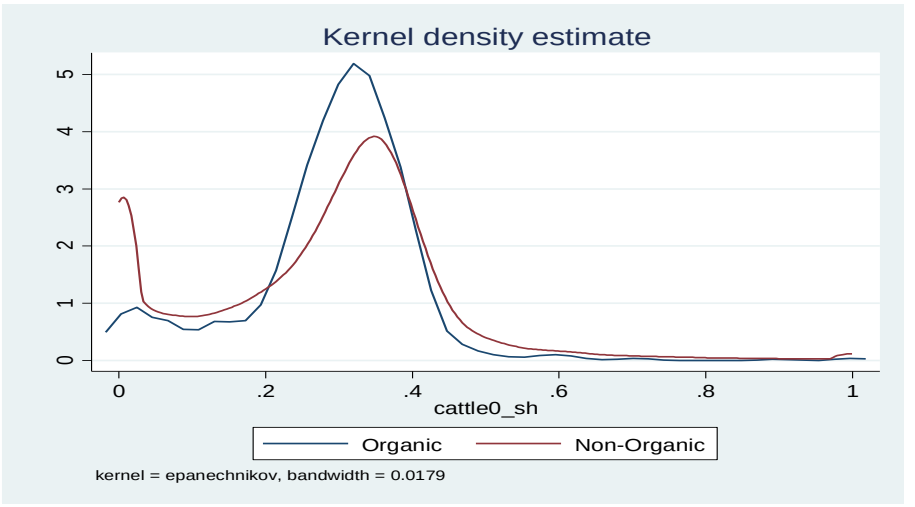
Figure 3.Kernel Density of Animal Type Shares for Organic and Non-Organic Farms

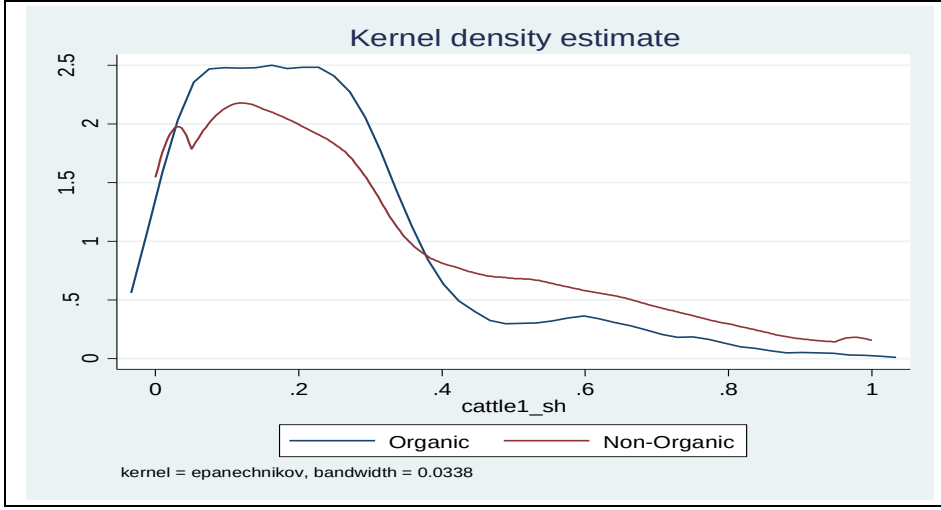
Suckler Cattle



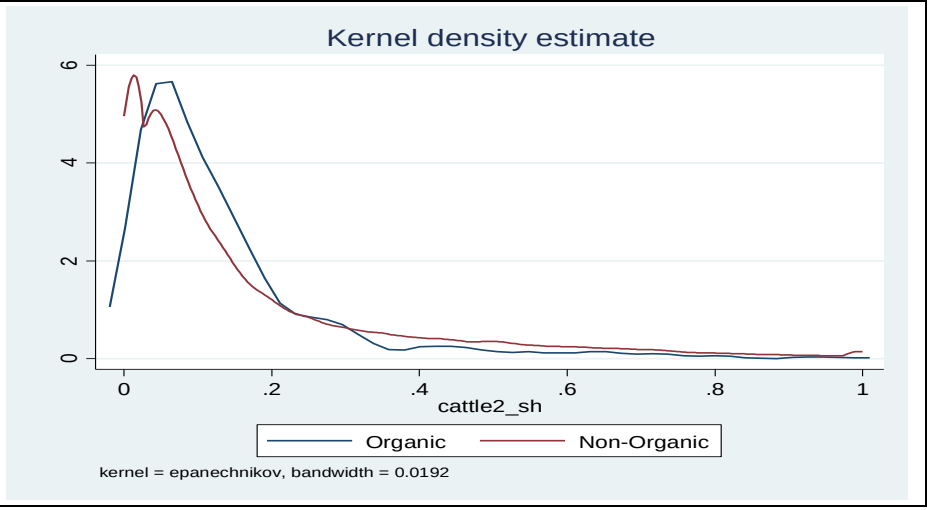
Cattle Aged 0-1



Cattle Aged 1-2



Cattle Aged 2+



Source: Authors: AIMS LPIS and Organic Census

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The distribution of older aged cattle shows a greater concentration of lower shares for organic farms and a slightly greater concentration of higher shares for non-organic farms. This illustrates the slightly higher degree of specialisation into either suckler to weanlings or suckler to finished animals on non-organic farms, whereas organic farms are slightly less specialised with more animals in the more general suckler to finish category. Thus the fact that more organic farms have suckler cows (as presented in Table 5), resulting in a unbalanced or "lop-sided" value chain, is mitigated by the fact that organic farms are less specialised.

Table 5. Share of Cattle Farms with No Suckler Cows

	Share of Farms with No Suckler Cows
Non-Organic	27.7
Organic	9.9

Source: AIMS and Organic Census

Table 6 describes the progression rate by age, or the probability of staying within the same system. The proportion of animals progressing from mothers to 0-1 years is quite similar at 85.9% for non-organic compared to 84.6% for organic, reflecting the fact that young animals typically stay in the same system as their mothers. Part of the reason for a progression rate of less than 100% is a combination of fertility (calves per suckler cow) and calf mortality (calves surviving to age 1). The slightly higher rate for non-organic farms reflects the higher fertility rates amongst dairy farmers. When we look at cattle aged 1-2 years, we see a lower progression rate of 79.7% for organic farms compared to 91.6% for non-organic farms, which may reflect a greater leakage of animals from organic to conventional farming at this age. The higher progression rate of 54.2% for organic farms relative to non-organic farms at 46.6% for cattle aged 2+, reflects the more extensive rearing system amongst the former, with a greater share of animals being finished before the age of 2 years on non-organic farms.

Table 6. Progression Rate by Age

Progression Rate	Cattle 0-1 Years	Cattle 1-2 Years	Cattle 2+ Years
Non-Organic	85.9	91.6	46.6
Organic	84.6	79.7	54.2

Source: Authors: AIMS, LPIS and Organic Census

Spatial Distribution of the Organic Value Chain

Thus far we have considered the national value chain for organic cattle production compared with conventional farms. However much of the trade in animals is done at a local level through marts. As a result the spatial distribution is quite important. Areas with a lower capacity of growing grains for finishing have lower shares of older animals. This spatial differentiation of different parts of the cattle value chain may provide challenges for niche sectors such as organic farming. In Table 7, we report the spatial distribution by region of different age groups.

The West, Border, Mid-West and Midlands have higher shares of suckler cows. However the concentration amongst organic farms is relatively higher in the Mid-West and Midlands than for non-organic farms. The spatial distribution of suckler and dairy cows is relatively similar for organic and non-organic animals. However in the case of animals raised for meat, the distribution changes. The Western region is the 4th ranked region for conventional animals aged 0-1 and 2+ and 5th for 1-2 years, while for organic it is the 1st ranked region for 0-1 and 2+, and 3rd for 1-2. Similarly the Midlands region is respectively 6th 4th and 5th for aged 0-1, 1-2 and 2+ for non-organic, compared with 3rd, 1st and 2nd for organic farms.

Table 7. Spatial Distribution of Animals by Age and Organic Status

	Non-organic				Organic			
	Suckler & Dairy Cows	Cattle 0-1 Years	Cattle 1-2 Years	Cattle 2+ Years	Suckler & Dairy Cows	Cattle 0-1 Years	Cattle 1-2 Years	Cattle 2+ Years
Border	13.2	13.1	12.6	12.5	13.0	16.0	14.2	13.6
Dublin	0.3	0.3	0.3	0.5	0.3	0.2	0.3	0.1
Mid-East	6.9	7.2	8.5	10.8	7.9	7.2	7.9	7.2

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Midlands	9.6	11.3	12.9	13.5	11.4	16.4	19.1	17.7
Mid-West	14.7	14.7	14.0	14.6	14.5	16.5	16.0	16.1
South-East	18.8	19.9	20.3	17.0	19.3	13.6	16.3	15.9
South West	23.6	19.9	18.7	16.8	20.4	11.9	10.0	11.2
West	13.0	13.6	12.6	14.3	13.3	18.2	16.2	18.2
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: Authors: AIMS, LPIS and Organic Census.

Table 8 reports the progression rates by region. Excluding Dublin, due to the low sample size, we see that progression rates are lower for organic than for non-organic for almost all regions and ages up to 2 years of age, reflecting the leakage to conventional agriculture. The highest progression rates are in the Midlands and the South-East for both organic and non-organic, reflecting the trade in animals from poorer land in the West to better land that is more suitable for finishing in the East. Thus for both organic and non-organic farming, we notice a flow from West to East, indicating that a national value chain exists for both sectors. However the flow is lower for organic production, reflecting the lower specialisation found on organic farms, also highlighted above.

Table 8. Progression Rate by Region

Organic	Non-organic			Organic		
	Cattle 0-1 Years	Cattle 1-2 Years	Cattle 2+ Years	Cattle 0-1 Years	Cattle 1-2 Years	Cattle 2+ Years
Border	85.6	87.9	46.2	75.1	71.4	51.6
Dublin	92.7	100.0	74.3	104.2	143.0	15.1
Mid-East	89.9	107.9	59.1	87.0	87.8	49.5
Midlands	101.4	104.9	48.6	95.4	93.6	50.0
Mid-West	85.9	87.6	48.4	86.6	78.0	54.4
South East	91.0	93.9	39.0	89.7	96.6	52.5
South West	72.6	86.2	41.8	81.3	68.1	60.4
West	89.8	85.2	52.5	83.1	71.7	60.8

Source: AIM and Organic Census

6. Conclusions

In this case study, we utilise a unique dataset that links administrative data on animal movements, land parcels and organic conversion data to study the types of farms across the value chain that have converted to organic production, in order to test whether the incentives created by the Organic Farming Scheme under the Rural Development Programme result in a balanced value chain. Given the fine spatial resolution of this data and the remote location of organic farms and mart and processing outlets, (resulting in high transport costs), we examine whether there are value chain issues in particular areas and conversely whether there are better performing areas from a value chain perspective. Our results show that:

- organic farms in Ireland are concentrated in less favoured areas which are more extensive and less specialised;
- a slightly higher share of animals on organic farms are aged 0-1 years (29.3% compared with 28.5%), while the share of animals aged 1-2 is lower (23.6% compared with 26.2%);
- the structure of cattle farms is quite complex, with less specialisation on organic farms, while the vast majority of organic farms contain suckler cattle, with only 10% having no suckler cattle, compared with 28% of all cattle farms;
- the lower level of intensification on organic versus conventional farms results in a longer production cycle, with more animals finished on grass than in the conventional sector;
- when we look at cattle aged 1-2 years, we see a lower progression rate from 0-1 years of 79.7% for organic farms than for non-organic farms at 91.6%, which may reflect a greater leakage of animals from organic to conventional farming at this age;
- less specialisation implies that there is less leakage than would be expected under the more specialised conventional system;

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- progression rates for almost all regions and ages are lower for organic than for non-organic, reflecting the leakage to conventional agriculture of cattle up to 2 years old as previously highlighted.
- for both organic and non-organic farming, we notice a flow in animals as they age, from poorer land in the West to better land that is more suitable for finishing in the East, indicating that a national value chain exists for both sectors, however the flow is lower for organic, reflecting the lower specialisation found on organic farms
- as a result of the differential position across the value chain, there is a risk of significant leakage, with sub-optimal production of organic meat relative to the investment made.

Overall, this analysis is consistent with anecdotal evidence in relation to specialization and progression in the organic beef value chain and confirms anecdotal evidence in relation to a leakage of animas from the organic to the conventional beef system. While this analysis represents the Irish organic beef sector as a case study, the risk of leakage from organic sectors could have implications for European policy makers in relation to the effectiveness of current incentive schemes and the design of new schemes. However this analysis reflects a snapshot in time of the value chain. In order to follow the progression of animals through the value chain, a time series dataset is required. This would allow us to examine:

- changes to the structure of the organic beef value chain over time by examining matched AIMS and organic census data over a number of years
- the tillage component of the value chain in terms of organic cereals for feed
- the level of the leakage of animals from organic to conventional farms.

Policy recommendations

This analysis provides a basis to work with industry partners to consider institutional solutions to improve the effectiveness of the organic value chain and to draw lessons for future CAP scheme design. A number of options are thus suggested that could be relevant for policy makers both in Ireland and in other EU countries in the mid-term review of the CAP, in relation to improving the functioning and profitability of the organic value chain and the design of future OFS.

- Collation of accurate market and processor information to establish market requirements and future expected demand trends for Irish organic beef.
- Once market demand is established, encourage and incentivize the establishment of organic KT discussion groups which could act as a spring-board for organic farmers to communicate and co-operate with others, with a view to establishing collaborative arrangements to improve the efficiency of the organic value chain. For example, collaborative arrangements could include the establishment of buying/selling groups, linking groups of weanling producers in the West to cattle finishers in the East. It could also include the establishment beef-finishing producer groups with contracts established with organic beef processors. This will encourage more organic beef finishers to become more specialised in finishing beef animals.
- Introduce a separate and increased rate of OFS payment for crops required to finish organic cattle e.g. arable crops and red clover leys for animal feed, to account for concentrate feed requirements. This will also encourage more farmers to finish cattle.
- The establishment of more strategically located organic cattle marts and an independent on-line buy/sell trading facility for organic cattle.

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