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Policy Incentives and the Organic Value Chain in Ireland

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ABSTRACT

Administrative datasets are utilised to study farms that have converted to organic beef production in Ireland, to draw lessons for future CAP scheme design. The analysis confirms anecdotal evidence in relation to a leakage of animals from the organic to the non-organic (conventional) beef sector. As a result of this differential response across the value chain, there is sub-optimal production of organic meat relative to the investment in incentives for conversion from non-organic to organic production. This may result in risks to the long term viability of the incentive scheme and more widely, for supports for organic farming.

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 unintended environmental outcomes (Bennett et al., 2014). This can involve agro-ecological approaches which have multi-dimensional impacts, such as the conversion from conventional (non-organic) 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, historical policies have focused on the incentivisation of greater uptake of organic production by farmers, without examining the effectiveness of the individual components that comprise the organic sector (producers, processors, government agencies and related organisations), how they interact, and how and where value is created. However, while recent EU policies are taking a more holistic approach across value generation in the organic sector by considering market development a priority (Larsson et al., 2013; Schmid et al., 2015), there are concerns that the historic focus on incentivizing production without also facilitating market development may have led to imbalances in organic value chains. The concept of 'value chains' refers to the steps involved in bringing a product from conception to market (De Backer & Miroudot, 2013). Analysis of value chains can be used to provide a more holistic sectoral perspective of value-adding activities and to provide economic insights on the actors and institutions that create value within a sector (Gereffi & Fernandez-Stark, 2011).

The objective of this paper is to develop a better understanding of the characteristics of organic farming value chain which has developed as a consequence of EU subsidies to convert from non-organic to organic farming. Using Ireland's organic beef sector as a case study, we employ a value chain mapping approach to understand the structure of the organic value chain and in particular to study the types of farms across the value chain that have converted to organic production, in order to test whether the policy incentives and subsidies employed to date have led to the development of balanced value chains.

We create a unique dataset that links administrative data on animal movements and organic conversion data, to study farms that have converted to organic production. These data allow us to examine the distribution of organic farms in relation to their production systems and categories of animals produced. We also examine the relative distribution of organic farmers and processing outlets to ascertain whether there are spatial value chain imbalances.

Section 2 describes the EU and Irish organic policy contexts before examining the sectoral value chain opportunities and challenges in Section 3. Next, Section 4 describes the theory of value chains and lastly, we present results and conclude with suggestions for future scheme design and policy implications for supports for organic farming.

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 non-organic 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; Rundlöf et al., 2008). The use of legume and species-rich legume leys which are recommended as part of organic farming standards help to 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 and synthetic fertilisers. In addition, organic

farmers can also benefit in a social context from the formation of organic producer groups and marketing networks.

According to the 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 Utilisable Agricultural Area (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%). In terms of animal numbers, 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 improving awareness of incentives, addressing technical gaps in organic production and providing more information on the organic production sector. However, it has been increasingly recognized that the production focused schemes run the risk of generating an over-supply which cannot be easily absorbed by the market (Hamm, 2002; Schmid et al., 2015). According to Hamm et al. (2002), government policy for organic farming should support functioning markets where both the supply side and the demand side are equally developed. Thus, recent schemes are more likely to consider market development a priority (Larsson et al., 2013; Schmid et al., 2015) and provide information on the market and supply chain, and increasing consumer confidence in organic food and farming (Schmid at al., 2015).

However, Hamm et al. (2002) highlighted the need for comprehensive data collection in relation to up-to-date supply chain and market information, as different data collection approaches are adopted in EU countries. Larsson et al. (2013) report that market development was the least developed step of a series of six steps proposed to develop the organic sector in central and European countries of the Baltic region. Some Organic Action Plans mention specific activities to strengthen short supply chains for organic food (e.g. Czech Republic, Slovakia and Switzerland) while other countries such as France focus on developing sectors where demand is not being met. In Wales and Ireland however, there are concerns of unbalanced organic value chains (e.g. leakage of organic lamb into the non-organic market in Wales and leakage of organic cattle and beef into the Irish non-organic market).

Irish policy

The Food Harvest (FH2020) agricultural strategy (DAFF, 2010) highlighted opportunities for growth in the organic sector 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.

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 reaching 5%.

The main financial incentive available to organic producers is the Organic Farming Scheme (OFS) which provides organic farmers with an area-based payment for eligible in-conversion and organically certified land. The overall objectives of the scheme are to deliver enhanced environmental and animal welfare benefits and to encourage producers to respond to market demand for organically produced food (DAFM, 2014). The scheme contains a provision to employ a ranking system for selection of new applicants based on criteria such as, the market requirement of the enterprise, potential to convert to organic production, and previous history of organic participation and production. Heretofore, the ranking system has not been implemented and all otherwise eligible applicants have been allowed to participate in the scheme.

Adoption studies show that higher organic production payments and higher prices for products are the two main drivers of adoption of organic farming for conventional Irish farmers (Läpple and Donnellan, 2008; Läpple and Kelley, 2010). The subsidies paid to Organic Farming Scheme (OFS) participants, led to an increase in organic bovine numbers and herds from a low base of 350 animals and 6 herds in 2007, the sector grew rapidly to over 40,000 animals and over 900 herds by 2012. By 2016 organic cattle numbers had reached 59,000 animals in 1,400 herds (Clavin and Leavy, 2017), which represents an increase of 65% in cattle farms and an increase of 100% in cattle numbers since 2008. The majority of these herds contain suckler cows that produce milk to rear calves for the beef market (whereas dairy cows produce milk for sale) (DAFM, 2014).

3 Beef Sector Overview and Value Chain Opportunities and Challenges

Beef sector in Ireland

According to the Department of Agriculture, Food and the Marine (DAFM), there are three categories of beef producers in Ireland: (a) suckler producers who rear and wean beef calves, (b) fatteners, who fatten weanlings and (c) cattle finishers, who keep older animals until they are fit for slaughter. There are almost 68,000 beef farms with another 28,000 mixed farms that are involved in some aspect of the beef supply chain (Agri Aware, 2013).

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 having 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). The non-organic beef processing industry is made up of around 30 large-scale, DAFM-supervised private processing facilities which are approved to export to the UK, continental Europe and other markets. There are relatively few processors of organic beef in the country. Likewise there are relatively few marts dedicated to organic animal sales with the majority located in the Border and Western regions.

Market opportunities for organic beef

Approximately 70% of organic beef is exported to countries including the U.K., Germany, Scandinavia, France and the Netherlands. Latest figures show the organic retail food market in Ireland is now worth over €136 million annually and the EU organic food market was worth €24 billion in 2014, a doubling in size over the last 10 years (Bord Bia, 2015). The global organic market for food has also increased in recent years with sales of €81.6 billion in 2015, up from €33.2 billion euro in 2005 (Willer and Lernoud, 2016). A premium of 15-20% above the price paid for non-organic beef has been achieved for organic beef in recent years. While the majority of beef supplied to the organic market is from steers and heifers, a market has also emerged in continental Europe for calves (organic veal).

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 improving seasonal continuity of organic supply to both domestic and export markets. Since 2015, an organic beef producer group comprising 30 members is supplying approximately 1,500 cattle per year to the largest organic beef processor.

Value chain challenges

There are concerns within the sector in relation to the structure of the organic beef value chain, as there is a perception that there is a disproportionately high share of suckler producers who rear and wean beef calves, selling them through marts and farm-to-farm sales, while relatively few farms specialise in fattening or finishing animals for the market. In addition, there are relatively few dedicated organic cattle mart sales and processors in Ireland, so there are concerns that animals that are reared organically could leak into the non-organic food chain if there are insufficient numbers of beef fattening or finishing farms and processing facilities within the primary organic production regions.

There is also a perception that farmers who participate in organic schemes primarily to avail of the subsidies, may not have the capacity (land, facilities, knowledge, technical capacity to manage legumes and organic cereal crops) to fatten or finish animals for the meat market, thus creating leakage. In addition, relatively few tillage farmers have converted to organic production (Clavin, 2012), which may result in supply gaps for organic winter forage which is often an important element in beef production.

It is evident that while the rapid growth of Irish organic beef farming was initially largely due to the presence of subsidies, there is now a need to consider the structure of the Irish organic beef sector in relation to its achievement of Irish and EU policy objectives and also in relation to its ability to capitalize on global market opportunities. We would thus like to examine the structure of the sector and whether there is an imbalance in the organic beef value chain. In particular we would like to examine issues such as the spatial concentration of organic production, and the potential for leakage into the non-organic beef value chain. In the next section, we examine a theoretical framework which allows us to develop a greater understanding of the issues facing the sector from a multi-dimensional global value chain perspective.

4 Theoretical Framework

Value Chains

The concept of value chains 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 (Heery et al., 2016). There is an extensive literature in relation to organic value chains. Some studies consider the short supply chain from farmer to consumer (Marsden et al., 2000), while Raynolds (2004) considers the spatial dimension of global organic value chains. Other studies in 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 specifically on individual segments of the value chain such as the attitudes of consumers (Fotopoulos and Krystallis, 2003; Squires et al., 2001).

As the vast majority of Irish organic beef is exported, the sector interacts with a global value chain. In this context, a global value chain is essentially "the sequence of all functional activities required in the process of value creation involving more than one country" (Banga, 2013 p.6).

Value Chain mapping

Global Value Chain approaches 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 (Gereffi et al., 2005). 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 institutions and governments in understanding the different layers of global industries. 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.

The GVC methodology investigates four value chain components[1]:

- 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. 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). In mapping the Irish organic beef value chain, we first need to consider farm-level issues that impact on inputs and production systems.

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

Figure 1. Generic Industry Value Chain Segments

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

Organic beef farming in general requires similar inputs to non-organic beef farming, which include stock, feed, veterinary services, land, and fertilisers (permitted according to organic regulations) However there is a large degree of heterogeneity in both the organic and non-organic beef industries in terms of the age at which animals are sold on, intensification, breed, production systems, and types of animals – such as suckler cows (beef cows that are kept to rear calves as opposed to dairy cows that are kept to produce liquid milk), calves, heifers, young cattle, bulls and steers. This heterogeneity results in significant variation in costs across farms. In addition, relatively few tillage farmers in Ireland convert to organic production, thus there is little availability of organic grain, resulting in higher prices for organic grain. This is a particular problem for organic farmers who require who specialise in 'finishing' cattle as they normally need to buy in supplementary grains.

In relation to production systems, there is significant heterogeneity in the degree of 'specialisation' among organic farmers. In this context, specialisation refers to the production of a particular age-class of animal compared to non-specialised farms that keep animals from birth until they are 'finished' or ready for slaughter. In the wider context, 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 non-organic and organic sectors are fragmented in different regions, with the type of production largely related to land type. Suckler farms, where calves and the suckler cows are mainly grass-fed, tend to be concentrated in areas with poorer, wetter land in the North and West. Conversely fattening and finishing systems which feed more grains tend to be located on bigger, drier farms in the South and East. 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. Organic cattle farmers can buy and sell cattle through farm-to-farm sales and through a series of dedicated organic sales mainly in the border, west and mid-west regions. In this analysis, we include a spatial analysis of the distribution of organic farms.

Governance Structure

Analysis of 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 are 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 out-sourced and controlled by retailers and branded marketers (De Backer & Miroudot, 2013). The beef value chains, both in the organic and non-organic 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 of 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.

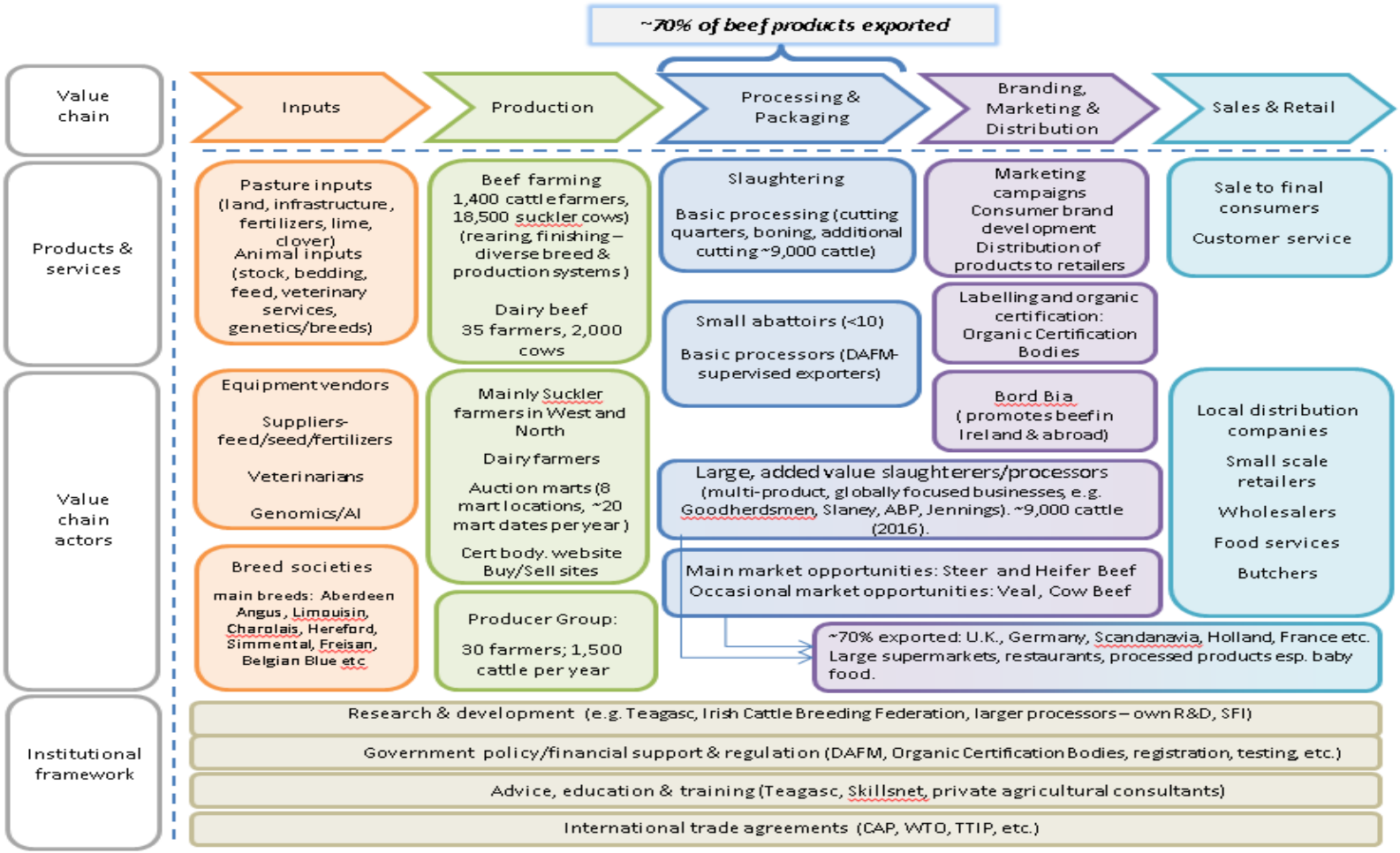
As the development of the organic beef sector in Ireland has been largely driven by financial policy incentives, the sector is characterized by very heavy state involvement, in terms of animal and environmental regulations, organic certification and subsidies. An additional element of analysis often 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 non-organic beef sector. This is evident in relation to sales of meat products and higher value-added consumer products at farmers markets and also directly to consumers.

5 Data

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 on organic and non-organic farms by region. The Bovine Animal Identification Movement System (AIMS) was established by the Irish Department of Agriculture, Food and the Marine (DAFM). The purpose of the system is to reassure consumers that the food they eat can be traced back to its source. The system tags all animals, provides a bovine passport, and stores a bovine herd register (by farm) on a computerised database. The AIMS database contains the number of animals by age, for each registered herd number in the country and is used to trace bovine animal movements. For the purpose of this paper, we utilise the 2014 Animal Identification and Movement System (AIMS) database.

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. The resulting value chain map of the organic beef sector in Ireland is presented in Figure 2.

In order to determine whether a farm is organic or not, we draw upon DAFM data in relation to organic status as recorded on the by DAFM Organic Unit database of registered organic herdowners. Farms are categorized as either Organic or Non-Organic and are recorded using a farm identification number (herd number). For the purposes of this paper we utilize data on full organic status herds (excluding in-conversion herds) registered with DAFM on May 31 2014. Using herd numbers to match and merge the 2014 AIMS and the 2014 DAFM database of registered organic herdowners, we produce a unique database of organic animals, by type, age and region.



Source: Authors

Figure 2. Irish Beef Organic Value Chain Map

Table 1 describes the spatial distribution of Organic and Non-Organic farms. Areas with a higher share of organic farms relative to non-organic farms include the Border, Midlands, Mid-West and Western regions. These are areas that are almost entirely less favoured areas (LFAs[2]), with poorer agronomic and soil conditions and with typically lower returns from agriculture. 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-Wes, which afford greater opportunities to 'finish' cattle.

Table 1.
Regional Distribution (%) of Organic and Non-Organic Cattle

	Non-Organic (%)	Organic (%)
[3]Border	13.7	15.5
Dublin	0.3	<0.0
Mid-East	7.5	7.1
Midlands	11.0	17.6
Mid-West	14.6	17.4
South-East	19.0	16.2
South West	20.5	12.7
West	13.4	13.4

Source: Authors: AIMS & DAFM database of registered organic herd owners

6 Summary Statistics and Results

Structure of the Organic Value Chain

Table 2 shows the scale of beef production from organic farms compared to all farms. The majority of beef is supplied directly to the market from individual farms with 85% of organic farmers who finish cattle, finishing less than 20 cattle, compared to 73% of national finishers (Table 3). On organic farms, less than one percent of farmers who finish cattle, have more than 100 cattle compared to four percent of cattle finishers nationally. This reflects the extensive nature of beef production on organic farms compared to non-organic farms, with on average a lower throughput of finished animals per farm from organic farms.

[2] 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),

[3] 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.

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 = non-organic and organic

In Table 3 we report the distribution of animals by age. The share of farms with dairy cows is much lower amongst organic farms at four percent, than for non-organic farms at 17%. This in itself does not make much difference to the proportion of all cows in the population as the share of suckler (beef) cows is higher for organic at 30% vs 16% for non-organic. In total, 33.2% of organic and 34.4 % of non-organic animals are either dairy or suckler cows.

Table 3.
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	1,099,280	1,019,207	1,820,795	1,666,595	776,367	6,382,244
Organic	1,644	12,127	11,229	9,649	5,373	40,022
Distribution	%	%	%	%	%	%
Non-Organic	17.2	16.0	28.5	26.1	12.2	100.0
Organic	4.1	30.3	28.1	24.1	13.4	100.0

Source: Authors: AIMS and DAFM database of registered organic herd owners

The share of animals on organic farms is only slightly lower for 0-1 years age category (28.1% organic v 28.5% non-organic), and is also lower for 1-2 years, (24.1% organic v 26.1% non-organic). This is despite a slightly higher share of cows (dairy and suckler combined) on organic farms and a lower share of dairy animals, therefore we would expect more young animals on organic farms. The lower share of animals aged 0-1 years and 1-2 years on organic farms may reflect a leakage from organic to non-organic farming. Conversely, for animals aged two years and over, there is a higher share amongst organic farms at 13.4% compared with 12.2% for non-organic farms, reflecting a longer rearing period, 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 75% of all non-organic cattle farms. The mode for organic farms and the second mode for non-organic farms represent about 25%-55% of cattle on the farm. Organic farms with animals aged 0-1 exhibit a similar but more peaked distribution, which is unsurprising as offspring are typically held until at least 6 months. The distribution of cattle aged 2+ years shows a greater concentration of higher shares for organic farms and a slightly greater concentration of lower 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 4), resulting in an unbalanced or 'lop-sided' value chain, is mitigated by the fact that organic farms are less specialised.

Table 4. Share of Cattle Farms with No Suckler Cows

	Share of Farms with No Suckler Cows
Non-Organic	24.3
Organic	9.9

Source: AIMS and Organic Census

Table 5 describes the animal progression rate by age, or the probability of animals staying within the

same system. For example, if all cows in a herd have calves (0-1 years) which stay in the herd, then the progression rate is 100%. The census analysis calculates the number of animals of each type and age category (cows; cattle 0-1 years; 1-2 years; 2+ years) on 31st December 2014). The percentage of animals progressing from cows to 0-1 years is higher at 86% for non-organic compared to 82% for organic animals. Part of the reason for a progression rate of less than 100% may be a combination of fertility (calves born per suckler cow), calf mortality rate (calves surviving to age one), live exports to another country, slaughter, and leakage/movement of animals from one sector to another.

Table 5.
Progression Rate by Age

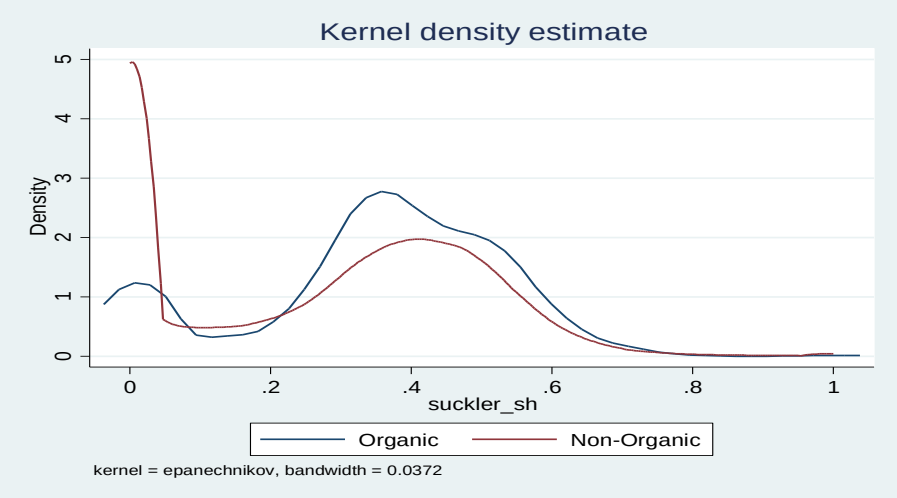
Progression Rate	Cattle 0-1 Years	Cattle 1-2 Years	Cattle 2+ Years
Non-Organic	85.9	91.5	46.6
Organic	81.6	85.9	55.7

Source: Authors: AIMS & DAFM database of registered organic herd owners

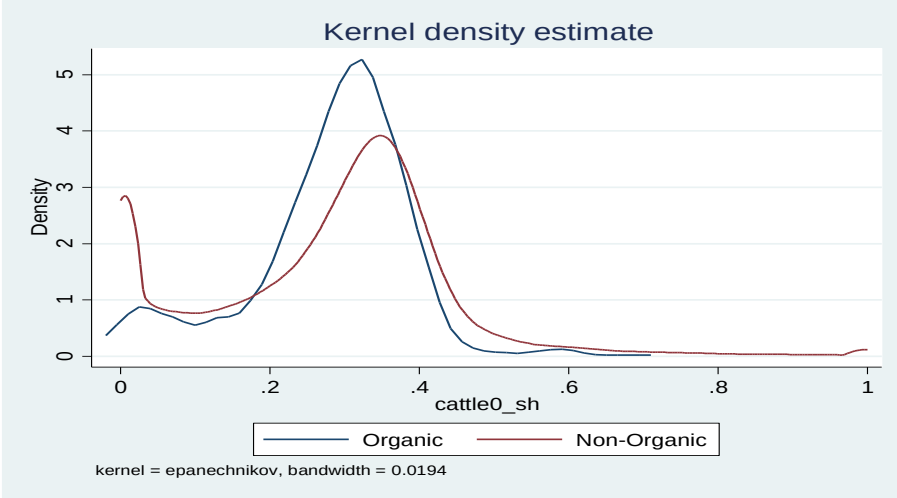
The lower progression rate for organic farms for cattle aged 0-1 years, may reflect the higher fertility rates of dairy versus suckler cows and potential differences in calf mortality rates between organic and non-organic herds, and leakage of animals from organic to non-organic farms. The market for veal and live exports was not considered to be a factor affecting progression rates as there was no demand for organic veal (calves slaughtered at <1 year old) and there was a negligible live export trade (cattle exported live <1 year old) in the Irish organic sector at the time of this study.

When we look at cattle aged 1-2 years, we see a lower progression rate (animals progressing from 0-1 years old to 1-2 years old) of 86% for organic farms compared to 92% for non-organic farms, suggesting a leakage of animals from organic to non-organic farms at this age. The higher progression rate of 56% for organic farms relative to non-organic farms (at 47% for cattle aged 2+), reflects the longer rearing period amongst the former, with a greater share of animals being finished at <2 years on non-organic farms. Grain/concentrate feed is generally required to supplement grazing in finishing young cattle (<2 years) and the higher price for organic grain/concentrates for farmers allied to the requirement to feed a minimum amount of grass forage in organic diets results in a longer rearing period prior to slaughter.

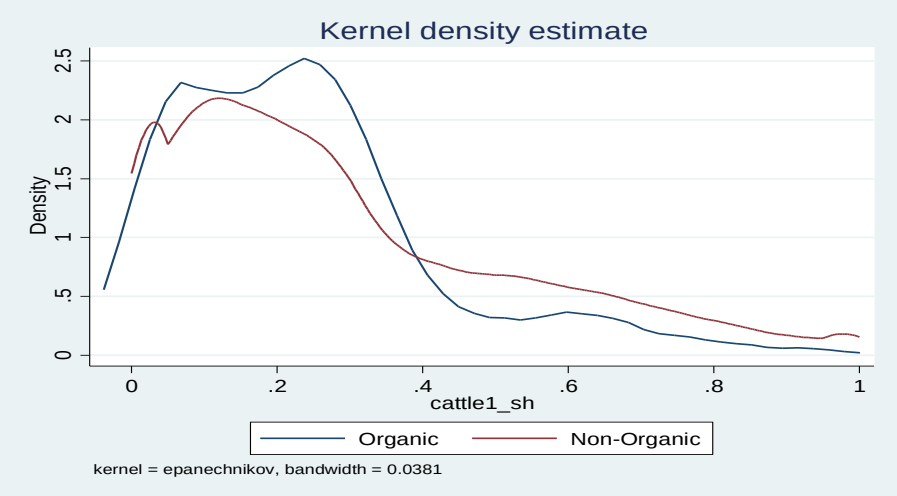
Suckler Cattle



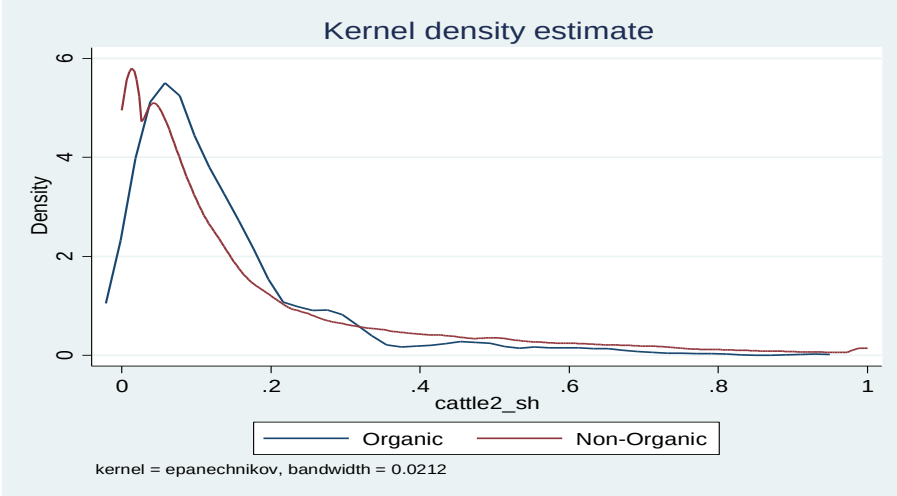
Cattle Aged 0-1



Cattle Aged 1-2



Cattle Aged 2+



Source: Authors: AIMS & DAFM database of registered organic herd owners

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

Spatial Distribution of the Organic Value Chain

Thus far we have considered the national value chain for organic cattle production compared with non-organic farms. One might expect that areas with poorer agronomic conditions and a lower capacity for growing grains for finishing, would have lower shares of older animals. However much of the trade in animals is undertaken at eight auction marts which are mainly located in the Border and Western regions. Additionally, of the three main factories which slaughter organic cattle are one is located in the Border region and two in the South-East. As a result, the spatial distribution of organic farms is quite important. In Table 6 we report the spatial distribution by region of different age groups.

The spatial distribution of suckler and dairy cows varies between organic and non-organic herds with higher concentrations of organic farms in the Midlands, Border, Mid-West and West and lower in the South West, South East and Mid-East. In the case of cattle raised on non-organic farms, the South West region is the 1st ranked region for animals aged 0-1 and 2nd for 1-2 and 2+years, while for organic farms it is the 5th ranked region for 0-1 and 6th for both 1-2 years and 2+ years. Similarly the Midlands region is ranked 6th for aged 0-1 and 5th for aged 1-2 and 2+ years for non-organic, compared with 1st, 2nd and 1st respectively for organic farms.

Table 6.
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	13.9	13.8	13.1	13.1	18.3	15.7	12.3	13.8
Mid-East	6.9	7.2	12.9	13.4	6.7	7.3	8.1	6.4
Midlands	9.6	11.3	12.9	13.4	16.3	17.9	18.71	18.7
Mid-West	14.6	14.6	14.0	14.5	16.9	17.1	17.9	18.1
South-East	18.6	19.7	20.2	16.9	14.2	15.2	19.3	18.0
South West	23.3	19.7	18.5	16.7	13.6	13.4	11.4	10.9
West	13.0	13.5	12.6	14.2	14.0	13/4	12.1	14.2
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: Authors: AIMS & DAFM database of registered organic herd owners

Table 7 reports the progression rates by region. Excluding Dublin (low sample size), we see that progression rates are lower for organic than for non-organic animals for almost all regions and ages up to 2+ years, reflecting the leakage to non-organic farming. The highest progression rates are in the Mid-East and the Midlands 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 farming, reflecting the lower specialisation found on organic farms, as noted earlier.

Table 7.
Progression Rate by Region

	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	85.4	87	46.7	69.8	67.2	62.5
Mid-East	89.9	107.8	59.1	88.9	95.4	43.8
Midlands	101.4	104.9	48.5	89.4	89.8	55.7
Mid-West	85.9	87.5	48.4	82.4	90.1	56.1
South East	91.0	91.0	39.0	87.1	109.3	51.8
South West	72.7	72.7	41.9	80.6	73.2	53.0
West	89.8	85.1	52.5	78.5	77.3	65.7

Source: AIM and DAFM database of registered organic herd owners

7 Summary

In this case study, we utilise a unique combined dataset that links administrative data on animal movements, land parcels and organic cattle herd numbers to study the characteristics of farms across the value chain that have converted to organic production, in order to learn more about the development of an organic value chain which has grown as a result of incentives under the Organic Farming Scheme (OFS) of the Rural Development Programme. Given the fine spatial resolution of these data and the remote location of organic farms, marts and processing outlets, (resulting in high transport costs), we examine whether there are spatial weaknesses in the value chain and conversely whether there are better performing areas from a value chain perspective. Our results show that:

- 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 cows, compared with 24% of non-organic farms;
- a slightly lower share of animals on organic farms are aged 0-1 years (28.1% organic compared with 28.5% non-organic), while the share of animals aged 1-2 is also lower (24.1% organic compared with 26.1% non-organic);
- when we look at cattle aged 1-2 years, we see a lower progression rate from 0-1 years to 1-2 years of 85.9% for organic farms than for non-organic farms at 91.5%, which may reflect a greater leakage of animals from organic to non-organic farming at this age;
- less specialisation on organic farms implies that there is less leakage than would be expected under the more specialised non-organic system;
- progression rates for almost all regions and ages are lower for organic than for non-organic farms, confirming leakage to non-organic farming of cattle up to 2 years old.
- for both organic and non-organic farming, we notice a flow of animals as they age, from poorer land in the West to better land that is more suitable for finishing in the Midlands and the Mid-East, indicating that a national East-West value chain exists for both sectors, however the flow is lower for organic, reflecting the lower specialisation found on organic farms.

8 Conclusions

This paper set out to address concerns in relation to value chain imbalances and leakage of organic animals from the organic beef sector to the conventional (non-organic) sector, by mapping the progression of animals through the organic value chain. Overall, this analysis is consistent with sectoral concerns in relation to specialisation and progression rates in the organic beef value chain and confirms sectoral concerns in relation to a leakage of animals from the organic to the non-organic beef system. While this analysis represents the Irish organic beef sector as a case study, the risk of leakage from the organic sector could have implications for European policy makers in relation to the effectiveness of current incentive schemes and the design of new schemes. In this context, our analysis suggests that due to differential specialisation across the value chain and subsequent leakage, there is sub-optimal production of organic meat relative to the investment in incentives for the conversion from non-organic to organic production. However, 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. While Läpple and Donnellan (2008) and Läpple and Kelley (2010) showed that adoption of organics by Irish farmers is driven by financial conversion subsidies and higher market prices, this study suggests that the strong focus on developing the supply side through subsidies under the Organic Farming Scheme (OFS) of the Rural Development Programme, without an equivalent focus on developing the specialisation of farms and the location of processors, has resulted in a level of imbalance in the organic value chain.

The use of previously un-integrated non-organic and organic administrative datasets with spatial data facilitated the analysis of the organic value chain in Ireland in one year. Further analysis with time-series administrative data could examine trends in market supply, in addition to providing further information on animal mortality, live exports and slaughter numbers. In addition, better market data are needed to assess current market and future demand for organic beef to provide data on which to base a stronger market development focus in the design of future Organic Farming Schemes (OFS) at national and EU level.

In addition, further spatial analysis of the relative locations of farms with different specialisation characteristics could help match unspecialized farms in poorer agronomic regions, with finishers in better agronomic regions. In this context, the introduction of 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 grain/concentrate feed requirements, could encourage more farmers to finish cattle. From a market development perspective, additional spatial analysis could be used to incentivize the development of future processing and sales capacity to spatially optimize the value chain, while the operationalisation of the OFS market requirement ranking scheme, could be employed to ensure that market considerations are taken into account by new entrants to future organic farming schemes.

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