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PDO as a Mechanism for Reterritorialisation and Agri-Food Governance: A Comparative Analysis of Cheese Products in the UK and Switzerland

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Abstract: The protection of geographical indications (European regulation 1151/2012) is arguably the most significant initiative, certainly within Europe, that promotes foods with territorial associations and reorganises agri-food chain governance through a strategy of reterritorialisation. Research on Protected Designation of Origins (PDOs) and Protected Geographical Indications (PGIs) suggests that they generate significant economic value at an EU-level, especially in certain countries. They can also help to deliver territorial rural development policy and develop new food markets. In this paper we examine the way the PDO scheme has been developed and applied in one commodity sector (cheese) in two countries (Switzerland and the UK), where the uptake of PDOs is variable. We adopt a food chain approach and examine specific cheese product case studies (at micro and meso levels) in both countries to better understand how the PDO scheme (as a territorialisation and respacing strategy) is implemented. L'Etivaz and Le Gruyère are examined in Switzerland. Single Gloucester and West Country cheddar are examined in the UK. The PDO scheme is an important governance strategy and regulatory system, but despite strict guidelines regarding implementation and geographical infrastructure there are notable differences between the UK and Switzerland in terms of how the label is used to organise and respatialise food chains: it is framed as a strategy to protect the rural economy in Switzerland but is promoted more as a mechanism to communicate and reconnect with consumers in the UK.

Keywords: PDO; Geographical Indications; reterritorialisation; sustainability; Switzerland; the UK; cheese supply chains

1. Introduction

The protection of geographical indications (European regulation 1151/2012) is arguably the most significant initiative, certainly within Europe, that promotes foods with territorial associations. Protected Designation of Origin (PDO) and Protected Geographical Indication (PGI)—also referred to as Geographical Indications (GIs)—are credited with generating significant economic value at an EU-level, especially in certain countries [1]. They can also help to deliver territorial rural development policy and develop new food markets. For these reasons they are an important component of what Wiskerke [2] calls an integrated and territorial agri-food paradigm, where food production is based upon the specific qualities and distinctive features of an area or region. This paradigm is "built around a highly differentiated definition of food quality, which reflects differences in farming systems, organisational networks, cultural traditions, consumer preferences, institutional frameworks and policy support" ([2], p. 374). Three processes are important in Wiskerke's [2] territorial paradigm: first, (re)connecting, where the various players link up with each other to form close regional networks and engender social capital; secondly, embedding, where distance between food production and consumption is shortened, and the socio-cultural, historical, and landscape characteristics of a region become embodied in the food; and thirdly, intertwining, where the various economic and non-economic activities and roles come together in a region to create coherence and synergy.

In a further elaboration of the territorialised rural development perspective, Kneafsey [3] argues that the re-regionalisation of food is an outcome of three 'cross-cutting' impulses. First, the devolution of governance functions to the regional scale through *re-scaling* (cf. Goodman et al. [4], p. 68–70). Governance rather than government is emphasised and delivery is through partnerships between public, private, and voluntary agencies. Second, changes in the agri-food regime through *respacing* and driven by market-based ecological modernisation. Consumer demands for foods of local provenance are critical here and help to valorise local and regional foods. Certification, including the EU's PDO and PGI food and drink quality schemes, is also an important part of this valorisation process [5]. However, Kneafsey ([3], p. 184) is critical as to whether this legislation can really stimulate regional food networks, and for this reason argues that re-spacing should be viewed primarily as a driver of regional foods rather than regionalised food networks. Third is *re-connection*, which is about supporting food that is produced, retailed, and consumed in a specific territory. As Kneafsey ([3], p. 185) explains, "whereas rescaling and respacing attend primarily to policy and market dimensions, the reconnection perspective excavates the multiple and sometimes contradictory motives expressed by individuals and agencies involved in the construction of territorially-embedded food projects and initiatives".

This paper is concerned with further exploring this territorialised rural development perspective, particularly the potential of the PDO scheme to re-scale and re-space the agri-food regime in different national contexts. A significant proportion of European research literature to date has been concerned with some aspect of reterritorialisation, notably "the efforts of small agro-food producers and processors located in marginal rural areas to carve out niche market opportunities by selling high-quality 'speciality' products through 'short' supply chains and more direct, sometimes re-localised, relationships with consumers" ([3], p. 181; see also [4]). The interest here is more in terms of understanding the way PDOs are implemented at a supply chain level and their impact and influence as a strategy of reterritorialisation. The development of reterritorialisation strategies, including PDO and PGI schemes, has benefited significantly from reforms of the Common Agricultural Policy (CAP) and in particular the Rural Development Regulation which has encouraged a more integrated and endogenous approach to rural development [6]. However, the way pan-European regulations are interpreted and understood at member state and supply chain levels can be very different and can significantly determine reterritorialisation potential.

Analysis of what we know to date regarding GIs as instruments of reterritorialisation is reviewed below. As Rippon ([1], p. 2) explains, "[t]he GI system is predicated on the belief that the physical characteristics of defined places are able to generate foods and drinks of exceptional and unreproducible quality". Policy initiatives to promote foods with territorial associations became prominent in the early 1990s [5,7,8]. The labels were seen as indicative of a quality turn and characteristic of attempts to encourage territorial rural development [9]. Regulation 2081/92 on the Protection of Geographical Indications and Designation of Origins for Agricultural Products and Foodstuffs was introduced by the European Union in 1992 and is more commonly referred to as the European "quality schemes for agricultural products and foodstuffs". The impetus for the Regulation was "to encourage the production of quality foods, assist poorer lagging regions, allow producers to charge higher prices and inform consumers about the origin of their produce" ([1], p. 2). The system is similar to the long established French, Italian, and Spanish Appellation d'Origine Contrôlée (AOC) system, where groups of producers can apply for either a PDO (product originates from a specific place and is linked to its natural/geographical environment) or a PGI (product is linked to a particular place, but not necessarily in terms of its raw materials) [5,7]. More generally, and according to cross-country analysis, justification for the protection of geographical indications finds historical root in four dimensions: fair competition, quality and market management, rural development policy, and protection of natural resources [10].

The number of PDO and PGI designations has increased steadily, from 450 in 2000 to 760 in 2008, 970 by 2011, and 1196 by March 2014 [1,11]. Table 1 summarises the number of designations at an EU scale and for the 27 individual member states. A number of key points can be discerned. Firstly, GIs have a distinct geography, with a strong concentration of PDOs/PGIs in southern European countries (Spain, France, Greece, Italy, and Portugal) and a relative scarcity in northern and eastern European countries (only Austria, the Czech Republic, Germany, and the United Kingdom have more than 10, for example). Secondly, these data reflect the cultural significance and connection with regional foods in southern European societies [8], a connection which is less evident in more northern societies. Thirdly, GIs generate significant economic value at an EU-level and especially in certain countries (notably Italy, Germany, France, and the UK), a distribution which is not always reflected by the relative number of GIs per country. Past research suggests there are also significant differences in PDO/PGI geography (see [11]). For example, PDOs have tended to outnumber PGIs in Italy, Spain, Portugal, and Greece, but the opposite pattern is evident in France, Germany, and the UK. Inter-country variation for the types of food and drink products receiving PDO/PGI status is also evident. Cheeses are popular in France and to a lesser extent the UK and Austria, for example, but fruit, vegetables, and cereals are dominant in Italy, Spain, Portugal, and Greece and oils and fats are only of significance in Italy, Greece, and Spain.

Table 1. Geographical Indications (Protected Designation of Origins (PDO) and Protected Geographical Indications (PGI)) by European Member State, 2010.

Member State	No. of GI	Value (1000 €)	Member State	No. of GI	Value (1000 €)
Austria	13	139,196	Italy	193	5,982,211
Belgium	7	28,153	Lithuania	0	0
Bulgaria	0	0	Luxembourg	4	7885
Cyprus	1	S	Latvia	0	0
Czech Republic	22	186,597	Malta	0	0
Germany	68	3,374,893	Netherlands	6	92,840
Denmark	3	105,871	Poland	9	3644
Estonia	0	0	Portugal	111	72,682
Spain	128	868,699	Romania	0	0
Finland	3	S	Sweden	2	S
France	170	3,045,363	Slovakia	4	4386
Greece	86	753,209	Slovenia	1	S
Hungary	4	16,818	United Kingdom	33	1,059,339
Ireland	4	28,976	Total EU 27	872	15,789,569

S, statistical confidentiality. Source: [12].

Watts et al. [13] believe that, despite considerable government encouragement, PDO/PGI potential for stimulating economic development in regions that lack a developed culture of *terroir* (i.e., that develops strong associations between the place where a food is produced and its quality) is limited. Ilbery and Kneafsey [5], in their examination of PDO/PGI designations in the UK, also expressed some reservations about the scheme. They found, for example, that some of the producer groups applying for status were effectively 'groups of convenience' that had no real intention of working together. The labels were used to protect their names from cheap imitations rather than as a genuine marketing device. More recently, a comparison between Austrian and Italian PDOs has shown that a lack of co-operation and empowerment of producer groups may hinder implementation, as in an Austrian case, where the producer group concerned finally withdrew their registration [14]. A review of the economic effects of PDOs/PGIs has shown that they are constrained by many independent factors, and therefore are very variable [15].

This paper extends and complements previous analyses of GIs (especially PDOs) as instruments to enable more territorialised agri-food governance. The aim is to move beyond general analysis of PDO/PGI schemes and to look in detail at how they are applied at a product-specific level (other studies have adopted a similar approach, for example, De Roest and Menghi's [16] study of Parmigiano Reggiano). To develop this perspective, we examine the way the PDO scheme has been developed and applied in one commodity sector (cheese) in two country contexts (Switzerland and the UK), where the uptake of PDOs is variable. Switzerland is not part of the European Union but as an associated member of the EU has actively supported and implemented PDO and PGI for its food and drink products. (For example, in 2015 PDOs and PGIs generated 670 million CHF (627 million €) at the production level and 1.4 billion CHF (1.3 billion €) turnover at retail level [17]).The comparison of practices and understandings of the PDO scheme in Switzerland and the UK is now all the more pertinent since the vote in the UK on 23 June 2016 to leave the European Union, which means that a model not dissimilar to Switzerland may be necessary in future, at least as it relates to GIs. Further explanation for the choice of sector and countries is provided in the next section of the paper. The results are then presented, which outline an analysis of how four cheese PDOs are implemented in Switzerland and the UK. The discussion and conclusion identify wider lessons that can be learned from the case material by way of recommendation, particularly in terms of the potential of GIs to act as governance instruments to rescale and respace the agri-food regime.

2. Materials and Methods

The data presented in this paper are drawn from an EU project called GLAMUR—Global and Local Food Chain Assessment: A Multi-Dimensional Performance-based Approach [18] —that examined the sustainability of global and local food chains. The overall assessment compared the economic, social, ethical, health, and environmental impacts of 39 food supply chains belonging to seven different sectors (apples, berries, bread, cheese, pork, tomatoes, and wine) (see Brunori et al. [19] for details). This paper draws on work conducted in Switzerland and the UK for the cheese supply chain case study (see also Schmitt et al. [20]). In each country two cheese supply chains were selected, one with 'local' characteristics and one with 'global' characteristics: L'Etivaz (local) and Le Gruyère (global) in Switzerland and Single Gloucester (local) and cheddar (global) in the UK. Schmitt et al. [20] provide a detailed comparative analysis of the sustainability performance of the four cheeses. In this paper the focus is on comparing one aspect of sustainability performance that was only briefly examined in the overview paper: PDO governance. PDO emerged as an important governance strategy, with notable differences between Switzerland and the UK in terms of how the scheme is used to organise and respatialise supply chains. The paper compares PDO governance for each cheese in the two countries in terms of:

1 the history and origins of the label,
2 governance influence in determining supply chain structure and reterritorialisation, and
3 market impacts

The goal is to draw out the differences that emerged between the cases and the wider lessons that can be learned from this product-level country comparison.

A series of research steps were taken to develop the comparative analysis of cheese supply chains in Switzerland and the UK. Aspects that helped to reveal the way PDO legislation was implemented and its impact across the four cheese cases studied are described below. The study adopted a supply chain perspective. The first step was a detailed description of each supply chain. The purpose was to identify key characteristics that differentiate 'global' and 'local' supply chains in each country and to provide a contextual analysis of production-consumption issues for cheese in each country. This exercise revealed key performance issues, including the role of certification and the use of the PDO scheme. It also informed the selection of the two cheese supply chains to be studied in each country

(L'Etivaz and Le Gruyère in Switzerland and Single Gloucester and cheddar in the UK), which was made in close discussion with stakeholders from the sector in each country.

There were then three main phases of work undertaken to examine the two cheese supply chains selected for study in both countries. First, analysis of supply chain performance for the four cheeses studied at the producer stage was undertaken. In Switzerland, 11 interviews were conducted with farmer-cheesemakers in the local chain. In the global chain, 53 milk producers, 18 cheesemakers, four cheese ripeners, and the Inter-branch Organization were interviewed. In the UK, six producers were selected from a database of over 20 producers for detailed supply chain analysis. This number represents two producers from each of two types of farmhouse cheeses (Single Gloucester and farmhouse cheddar), and two creamery producers of cheddar. During the interviews producers were asked a number of questions, including questions about the PDO label, its role and importance to their business, etc. Secondly, a series of interviews were conducted in the UK with milk producers, wholesalers, and retailers in the supply chain who had involvement with one or more of the cheeses studied; again, some specific questions related to PDOs were asked, including the importance and value of obtaining the PDO for the cheeses studied. In Switzerland, one input company and five retailers were interviewed or sent questionnaires by e-mail. A total of 12 supply chain interviews were conducted for the UK case study. The PDO code of practice for each cheese, which provides detailed guidance and rules about how the cheese should be produced and where, were also examined for the four cheeses studied. The first two phases of work thus covered agricultural production, primary processing (milk aggregation and cheese making), secondary processing (cheese refining), and retailing. The consumption stage was studied in a final phase of research. Consumer perspectives were explored through a series of four consumer focus groups in the UK and one in Switzerland. Consumers were asked the same research questions in each case. The socio-economic profile, age, and gender of the participants were balanced as far as possible. The focus groups covered a range of issues, including purchasing patterns, buying behaviour, and specific questions about the PDO and consumer understandings of it.

Materials used for data collection, such as interview protocols and focus group schedules, were shared between the research teams to enable comparability, as were analysis procedures, including a 'knowledge exchange' visit between the two countries. Analysis of the results was discussed in a stakeholder workshop with supply chain representatives in each country. This final element of the work provided significant input and feedback, including suggestions in terms of how PDOs might be used more effectively as an instrument of reterritorialisation and agri-food governance.

3. Results

The paper turns now to examine the way the PDO scheme is applied for the four cheeses studied in Switzerland (Le Gruyère and L'Etivaz) and the UK (cheddar and Single Gloucester) respectively. The material is organised around three themes that structured the PDO-element of the case study analysis: origins of the cheese and history of the PDO; how the PDO is implemented in terms of governance and reterritorialization; and market impact, including differentiation, market access, and consumer recognition.

3.1. Le Gruyère—Switzerland

3.1.1. Origins

Le Gruyère cheese is a hard cheese traditionally produced from raw milk from cows grazing on the pre-alpine meadows in Switzerland. The first mention of Le Gruyère cheese dates back to the year 1115. The cheese is closely linked to the development and prosperity of the area of production in the French-speaking part of Switzerland. The original purpose of making cheese in that region was to preserve the quantities of milk produced by cows on the summer pasture. The cheese requires several months of ageing in the form of big rounds of around 30 kilos, allowing it to be brought down the valleys and transported. It was exported to France and Italy as early as the 14th century and the marking of the higher quality cheeses started in 1740 with an engraved G and the region's emblematic crane. As people emigrated from La Gruyère region to other parts of Europe in the 18th century, the imitation of the cheese and adoption of the name "Gruyère" started for other hard cheeses in France. At this time, the cheese's shape and preservation were modified to export it more easily. The original cheese from Gruyère could only be distinguished by its quality. Consequently, the fight for a protected name and quality mark started at the end of the 19th century. The process of getting an AOC was accelerated when industrial factories started producing Gruyère in German-speaking Switzerland in the 1990s [21]. A charter for Gruyère Cheese was established in 1992, uniting most producers into defining a geographical area and methods of production. At the national level, legislation on AOC was still needed and actors from Le Gruyère were important triggers in its establishment in 1997 [22]. That year, an inter-branch organization ("l'Interprofession du Gruyère" (IPG)) was also created with different missions including obtaining an AOC (now "Appellation d'Origine Protégée" (AOP) as the new term used in accordance with the EU), which it did in 2001. It obtained the protection with a bilateral agreement between the European Union and Switzerland in 2011 [23].

3.1.2. Governance and PDO Requirements

The role of the IPG is to manage agreements and communication between producers, cheese makers, and retailers, as well as PDO certification, quantity and quality of production, commercialisation, and promotion (publicity, sponsors, website, etc.). The committee includes 13 representatives from the different stages of the supply chain. Le Gruyère's supply-chain is made up of around 2300 milk producers (in steep decline), 223 cheese factories, and 8 ripeners and traders, with an annual production of around 30,000 tonnes [24]. Other stages of the supply chain (supermarkets, exporters, input providers, consumers) are not included in the IPG. There are also small milk and cheese associations linking milk producers and their cheesemaker at a smaller scale, enabling communication between actors within the same area. However, the main channel of communication is done via delegates at the IPG and other members only have their voice heard as electors. Some producers or cheese makers feel that decisions, for example, on quantities, are taken by the IPG without sufficient consideration of their concerns and problems [24].

Producers must align to the PDO's code of practice, authored by the Federal Office for Agriculture (FOAG) [25]. It specifies the conditions for milk and cheese production and for ageing as well as the region of production. It includes the precise description of the geographical area where the milk comes from. The milk is delivered twice a day from a maximum of 20 km to the factory. The cheese must also stay in that area for the first three months of ageing (mandatory duration). The quality requirements specify that silage feed is forbidden (among other feed), and that the milk must not be pasteurised. Other requirements are specific to avoid up-scaling: the cheese must contain the morning and previous evening's milk in a time limit of 18 h; the milk vats in the dairy can be used only once in 24 h and cannot be bigger than 6600 L. The cheese can be sold only after five months of ageing, and different ages give different designations, like Le Gruyère "mild", "mature", or "extra mature". The high number of producers also means there are different qualities and specificities that can be taken into account (e.g., Le Gruyère d'alpage, which is made in the Alps chalets, or certified organic Le Gruyère, both of which are distinguished by a specific logo).

3.1.3. Market Impact

Le Gruyère cheese is as much a local cheese sold directly at the dairy factory or on markets as a global cheese, with 41% exported worldwide. It is as such a typical "locality" product, combining localness with large-scale operations [19]. Its historical orientation to export markets made the recognition of the original Le Gruyère difficult at the international level and an agreement had to be concluded with French producers in order to allow the registration of a European PGI for French Gruyère as well. Several lawsuits had to be conducted to defend the name, notably in the

United States [20,21,24]. Most Le Gruyère is marketed by eight ripeners, who also take a role as wholesalers and exporters. They have strong negotiating power because of the quantities of cheese they collect and they defend and maintain a high price for the whole supply chain [26]. The IPG then discusses indicative prices that should be paid by the ripener to the cheesemaker and by the cheesemaker to the milk producers; however, the prices are not guaranteed and are set on a basis of free bilateral negotiation between milk producers and cheesemakers, and between cheesemakers and ripeners. This organisational structure enables producers to maintain their decentralised artisan way of producing the cheese, with a high diversity, while the ripeners (big companies) manage the collection and ageing and have, as a result, a relative market exclusivity (the cheese factories have the option to sell part of their production directly).

The PDO can offer market openings and visibility for some informed consumers, but it is especially the IPG's contribution to market stability that is a key asset for producers, keeping the sector attractive for young farmers and cheesemakers [21]. The IPG controls the overall quantity of the cheese produced, evaluates demand and stabilises the prices (which includes having to deal with currency fluctuations). It also manages subventions and bonuses that are redistributed to cheese and milk producers. The Swiss agricultural policy still offers bonuses for cheese so that it does not become too expensive abroad, and also for non-silage milk for cheese, but the IPG also redistributes a bonus of 0.1 CHF/L to its milk producers. This makes the milk price attractive in comparison to industry milk prices in Switzerland. Gruyère remains one of the cheaper and most consumed hard-cheeses in Switzerland [24].

3.2. L'Etivaz—Switzerland

3.2.1. Origins

The history of L'Etivaz cheese was interconnected with Le Gruyère until the 1930s. In the region of "Pays d'Enhaut" in the pre-Alps of the canton of Vaud in Switzerland, cheesemakers were making a hard cheese in high pastures during the summer, using very rustic and traditional methods. In 1932, a group of producers decided to create an association to tackle the degradation of the ripening infrastructure (decaying chalets) which was leading to a decrease in quality and production and causing marketing difficulties. Their goal was also to differentiate themselves (using 19th century techniques in a rugged environment) from other producers who at the time were modernising production methods or mixing milk production. They named their association after the village of L'Etivaz where they built the first ripening cellars to age cheese produced by 30 members [27]. During the 20th century the production grew again and the cellars were enlarged and renovated in 1974, when they became a cooperative, and again in 1986, 2005, and 2012 [28]. The cooperative gained independence from diverse milk and cheese federations and chose a marketing strategy oriented towards differentiation of a traditional product, putting forward artisan and alpine terroir as distinct attributes. In the 1980s they adopted a trademark with strict rules and identification marks alongside active promotion by the families producing the cheese. In the 1990s, the national price support system for milk changed and new ways of securing prices were needed. Thanks to the initiative of producers, and especially one producer named Jacques Henchoz, they obtained the AOP in the early 2000s and were the first registered AOP product in Switzerland [29].

L'Etivaz is made today by 68 families with an annual production of 445 tonnes [28]. It follows the traditional methods and recipe now defined in the book of requirement. This requires hard manual work from the farmer-cheesemakers who use very little modern equipment, with the milk being heated in cauldrons and the curd being separated with cheesecloth. The cheeses are flipped and scrubbed by hand before being delivered within three days to the cooperative's ripening cave for salting and ageing (minimum eight months). A special L'Etivaz is aged another three years to be extra hard and is called L'Etivaz Rebibes. There is also L'Etivaz bio (certified organic).

3.2.2. Governance and PDO Requirements

The code of practice written by the cooperative during the application for the PDO specifies the conditions of production and the geographical area. It lists the 10 municipalities where production and processing can occur; even specifying that it must all be processed on the chalets between the altitude of 1000 to 2000 m and on a restricted time period (during the summer). The salt must also come from this production zone (by chance there are salt mines in the area). The ageing must also occur in the district of Pays d'Enhaut. The code of practice also specifies the aspect, content, and the quality the cheese must have; the methods of milk production are also specified, including a ban on silage and twice daily milking and a ban on milk transport outside the farm. Processing must occur with unaltered raw milk at the latest 18 h after milking (mixing of the morning and previous evening milking) in copper cauldrons over a wood fire [30]. All production stages of the supply chain are united in the cooperative, which is owned by all the farmer-cheesemakers who manage the ageing and common marketing thanks to a committee of 7 producers and the cooperative's 11 employees.

3.2.3. Market Impact

The cooperative defines a common price paid to the producers and then all the cheese is sold by the cooperative to retailers or exporters. The cooperative also owns their own shop next to the cellars in the village of L'Etivaz, mainly targeting tourists. Producers have a right to sell up to 10% of their production in their chalets. Around 70% of the total volume is sold in Switzerland, 40% of which is sold in the French speaking part. The remaining 30% is sold mostly in France, Belgium, and Germany and some small quantities worldwide [24]. Regarding market orientation, L'Etivaz is a "locality" product but on a much smaller scale compared to Gruyère, and is even more anchored in its terroir regarding production. The PDO has succeeded in protecting the name, securing a price for the cheese and has fostered interest in the younger generation to continue the tradition of making the cheese [31]. The PDO has also been a success in the sense that cheese production is not declining anymore and it provides a living for the families in a rural alpine region. It is very hard for producers in the area to cut the production costs of their milk. Producers of L'Etivaz can add value to their milk by promoting their traditional cheese making methods and the link with the landscape [27]. Additional costs are compensated and value added by consumers' willingness to pay for a high quality product with a typical taste. The cooperative has a system of quality evaluation of the cheeses and bonuses for quality in order to foster outstanding quality.

3.3. Cheddar—UK

3.3.1. Origins

Although cheddar is geographically associated with western England, most notably the Somerset town of Cheddar, it was 'from the outset made throughout the country and the wider region' [32]. The term cheddar is really a signifier of a process, namely *cheddaring*, which is the cutting and piling up of curds to expel whey. This means that the UK's favourite cheese is not territorially restricted and important cheddar exporting countries include Ireland, Canada, Australia, New Zealand, and Germany. Cheddar cheese accounts for around 55% of cheese consumption in the UK, equating to c. 230,000 tonnes of total annual domestic cheese production [33–36]. This requires a quarter of all UK-produced milk. Meanwhile, domestic consumption of cheese, including cheddar, is rising [35]. A consequence of the post-war industrialisation of farming was the disappearance of many regional cheeses under a state-run cheese production and marketing organisation. This also led to the standardisation of cheese quality and a loss of local distinctiveness and production traditions [32,36].

Despite standardisation and automation, a number of West Country Cheesemakers continued to follow traditional techniques, including manual cheddaring and lengthy maturation of their cheeses in cloth-bound, cylindrical 'truckles', weighing around 27 kg. A signifier of the continuation of 'farmhouse' production included the use by cheesemakers of their own milk, although unlike

Single Gloucester (see below), there is no specific restriction on cow breeds used. In 1993, a group of 18 regional producers called the West Country Farmhouse Cheesemakers Association (WCFCA) wanted to capture the market value of their traditional production techniques and regional distinctiveness and successfully applied for PDO registration for West Country Farmhouse Cheddar. The West Country Farmhouse Cheddar PDO now assists cheddar producers with West Country origins; it cannot be used by craft cheddar cheeses made outside the West Country, or entirely new farmhouse cheeses, of which there are many in the UK. Farmhouse cheddar, along with many other types of cheese in the UK, is currently in a period of artisan revival.

3.3.2. PDO Implementation and Governance

There are two main criteria which need to be fulfilled for a cheddar to qualify for PDO status. The first is geographical; namely, that the cheddar cheese must be produced within one of the four counties of Cornwall, Devon, Somerset, and Dorset. Secondly, in relation to the production process, West Country Farmhouse Cheddar must be matured in linen for a minimum of nine months. This second criterion acknowledges traditional maturation practices, and the cloth-wrapped cheese is smeared with lard to prevent moisture escaping during the period of maturation. In contrast, non-PDO cheddar produced according to modern creamery techniques is matured in plastic and in its mildest form may be ready to eat after three to six months.

PDO applications in Britain are administered by a branch of the Department for Environment, Food and Rural Affairs (DEFRA), the Food Composition and Standards team. If a PDO is awarded, producers can expect to be inspected once every nine months for their compliance with the PDO criteria. This includes a close inspection of ingredient sourcing as well as observations of production processes. Several of the original members of the WCFCA have since gone out of business because of the challenges linked with small-scale dairy production in the UK. Other alliances have emerged, such as the Somerset Artisan Cheddar Presidium, which is linked to the Slow Food movement and specifies the geographical origin more narrowly and only includes producers who use unpasteurised milk. None of the Somerset Artisan Cheddar Presidium cheddars are PDO-accredited.

3.3.3. Market Impact

The PDO has helped to protect origins and production techniques associated with farmhouse cheddar. It has also enabled market delineation and a better price, as one interviewee, who produces WCFC, explained: '[an] advantage of the PDO designation is that it puts you in an industry class of your own.' (Interview FC1). Nevertheless, the research undertaken here suggests the market profile of the PDO is limited. Although FC1 is a co-founder of the association which applied for the designation, it was noted that 'few people inquire, or know about, the details behind the PDO'. A local retailer of FC1's cheddar echoed this lack of awareness of, or inquiry from, customers in relation to the PDO. Consumer focus group data reflected a general lack of awareness of the meanings and intentions behind the PDO stamp. In the interviews there was a strong sense that a key role of the PDO should be to communicate and connect with consumers, even though, as we have seen in Switzerland, it can arguably be used more effectively as a means to manage supply chains at the processing end.

It is notable that the geographical assurance which PDO is designed to communicate may not be as effective as alternative symbols of territory. Other regional farmhouse cheesemakers featured in our research, for example, used websites and promotional images, as well as place names and union jack flags to represent an indication of origin, embeddedness, and some sense of bucolic environmental stewardship, especially for cheeses sold to export markets. It is unclear why the PDO stamp fails to resonate with consumers, although many cheeses, especially those sold under the demanding labelling criteria of supermarkets, may simply be too cluttered, with information on nutrition, dietary guidance, ingredients, production processes (organic, farmhouse, un/pasteurised, low fat/salt), geographical origin, storage guidance, and producer details. Another explanation for the limited effectiveness of the PDO in the UK is the tension between tradition and innovation in domestic cheese-making.

One regional specialist retailer suggested, for example, that PDO/PGI were 'tricky' in the UK. Here, 'the slate was almost wiped clean due to historical circumstances'. This has resulted in a great deal of creativity and innovation among cheesemakers, which some argued the PDO cannot capture.

3.4. Single Gloucester—UK

3.4.1. Origins

Single Gloucester (SG) is a hard, round cheese with a natural rind made with cows' milk. It is usually eaten young and has a mild, fresh taste. Traditionally, SG cheese would have been made when there was an abundance of milk on the farm. It was made with skimmed milk from the evening milking (with the fat being used to make butter or cream) added to full cream milk from the morning milking in order to make a mild cheese. The relatively small size of the SG cheese is a direct result of the skimming process, which reduces the fat and solid contents of the cheese [32]. It would usually have been kept on the farm or in the local community and not deemed to be of any great financial value. It was sometimes known as 'hay cheese', in that it was often made in the spring and ready to eat within a couple of months at which time it was taken out into the field at haymaking. After the Second World War, when there were not so many people making cheeses, its lack of commercial value meant that SG almost died out, as did the breed of Gloucester cattle. By 1972 only one herd remained, with a total of 68 animals worldwide [37].

The modern revival of SG cheese was inspired by a man named Charles Martel, whose original concern was for the near extinction of the Gloucester cattle. He was the driving force for the SG PDO in the 1980s, which was in large part intended to provide an economic incentive to keep Gloucester cattle. In this respect, the PDO requirement to have at least some Gloucester cattle in the dairy herd producing milk for SG cheese has been critical, and the numbers of Gloucester cattle have now recovered to the extent that there are now more than 700 registered females [37]. SG cheese is currently produced by six cheesemakers, all of whom are small-scale with the total annual production being in the region of 100 tonnes [38].

3.4.2. Governance and PDO Requirements

There are four elements that make up the SG cheese PDO. Firstly, in terms of geographical area it can only be produced within the county of Gloucestershire, England. Secondly, the milk used to make the cheese must have been produced within the county of Gloucestershire. Thirdly, the dairy herd must contain at least some traditional Gloucester cattle. The last two points relate to proof of origin. Ideally, those putting forward SG cheese for PDO status would have liked all the milk to have been sourced from Gloucester cows. However, there was a recognition that, as is often the case with traditional breeds, the cows tend to milk better in the summer months and can become dry (producing no milk) over the winter months. As such, a dispensation is included in the specification that states that 'exceptionally' the milk from other breeds may be included to supplement the Gloucester cows' milk, provided it is obtained from the same farm or area. The fourth element of the PDO relates to the method of production, which all of those involved have to follow [39].

There is some interaction between the six producers of SG cheese, but no coordinated governance as such, apart from the terms of the PDO specification. Furthermore, the latitude to incorporate milk from other breeds of cattle has significantly affected the composition of the dairy herds producing milk for the production of SG cheese. In one case, 100% of the herd is composed of Gloucester cows; but at the other extreme, only 5% of the herd are Gloucester cows. In effect, people are able to produce SG cheese provided they have at least one Gloucester cow in their herd. In this respect, there is a clash between the philosophical reasons for wanting to produce SG cheese (primarily to ensure the continuation of Gloucester cattle), and those who simply feel there is a marketing opportunity through being able to label their cheese with a PDO. The main commercial reason for reducing the number of Gloucester cows in a herd is their relatively low production output, which is in the region of 4500 L per annum. Inevitably, this difference of interpretation creates a tension in terms of the governance of SG cheese production.

3.4.3. Market Impact

Although approximately half of the total output of SG cheese is sold outside the county of Gloucestershire, together with a very small percentage exported from the UK, this cheese is predominantly local in its market orientation. It is clear that SG cheesemakers feel that the PDO protects the SG name, which is of value to them as Gloucestershire farmers. In this respect, cheesemaking is seen as an important form of diversification that results in additional farm income. At the same time there is recognition by producers that very few consumers are aware of what the PDO designation means. This perspective was endorsed by the results of a series of four focus groups held with consumers as part of this research process. Consumers were shown a series of cheese labels, including one that had a PDO stamp on it, with only one person (out of a total of 32) recognising the stamp and knowing what it stood for. More usually they are interested in whether the cheese is of a local origin and that it is 'artisan' or 'traditional', rather than specifically having a PDO (notwithstanding the overarching importance of price) [38].

As such, the PDO is not of great commercial value when selling directly to the end consumer, locally; nevertheless, outlets such as delicatessens, farm shops, and dedicated cheese counters within larger outlets stock SG precisely because it does have a PDO, which they can then promote as a point of difference from other cheeses—highlighting that the PDO makes this particular cheese special. Two examples of the latter are the supermarket chain Waitrose and the new Gloucester services on the M5 motorway, both of which value the cheese as it enables them to sell 'a bit of Gloucestershire'. The PDO status of SG cheese, coupled with the low volumes of production, mean that the producers have no problem selling all of their cheese at a price that they have some control over, rather than being price-takers at the mercy of larger-scale retailers.

4. Discussion

This paper has presented a detailed analysis of PDO regulation and implementation for four hard milk cheeses in Switzerland and the UK, respectively. The material raises a number of general points worthy of discussion, which are summarised in Table 2 and discussed in more detail below. If we look first at the origin and history of PDO legislation, in all four cases PDO status was applied for to protect product identity and/or intellectual property and knowledge associated with the production process. This is most evident and significant in the Le Gruyère case, which faced significant competition and threat from large-scale industrial imitations in Switzerland, in other parts of Europe, and also worldwide. L'Etivaz is sold more regionally and nationally in Switzerland. Producers applied for PDO status in response to a new milk price market structure which was not cost effective. The PDO protects the name and secures price which ultimately enabled producers to continue making the cheese. Only very small volumes of Single Gloucester are made by just six producers. In this case the PDO scheme was applied for to protect the Gloucester cattle breed and the process was driven by one key person. The West Country Farmhouse Cheddar PDO was applied for, similar to Le Gruyère, to help in this case 18 traditional producers in south west England to protect and differentiate their artisan cheese making methods from mass produced brands. In all four cases the PDO was therefore applied for and used as it was intended: i.e., to protect and provide copyright to traditional quality food production methods [1] and to allow continued production of threatened products.

Table 2. Swiss and UK PDO case study cheeses: key comparative findings.

	Origins of the PDO	PDO Governance	Market Impact
Le Gruyère	• Appellation d'Origine Contrôlée (AOC) and latterly PDO in 2011 was obtained to protect the original cheese from industrial imitations	• Inter-branch organisation manages the code of practice, quantities, and marketing • Regionally co-ordinated supply chain • Producers align to the PDO code of practice	• Locality product, with local, national and global markets • Eight ripeners sell most of the cheese (negotiating power) • Inter branch organisation negotiates the price ripeners pay and provides market stability for producers in the region
L'Etivaz	• Poor milk price in the 1990s: applied for protection to secure better prices. One producer drove the process.	• Producer co-operative • Strict code of practice for the PDO limits and protects how and where the cheese is made (10 municipalities)	• Locality product, mostly local and national markets • The cooperative defines a common price, buys all the cheese and manages the sales and marketing • PDO protects the name, secures a price for the product, and helps families to remain in the region
Cheddar	• West Country Farmhouse Cheesemakers Association (WCFCA) applied for the PDO in 1993 to differentiate from mass produced cheddars	• Code of practice limits where the cheese is produced (4 counties in SW England), using specific production practices • WCFCA can help producers in a very competitive SC, although lack of co-operation	• Range of markets, esp. national • Protects traditional cheddar producing methods and has enabled market differentiation and provided price premiums • Knowledge of PDO at retail and consumer levels remains limited • Some WFFCA producers have gone out of business.
Single Gloucester	• PDO used to help protect Gloucester cattle bred, PDO applied for in the 1980s inspired by one producer.	• Code of practice restricts where cheese is produced and herd must have at least some Gloucester cattle but differences in interpretation of PDO rules by six producers	• Predominantly local market orientation, although significant output is sold outside the county • The PDO helps sales but the commercial value is not exploited • Limited consumer awareness of the cheese/PDO.

The way the PDO is implemented as a mode of governance is interesting to compare, especially experiences in Switzerland and the UK, including the way the supply chain is organised and governed for each cheese and the impact this has in terms of pricing, market access, and communication. In Switzerland, both of the cheeses studied are PDO designations. In the UK, Single Gloucester has a PDO, as does West Country cheddar, but the cheddar market contains a number of other generic brands too. In Switzerland, the PDO is a key driver that determines where the cheese is produced, how it is produced (following strict quality criteria), how much of it is produced, the pricing structure, etc. The supply chain is regionally co-ordinated. The scale of operation for Le Gruyère is much larger than L'Etivaz, but production is territorially embedded, with farmer co-operatives co-owning and supplying a local creamery, for example. Farmers thus form a community around their creamery with one cheese maker describing it as a "family". The UK cheese supply chain, by contrast, is typically made up of a mix of highly competitive individual dairy processors and producers, particularly on the creamery side, and is dominated by a retailer-driven supply chain. The Swiss retail market is also very competitive. In the UK, however, which has embraced PDO/PGI schemes to a lesser extent, cheese processing is more centralised and scaled up for commercial cheese production. The farmhouse sector is less co-ordinated than is evident in Switzerland. PDO quality management does not drive how supply chains are organised in the UK, unlike Le Gruyère, which is a quality product, but also high volume and circulated through national and global supply chains. The Swiss cheese supply chains are organised in a way that secondary processing is managed either by a cooperative (L'Etivaz) or by dedicated ripeners for Le Gruyère, but much less by the producer themselves (Table 2). Inter-branch organisations also allow for each stakeholder to focus on their job and not too much on advertising, communication, selling, etc., as this is done by the organisation (for which each member pays a contribution). Considering the working schedules of small artisanal producers, this is critical. In the UK, some farmhouse cheese producers still tend to manage more tasks themselves than in Switzerland, for example, they all manage the complete ripening of the cheese. One West Country cheddar producer was launching an initiative to build a cooperative for the common management of ripening to share the costs involved.

The PDO scheme allows producers to value their product according to its production process, for consumers to find specific products for which they know where—and possibly how—they have been produced, and for both to maintain traditional know-how, food, and culture. In Switzerland, most cheeses found in supermarkets are under a PDO, whether they come from Switzerland, Italy, or France; and all major Swiss cheese products are under a PDO, especially hard cheeses for which the Federal Office of Agriculture declared pasteurization forbidden (Le Gruyère, Emmentaler, Sbrinz, Tête de Moine, Vacherin Mont d'Or . . .). Consumer understanding of PDOs in Switzerland is therefore very important, and a major purchasing driver. The cultural importance of cheeses in Switzerland, like all alpine countries, is very strong. In contrast, PDOs in the UK are only known by a few people and mostly sold in specialised shops. The potential of the PDO to make consumers aware of their cultural food heritage is less evident, as noted in the consumer focus groups (Table 2).

PDOs can also be associated with strong inter-branch organisations, as is the case in both L'Etivaz and Le Gruyère. The business relationships along the chain are completely different to a brand or an industrial creamery like the one found for cheddar production in the UK. All stakeholders (at least until the final product), have to follow strict specifications and meet regularly for strategic decisions (marketing, prices, quantities, etc.). The size of the chain is, however, of importance here, as smaller PDOs are more likely to reach consensus. The bargaining power is split between this organisation and the retailers/distributors. As the demand for these specific products exists, the competitiveness which underpins the industrial cheddar market in the UK, for example, is lessened and producers can maintain their traditional value-adding processes. Some farmhouse cheese producers in the UK have gone out of business because of weak bargaining power with supermarkets. The distinctiveness of milk aimed at PDO cheese production has helped to keep it out of the highly competitive and fluctuating milk sector, thereby protecting milk producers.

The PDOs studied in this paper also have an impact on the whole regional economy and are important for rural development, particularly the two Swiss examples. The code of practice rules that prevent up-scaling, for example, also prevent economies of scale and thus foster jobs as manual labour is required. The regional distribution of village creameries in Le Gruyère also provides jobs in a multitude of villages instead of in just one central large creamery, and the production of L'Etivaz has maintained economic activity and a young workforce in a remote alpine region. The number of jobs is also multiplied in annex sectors as, for example, salesmen are needed (and actually it is mostly women who get jobs in cheese shops, with creameries or chalets managed by men). The two Swiss cheese cases also are important consumers of local wood (firewood and ripening shelves must be of local spruce) and salt, among other necessary inputs and services required, such as machinery maintenance, etc.

5. Conclusions

This paper has examined PDO schemes as mechanisms to re-territorialise the agri-food regime, drawing inspiration from Wiskerke [2] and Kneafsey's [3] work on spatial modes of agri-food governance. The analysis has examined four cheese supply chains in Switzerland and the UK, respectively. In Switzerland the PDO label triggers local development that fosters cooperative working and maintains jobs in rural and remote areas as it determines where and how cheese is produced and especially controls scaling-up. In the UK both cheeses studied have used the PDO scheme to protect the cheese and its associated system of production. For cheddar the PDO's main functions have been: (i) to delineate production techniques and geographical origins for a cheese of global economic importance, which is made using predominantly industrial production processes; and (ii) the elevation of PDO cheddars into a niche market. This has improved the ability of producers to make returns in a dairy market that faces intense downward price pressures, both in terms of supermarket purchasing strategies and milk prices. Single Gloucester producers are happy to maintain their predominantly local market and the PDO is not seen as having much commercial value. Significantly, the PDO has also been important in terms of helping to preserve the traditional Gloucester cattle breed. In the case of Le Gruyère in particular, the way the supply chain is organised, with farmer co-operatives co-owning and supplying a local creamery, to ensure production remains territorially embedded and is not upscaled, is something that is not so well developed in the UK, but clearly offers significant potential as a model of reterritorialisation if appropriately applied. Similarly in L'Etivaz, the PDO has been essential in maintaining important economic activities in a remote alpine region by re-valuing a traditional product and its mode of production. As Ilbery and Kneafsey [5,7] noted, arrangements in the UK are often more through convenience than choice.

In conclusion, the PDO scheme is understood differently in the two countries: it is framed as a strategy to protect product identity and maintain the rural economy in Switzerland by protecting producers and adding value. It is applied as a mechanism to protect product identity in the UK, but also to communicate with consumers. The co-operative spirit and use of the guidelines to effectively protect the rural economy is less evident in the UK. This difference, combined with other contextual factors, impacts the influence PDOs have in terms of respacing and food chain organisation. There is some concern in the UK after the vote to leave the European Union (Brexit) about the future application and viability of geographical indications. The analysis here shows that PDO schemes, if implemented properly, have significant potential to valorise production and protect traditional production systems from market appropriation. PDO status can also help to ensure quality production and can protect rural economies. Our recommendation is to continue supporting these forms of agri-food governance, but to do so in a way that appreciates difference in terms of how member states implement PDO and related schemes relative to national contexts and multi-level supply chain pressures. This contextualisation is important in terms of informing future evaluations of the scheme's impact and to enable policy learning between member states. In this regard, more work is needed to better understand how PDO/PGI are used differently in different countries, and the influence they have on supply chain governance and organisation.

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Abbreviations

The following abbreviations are used in this manuscript:

PDO	Protect Designation of Origin
PGI	Protected Geographical Indication
EU	European Union
CAP	Common Agricultural Policy
GI	Geographical Indications
AOC	Appellation d'Origine Contrôlée
IPG	Interprofession du Gruyère (Inter-branch organization for Le Gruyère)
WCFCA	West Country Farmhouse Cheesemakers Association
UK	United Kingdom

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