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The EU Food Label 'Protected Geographical Indication': Economic Implications and Their Spatial Dimension

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Abstract: This study analyses the economic effects of the EU policy on the protection of origin. The focus is on three types of food products with Protected Geographical Indication (PGI), whose reference areas are located in the Free State of Bavaria: Beer (Bayerisches Bier PGI), asparagus (Franken-Spargel PGI, Schrobenhausener Spargel PGI), and carp (Aischgründer Karpfen PGI, Oberpfälzer Karpfen PGI). The study is based on secondary statistical analysis and a series of expert interviews. The results show positive effects on sales mainly for beer on international markets, and positive effects on price mainly for carp on the local and regional levels. All in all, we see that protection of origin stabilizes and supports the economic trajectory of its product. This study also shows that its economic effects vary widely: Firstly, price and sales effects are not automatic and differ in intensity; and secondly, the spatial dimensions of the economic effects exhibit different patterns. The primarily price-related effects at the local–regional level for carp (and to some extent for asparagus) are categorized as local effects (type A). The sales effect at the global level for beer is categorized as type B (export effect). Finally, this study postulates further potential forms of 'price and sales geographies'.

Keywords: protection of origin; protected geographical indication; EU policy; beer; asparagus; carp; Bavaria; economic effects

1. Introduction

In 2017, the sales value of products under the European Union (EU) protection of origin accounted for 6.8 % of total beverage and agricultural production in the EU. This comprises a sales value of €74.8 billion [1–3]. Today, the origin of food is the main criterion for more than half of EU citizens when buying food products [4] (pp. 10–12).

A number of case studies confirm the economic relevance for member states—e.g., Arfini and Capelli [5] for Italy, Tiberio and Francisco [6] for Portugal, and Profeta et al. [7] for Germany—even if the relevance of the protection of origin varies widely across countries [8–10]. The value of exports of food products with geographical indications (GIs) to EU and non-EU countries amounts to €31.4 billion, i.e., 42% of total sales [1] (p. 18).

In order to preserve culinary diversity and thus the diversity of European cultural heritage, regionally anchored products have been supported by European protection of origin since the 1990s (EEC Regulation 2081/92, EU Regulation 1151/2012). European protection of origin aims to prevent misleading indications of geographical source and to protect regionally anchored products and production methods from 'reputation exploitation, imitation and deception' [11] (p. 386), [12]. This legal

objective establishes a geographic definition of production rights. This is linked to a number of additional substantive goals, including objectives of regional development, tourism, and economic development, as well as sustainability in the regions of production—both in Europe [13,14] and in the global south [15]. The link between sustainability goals and GIs is manifold: Several case studies show that GI products can be seen as drivers for sustainable and rural development and contribute to Sustainable Development Goals (SDGs) [16–18], even if there might scope for more targeted focus on the EU level [19].

Two different EU labels indicate the origin of a product: 'Protected Geographical Indication' (PGI) and 'Protected Designation of Origin' (PDO). Article 5 and Article 17 of EU Regulation 1151/2012 define the requirements that a food product must meet in order to be registered as a PGI or a PDO. All of the products analyzed in this paper have received the EU label of PGIs. In Germany, 87% of GI products under this regulation are PGIs, while only 13% have received the PDO label [20]. A PGI is defined as follows:

- It originates in a specific place, region, or country;
- the quality, reputation, or other characteristic of the product are essentially attributable to that geographical origin; and
- at least one of the production steps takes place in the defined geographical area (Article 5 (2) of EU Regulation 1151/2012).

Despite the fact that this set of regulations has been in operation for now more than two decades (since 1996), knowledge about its economic implications is limited and rather scattered [2] (pp. 140–142). This can partially be attributed to the fact that economic success is 'extremely difficult to quantify' because other important variables can also influence outcomes [21] (p. 49), [22]. This study contributes to the understanding of the economic effects of the EU protection of origin by examining selected products from Germany's federal state of Bavaria. The study conducts a retrospective analysis of the economic development of protected Bavarian products in comparison with non-protected products. The basic assumption here is that empirically identifiable differences can provide information about the general economic relevance of the protection mechanisms.

This study examines three product types comprising a total of five PGI products:

- Beer: Bayerisches Bier PGI;
- asparagus: Franken-Spargel PGI, Schrobenhausener Spargel PGI;
- carp: Aischgründer Karpfen PGI, Oberpfälzer Karpfen PGI.

Our paper's contributions to the ongoing discussions are twofold. Firstly, with the example of a regional case study, we add empirical evidence with regard to the various economic effects of the protection measures. Secondly, on a more conceptual level, we develop a comprehensive system to capture the spatial effects of the protection measures across various scales.

2. Market Success of Products of Protected Origin

2.1. Price-Related Arguments

Even if a comprehensive assessment of the economic effects of these protection measures is lacking, a number of case studies reveal important aspects of their economic implications.

The most obvious potential effect is positive price development. Protection of origin limits the region of production for a particular product to a specific area, which tends to reduce the total quantity of production in many cases. Assuming that demand remains at least constant, higher prices can thus be expected [23–26]. Moreover, an active pricing policy is much easier for the suppliers to enforce, given that producers are fewer in number and contained in a single area. Carbone et al. [27] point out that the advantage is particularly noticeable for smaller producers. Some empirical case studies support this assumption; May [26] (p. 21) reports a general price increase of Allgäuer Emmentaler

PDO, whereas the individual profit margins of the producers vary. Profeta and Wirsig [25] refer to calculations by the Institut National de l'Origine et de la Qualité (INAO) that expect a 30% rise in prices for protected products compared to products without protection of origin. In this context, some authors refer to experiences in the protection of wine, which indicate clear price effects for high-quality wines [28,29].

According to an AND study [1,30], the price of a GI product is on average 2.11 times that of comparable non-GI products. While this is the broader average, this value varies between wine (2.85) and spirits (2.52) on the one hand, and agricultural products and food (1.50) on the other [1] (pp. 99–102).

Conversely, Huber's [31] investigations find little evidence of price effects for protected-origin products within Bavaria, and instead focus primarily on 'softer' impacts. Hassan et al. [32] argue with the example of French cheese that non-PGI products are less price-elastic and thus more economically predictable than PGI products, referring to their greater potential for substitution. Strecker et al. [33] underline that price effects can only be expected if product quality is sufficient. DIW Berlin [23] argues that price effects are not evenly distributed across all stages of value creation. Summarizing these studies at hand, we find that price effects are plausible, but there is little evidence for substantial effects, as well as some contradictory findings.

The results from Barjolle and Sylvander [22] show that the economic success of registered products in comparison to similar, unregistered products depends in particular on the specificity of the product, its relevance for the market, and cooperation between members of the protection associations. Most recently, Ferrer-Pérez et al. [34] show at the example of the Navarra lamb the potential of protecting regional farmers from strongly fluctuating prices with GI measures.

The debate on welfare effects is closely linked to price effects: A series of studies show welfare gains due to the resolution of asymmetric information problems [35–38]. The debate does not focus on quantifying price effects, but discusses qualitative effects such as market arrangements, reputation, and product quality [39].

2.2. Sales-Related Arguments

A further postulated effect is increased, or at least stabilized, quantities of sales. Protection of origin measures define a product in a rather narrow sense, which effectively eradicates most competition. The specificity of the product can be part of its marketing within and beyond its region [11] (p. 401), Teuber [40] for German apple wine. However, the empirical arguments in published studies are not yet very clear. Some authors see positive sales effects, such as Wirsig et al. [41] (p. 46), who predict a 30–40% increase in additional revenue due to protection of origin designation. A number of publications confirm the general potential of protection of origin to promote sales—for example, May [26] (pp. 118–119) discusses the overall importance of protected products in export, Belletti et al. [13] specifically of exported cheese and olive oil, Balogh and Jámbor [42] of cheese, and Kizos and Vakoufaris [43] of olive oil.

Beyond the effect of generally increasing sales and turnover, several authors see the potential of protection of origin on market development, i.e., access to previously unserved markets [11,44].

On the other hand, Galli et al. [45] show with the example of Italian cheeses that not all PDO products necessarily induce increasing volumes of sales—market shares decreased for six types of PDO cheese between 2004 and 2008. Török and Jámbor [46] demonstrate with the example of Eastern European fruit spirits that despite protection of origin measures, market losses are still being recorded. Barjolle and Sylvander [22] stress the role of entrepreneurial and management skills.

More recently, the debate also began to incorporate discussions on free-trade agreements (with non-EU players). Geographical indication was included in agreements with Canada (CETA), South America (Mercosur), and South Korea [14,47] among others. Huysmans and Curzi [48] report no positive export effect for PGI cheese, while Raimondi et al. [47] show increasing export prices for PGI products.

2.3. Geographical Origin as 'Key Information' for the Consumer

A considerable part of the literature deals with the 'soft', qualitative effects of protection of origin by regarding it as 'key information' in purchase decisions [49] (p. 59), [4] (p. 10). In particular, the relevance of the indication of origin for retailers is underlined [50]. Currently, consumers clearly value protection labels as a guarantee of certain product characteristics [51] (pp. 238–239), which better positions these products on the market [11]. These labels increase the credibility of quality promises [25] (p. 19) and eliminate information asymmetries [23] (p. 380). This effect can contribute to both higher prices and volumes of sales. The 2020 Green Deal of the EU Commission and the Farm to Fork Strategy point to the increasing relevance of information on geographical origin. The designation of origin for food products and the growing awareness concerning fraud relating to food origin are becoming more and more relevant [52].

Dentoni et al. [53,54] distinguish between the economic effects on companies of various sizes, as small producers tend to ask for stricter requirements whereas larger producers tend to plead for more flexibility between PDO and PGI.

2.4. Economies of Scale

The European policy of origin protection is located at the interface of two overarching EU policy objectives. On the one hand, the EU's economic liberalization aims to remove barriers between national markets within the EU. This facilitates market concentration due to economies of scale, including in agricultural production, food processing, and trade; fewer and fewer suppliers compose the market as their profits decrease from factors such as decreasing unit costs and increasing production volume.

At the same time, European cuisine has traditionally been characterized by small-scale diversity, which is generally seen as a cultural heritage worthy of protection. The effects of EU protection of origin can be understood as an impact on the mechanisms of economies of scale (see Figure 1). The effects of protection can be seen in two aspects:

- Firstly, the possible quantity of production is limited due to product-specific and geographical definitions. To give a concrete example, Allgäuer Sennalpkäse PDO can be produced in significantly smaller quantities than 'Bergkäse' (mountain cheese) in general, due to its small reference area and the few cheese producers located in the area. 'Bergkäse', on the other hand, can also be produced entirely outside of the mountains (Allgäu and others).
- Secondly, higher average costs per produced unit is a potential result. More specific and complex production methods can come with a greater appreciation of these products by consumers and thus higher prices.

The influence of economies of scale is obvious in cases where a globally known export product is clearly defined, geographically anchored, and protected in this sense (e.g., Parma ham). However, this is also the case for so-called 'niche products', where protection of origin can be a helpful complement to regional and national protections [55]. In economic terms, protection of origin aims to guarantee a market perspective for regionally defined products in a market characterized by economies of scale and tendencies towards concentration.

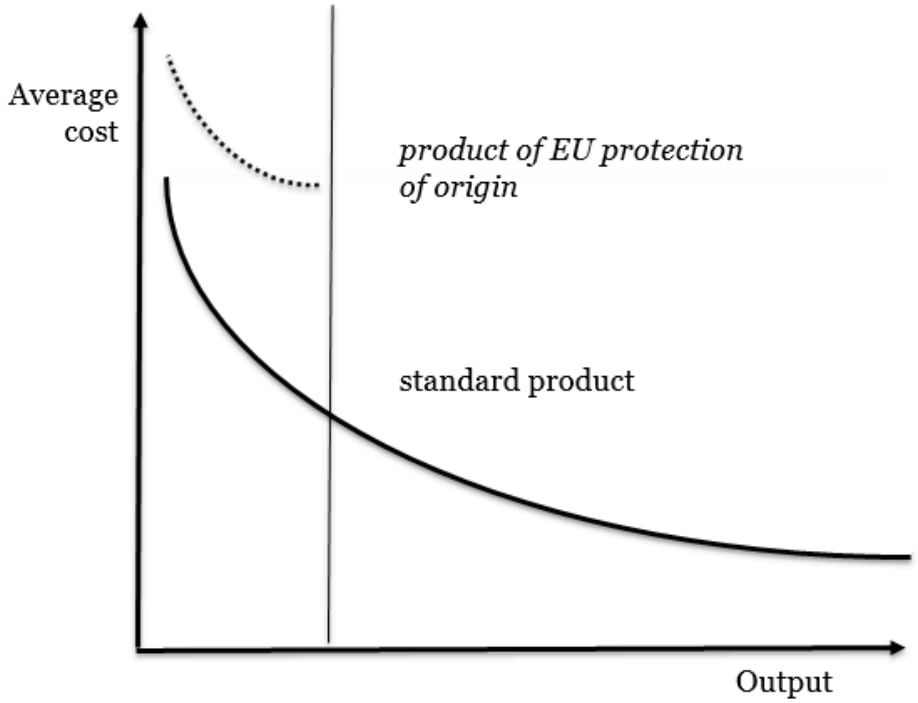

Figure 1. Economies of scale and the role of protection of origin.

2.5. Research Focus

The results of research on geographical protection of origin presented thus far are multifaceted. The general economic relevance is significant and the potential for economic effects is more than plausible. However, the economic effects have not yet been analyzed in a systematic way; rather, the various arguments complement each other in a complex research context.

This study contributes to the ongoing debate in two ways. Firstly, we provide a regional case study in a comparably strong economy of regional products, the Free State of Bavaria. We identify the kinds of economic effects that can be observed in the dimensions introduced above. Secondly, and more conceptually, we reflect on the question of geographic patterns of protection policy, i.e., what kind of 'price geographies' and market coverages have developed due to these protection measures.

The first aspect complements a series of existing studies by advancing empirical knowledge. However, in terms of originality, we see the main contribution of our paper to be in the second aspect, regarding the spatial dimension of economic effects. Our discussion transcends a mere differentiation of export and domestic markets, which has not yet been addressed in a systematic way.

3. Methodology

The present study analyses a series of products that are of protected origin within Bavaria. This region presents a strong case for studying protected-origin products; with 32 registered products that compose over one-third of Germany's total protected products, Bavaria is clearly ahead of other German federal states [20]. Exports are an important market for small and mid-sized Bavarian businesses in the agricultural and food industry, generating around 20% of industry sales in 2018. The most important target country for Bavarian exports in the EU is Italy, followed by Austria and the Netherlands [56]. Sales of products with protected indications of origin account for about 10% of the total sales of the Bavarian food industry [21,57].

German consumers value the origin of food as an important purchasing criterion over other criteria such as cost, safety, and taste, at rates higher than the European average [4] (p. 10). German consumers are willing to spend more money on the quality and provenance of regional products [3] (p. 29).

In Bavaria, the PGI label is of particular relevance; of 32 protected food and agricultural products, 26 bear the PGI label and six bear the PDO label [20,58]. In other countries this ratio varies—for example, in Italy and Spain, PDO protection accounts for up to half of the countries' labels for EU protection of origin [31] (p. 29).

This study is based on a comparative analysis of the economic performance of comparable protected and non-protected products. The Bavarian products discussed in this study cover a broad range of product types (beverages, fish, and vegetables; Table 1). All products have been protected for at least eight years and are subjects of PGI protection. The non-protected reference products are their counterparts in the broader German market (e.g., German beer, carp from other German regions).

Table 1. Products discussed in the study. PGI: Protected Geographical Indication.

Product Type	Protected Product	Protection Since	Area of Origin
Beer	Bayerisches Bier PGI	2001	Federal State of Bavaria
Asparagus	Schrobenhausener Spargel PGI	2010	3 municipal districts (Landkreise Neuburg-Schrobenhausen, Aichach-Friedberg, Pfaffenhofen a.d. Ilm)
	Franken-Spargel PGI	2013	3 regional districts (Bezirke Ober-, Mittel-, Unterfranken)
Carp	Aischgründer Karpfen PGI	2012	13 Municipal districts along the Aischgrund (Landkreise Erlangen-Höchstadt, Neustadt a.d. Aisch, Bad Windsheim, Fürth, Kitzingen, Bamberg, Forchheim Nürnberger Land and the cities of Erlangen, Forchheim, Bamberg, Nürnberg, and Fürth)
	Oberpfälzer Karpfen PGI	2002	1 regional district (Oberpfalz)

Our study is based on a mixed-methods approach that combines quantitative evidence and qualitative interpretation. The research process is based on a three-step approach: Firstly, the construction of the data base includes time series covering the period before the initialization of the protection label. The data set comprises data from a broad range of sources, including data from official statistical offices on federal and federal state level (e.g., [59]), institutional data from sectoral institutions (e.g., [60]), commercial statistics (e.g., [61]), and data from product specific associations (e.g., [62] or [63]).

In a second step, the available data were subject to a comparative indexation. The processed data are visualized in a time-indexed progression diagram or in absolute developments in order to compare the development of each protected product with that of its corresponding non-protected reference product. In a third step, the results were reviewed and calibrated in the framework of expert interviews. As a result, the descriptive statistical arguments must be seen as an important part of a mixed-method approach, as the validation of the data was the most important aim of the expert interviews.

Eight interviews with professional experts on the products focused on the following questions:

- To what extent do the experts confirm the secondary statistical analyses as presented (in the graphics shown during the interviews)?
- What motives are most important for implementing geographical indication?
- To what extent is the economic performance of the products linked to the European protection policy? Which other factors also have an impact, and to what extent?
- What price differences can be instated between a protected product and an unprotected product with similar product characteristics?
- How have sales volume, turnover, and price of the protected product developed since its registration?

Moreover, 'soft' factors such as the motivation for joining the protection association were also reflected in the discussions. The interviews each had a duration of 30–40 min.

4. Results

4.1. Beer

4.1.1. Market Context and Protection of Origin

Germany ranks fifth in the world in beer production after China, the US, Brazil, and Mexico [64] (p. 8). However, the German beer industry has experienced declining beer sales for several decades (Figure 2). Excluding the Bavarian share, German beer sales dropped 23% between 1995 and 2018 [59,65–67]. The decline in beer sales is mainly the result of a change in German consumer behavior. Beer consumption in Germany has fallen by a third, from almost 150 L per person per year in the mid-1970s to almost 100 L per person in 2018 [68–70].

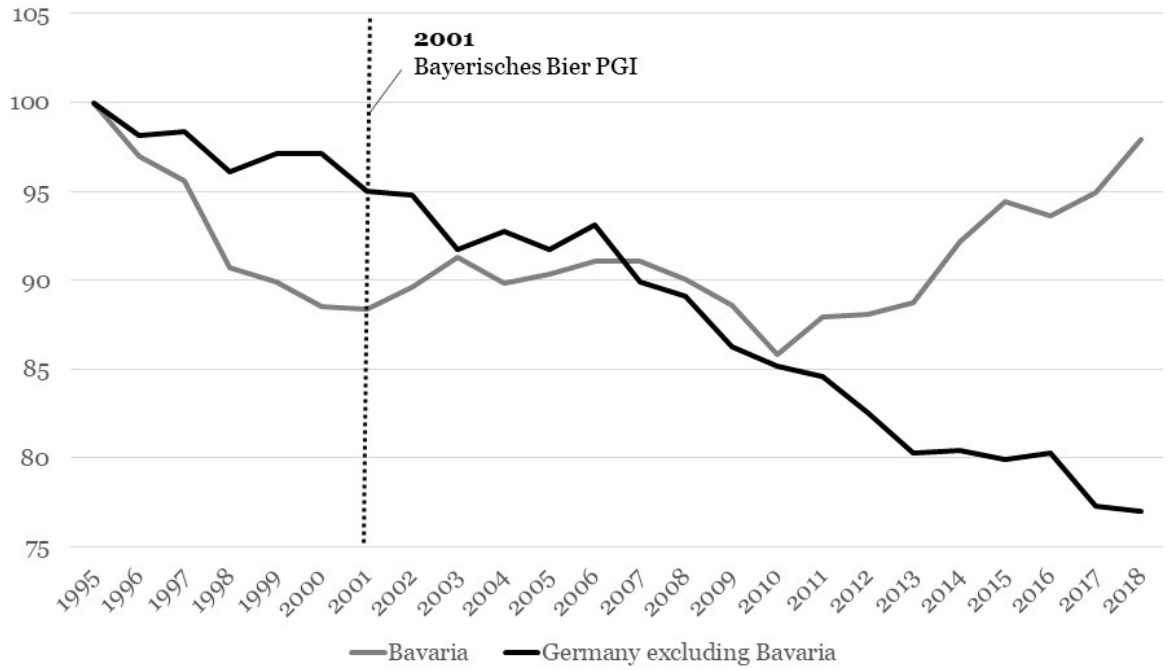

Figure 2. Beer sales index of Bavaria and Germany (excluding Bavaria), indexed for 1995 = 100. Source: Authors' own illustration; data: [59,65,67,68]. Data exclude non-alcoholic beer and malt beverages.

Bayerisches Bier PGI was registered in the database of the European Union in 2001. An important motivation to institute a protected status was to prevent the development of the label 'Bavarian beer' as a generic name, which would impede future protection, and to restrict the positive reputation of Bavarian beer to that is only produced in Bavaria [8] (p. 63). This idea was fueled by a year-long legal dispute with the Dutch brewery 'Bavaria', which had filed an action against the registration of Bavarian beer under Protected Geographical Indication [71].

Eighty-six breweries are registered in the list of producers of Bayerisches Bier PGI who are entitled to use the label [72]. The geographical production area is defined as the complete federal State of Bavaria following the EU Regulation 2017/990. An important feature of Bavarian beer is its production method that has been codified in the Bavarian purity law since 1516, which allows only water, hops, malt, and yeast in beer production, and which is compulsory throughout Germany. The protection comprises a series of products, e.g., Schankbier, light/lager, Pils, export, etc. Therefore, the regulation is relatively broad in scope, as it covers the entire territory of the Free State and includes all traditional brewing products.

4.1.2. Economic Effects

Sales Development

In contrast to the broader German trend, Bavarian beer sales have increased since 2010, reversing a previously negative trend. Then in 2018, the Bavarian brewing industry saw its most successful year in the last 20 years. Figure 2 shows that Bavarian brewers are approaching the 1995 baseline in terms of beer sales. One of the main factors contributing to the positive trajectory of Bavarian beer sales is its success as an export, which has more than compensated for the declining domestic demand.

Figure 3 shows that the export differential was just over 7% in 2001, and had risen to over 23% by 2018 so that nearly a quarter of the beer produced in Bavaria is now exported [65,73]. Unfortunately, the share of exported beer with a PGI label has not been recorded.

This overall positive trend can—at least partly—be traced back to the PGI label. Its economic effects can be seen in particular at the European and global levels, as the label is mainly used in marketing abroad. In many foreign markets, consumers are familiar with the European Union label through its own protected national products. However, at the local, regional, and national levels, the label has limited or no impact at all [71,74].

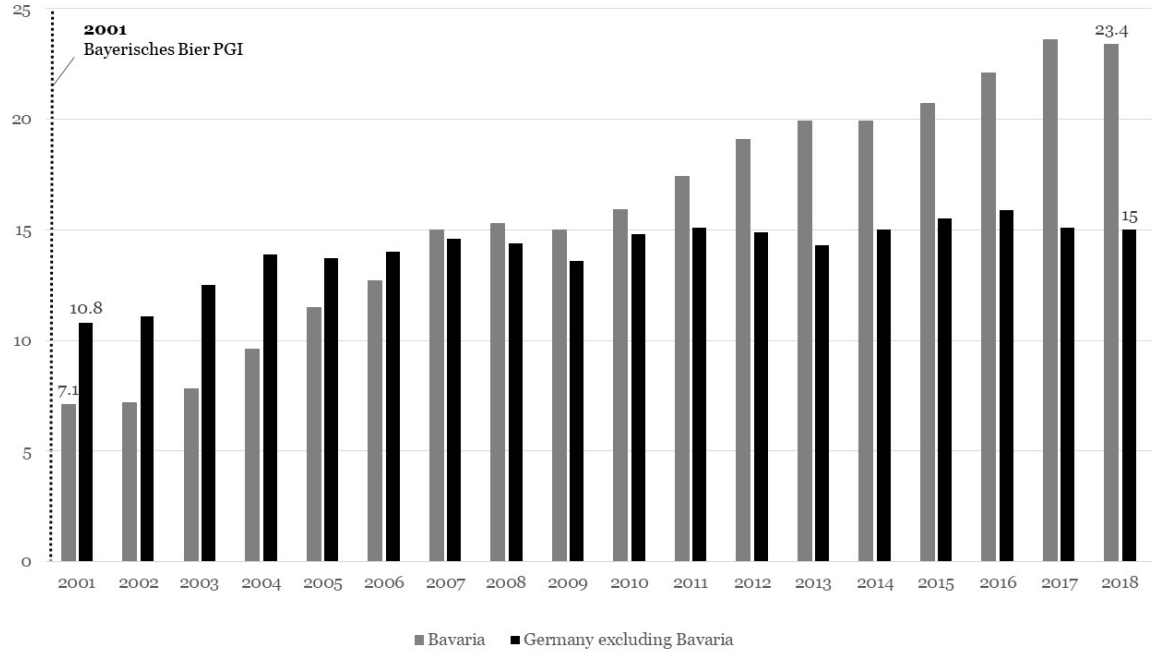

Figure 3. Development of the share of exported beer in total sales in Bavaria and in Germany (excluding Bavaria) since 2001 in %. Source: Authors' own illustration; data: [75].

To claim protection of origin as the only factor in international market success would certainly be an exaggeration. But both in the legal function of protection (i.e., avoidance of international competition with 'imitation products') and in its discursive function (i.e., the particularly credible reference to 'typically Bavarian quality'), protection labels are very plausible factors contributing to market success.

Bavarian breweries profit from the absence of foreign producers of 'Bavarian beer'. However, the experts involved in this study differentiated between the impacts for small and large breweries. Small breweries in Bavaria, especially in the Franconian (northern) parts, often sell only to a fixed local or regional customer base, in which PGI labels do not play a considerable role [31]. But as soon as they export their products, the PGI label helps draw a profit for brands hitherto unknown in markets abroad. At this point, they benefit from the advertising campaigns and brand visibility of larger breweries.

The large breweries function as 'locomotives' that 'pull' the small breweries along to mutually benefit in the long term. While larger breweries put their brand in the foreground, they also open new markets for small Bavarian breweries to follow via the PGI label [71].

Price Development

Neither the statistics nor the expert assessments give evidence for any price-related effects of the PGI label [71,74,76]. This confirms Huber's [31] argument, which also denies that price effects clearly correlate to PGI protection. Factors such as increased raw material or labor costs and other product policies have proven to be more relevant. Moreover, certain breweries sell their beer products at a high price without using the EU label. Some breweries even use their PGI label to mark and sell their budget products or second brand [73]. This procedure contradicts the actual purpose of the European protection of origin, which is to offer high-priced 'premium and specialty products'. The potential added value of the seal has not yet been fully exploited by the industry [71,73].

The Role of Consumer Information

Above all, Bavarian brewers have benefitted from the reputation of PGIs and the purity law abroad, as foreign consumers associate these with a long history and tradition and regard them as indicators of quality. These points are important aspects of product-specific 'storytelling', especially in foreign markets [71]. This ultimately explains the success of protection-of-origin products in accessing new export markets [73]; in some cases, the EU seal is even required by certain food retailers [76].

4.2. Asparagus

4.2.1. Market Context and Protection of Origin

Asparagus has a particular cultural and economic status in Bavaria; it is considered an important, premium local vegetable [77] and a 'prime example of a regional product' [78]. Considered 'white gold', it is the most important vegetable crop in the Free State in terms of harvest volume, cultivated area, and volume of sales [77,79,80].

Globally, Germany ranks fourth in asparagus production behind China (asparagus harvest in 2017 approx. 8,000,000 tons), Peru (383,000 tons) and Mexico (246,000 tons). Germany is thus the largest asparagus producer in the EU in terms of volume [81].

In 2016, 370 farms cultivated asparagus in Bavaria with a total area of 3736 ha [62]. A total of seven asparagus regions in Germany are acknowledged as PGIs. Three of these—Abensberger Spargel PGI (protected since 2012), Franken-Spargel PGI (protected since 2013), and Schrobenhausener Spargel PGI (protected since 2010)—are located in Bavaria. The latter two are discussed in this study (for the geographic definition, see Table 1).

The main motives for these asparagus producers to register as PGIs were cited as protection against imitators and misuse, and promotion of the quality of the products [78,82].

4.2.2. Economic Effects

Sales Development

In recent years, the asparagus sector has experienced a boom in Germany and Bavaria and is experiencing dynamic development in terms of harvest volume and area under cultivation. The per capita consumption of asparagus in Germany has risen steadily in recent years, reaching 1.7 kg per capita in 2017/18 [83]. The harvested volume of asparagus in Germany rose from ca. 51,000 tons in 2000 to over 133,000 tons in 2018 [84]. In Bavaria, the asparagus harvest even increased by approx. 400% from 5849 tons to 23,354 tons in the same period. In parallel, the amount of land dedicated to asparagus cultivation increased by 75% between 2005 and 2016 in Bavaria [79] (p. 2).

These developments in the asparagus sector are due, firstly, to technological developments and innovations in asparagus production. These include the use of plastic film systems and methods to heat the soil, as well as improved asparagus varieties that enable earlier harvests, an extension of its season and its cultivation on 'heavier soils' [77] (p. 128). Bavarian and German asparagus have thus become more competitive with foreign producers on the domestic market; asparagus imports from

other countries have fallen significantly [77,80,85]. In Germany, the asparagus self-supply rate is over 80% [85]. In Bavaria, the rate is even higher at just under 90% [78]. Foreign asparagus is only sold at the beginning of the asparagus season in March; otherwise, only Bavarian or German asparagus is sold [78,80].

Secondly, the PGI labels are seen as a factor explaining the market success of asparagus on the local and regional levels, although a distinction must be made here between Franken-Spargel PGI and Schrobenhausener Spargel PGI. Franconian asparagus farms are typically smaller in size and have high local and regional customer loyalty. The local asparagus farms usually have longstanding relationships with their customers, so personal contacts play a greater role than official labelling in direct marketing. Asparagus is typically not marketed to the consumer as Franken-Spargel PGI, but as native to its respective municipality (e.g., Schwabacher Spargel). Direct marketing (ex-farm/farm stand-alone sale) therefore tends to operate independently of the PGI label.

However, as soon as Franken-Spargel PGI is sold through food retailers or wholesale markets, European protection of origin becomes a fundamental requirement. Trade chains often request producers to label their products with the PGI label. Consumers tend to choose Franken-Spargel PGI over comparable products without an official label of origin [78]. In addition to the trade distribution channel, gastronomes frequently ask specifically for Franken-Spargel PGI [78].

In Schrobenhausen, asparagus cultivation has undergone professionalization processes, accompanying a trend towards concentrated cultivation among a fewer number of larger farms [78,82]. Here, European protection of origin becomes an important instrument both for direct marketing and for trade.

The spatial effects of the Schrobenhausener Spargel PGI label are most evidently perceived at the regional level. The main points of sale are the metropolitan areas of Nuremberg, Munich, and Augsburg, and their agglomerations. In contrast to Franken-Spargel PGI, sales of Schrobenhausener Spargel PGI at the local level is less important. Schrobenhausener Spargel PGI is hardly sold beyond Bavarian borders, although a small part of its production is exported across national borders to Austria and Switzerland. Attempts to market Schrobenhausener Spargel PGI to Saudi Arabia failed due to technical challenges (e.g., refrigeration) and long transport routes [82]. As a result, European protection of origin for Schrobenhausener Spargel PGI supports its sales and complements the generally positive economic trend instigated by technical innovations. Another important aspect is protection against food fraud, which outlines clear distinctions concerning the origin of raw materials [8,82].

Price Development

Figure 4 shows the development of the prices of Schrobenhausener Spargel PGI and Franken-Spargel PGI between 2010 and 2018. This graph is based on indexed data for 2010. Comparing absolute prices would be misleading, as German asparagus prices are only available as wholesale prices, which are not available for the PGI asparagus. In the latter case, ex-farm prices are far more prevalent. Since 2010, a positive trend has been identified for the prices of the two Bavarian asparagus, as well as the German asparagus.

For all three products, the general price increase can be traced back to other trends: Rising costs for electricity, young plants, and machinery are named as important financial factors. The introduction of the minimum wage in 2015 and the resulting increase in labor costs has also played an important role [78]. Asparagus is also subject to weather-related influences, which have a considerable impact on harvest quantity and, ultimately, on price.

Interestingly, the prices of Bavarian asparagus have taken a slightly more positive or stable trajectory. From 2016 on, a decline in German asparagus prices is seen, which is less pronounced in the two Bavarian regions.

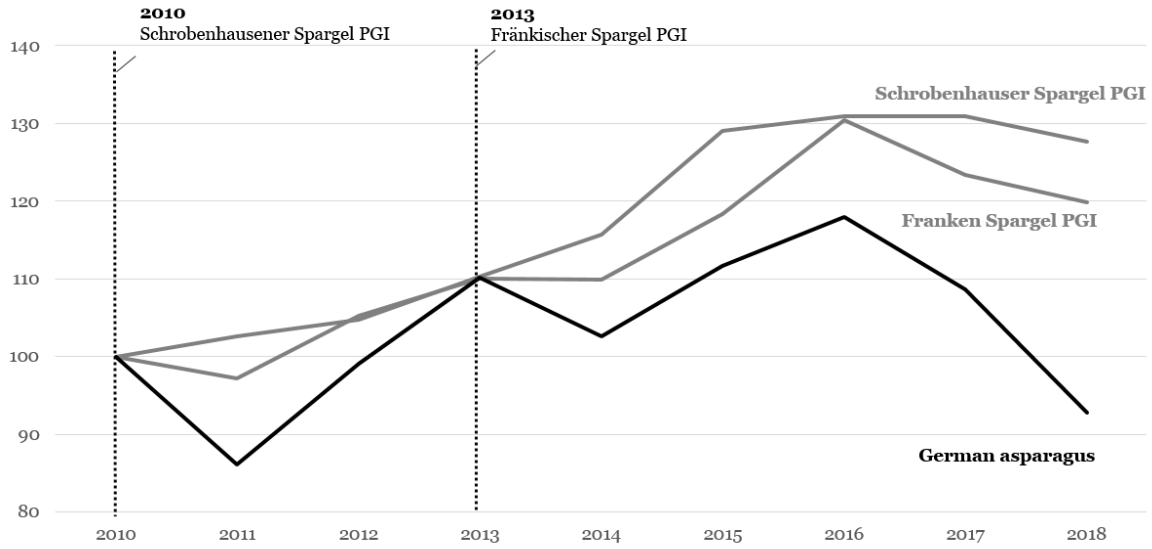

Figure 4. Development of the price of asparagus, indexed for 2010. Authors' own illustration; data: [61,62].

The experts' assessments differ with regard to the role of the PGI labels in this distinctly positive development. For the case of Schrobenhausener Spargel PGI, the label of origin is considered to have a price-stabilizing or price-increasing effect [82]. This effect is attributed to better communication of the specific product's characteristics [8,82]. Assessments for the Franken-Spargel PGI case are more skeptical [78]. For both PGI products, the causes cannot be definitively determined at this point, but it is more than plausible that the PGI label has played a role in the observed price stabilization over recent years, see also Schober [8]. PGIs place producers in a better position in price negations with retailers—the pool of competition for PGI producers is relatively small.

The Role of Consumer Information

European protection of origin for Schrobenhausener Spargel PGI was introduced primarily with the aim of obstructing misuse of the name. Inspections are usually carried out directly at the producers' premises. The experts interviewed in this study expressed the wish that more inspections should be made at the points of sale. It is assumed that two to three times the actual production volume is sold as Schrobenhausener Spargel PGI [82]. In the case of Franken-Spargel PGI, the label has yet to play a role in direct marketing due to the small-scale structure of the farms, but nonetheless serves as helpful information for the retail and gastronomic sectors.

4.3. Carp

4.3.1. Market Context and Protection of Origin

Carp breeding in Bavaria is mainly concentrated in two areas (some districts of the Upper Palatinate, and in Middle Franconian Aischgrund, Table 1). In both areas, carp breeding has a long tradition and is deeply rooted in the regional culture [86,87].

Both regions host numerous activities and events related to carp production. The carp-tasting weeks in Aischgrund and the Northern Upper Palatinate's denomination as the 'Land of 1000 Ponds' with guided tours are just two examples.

According to official figures, 1501 Bavarian aquaculture farms produced almost 2000 tons of the common carp in 2017 even if in its survey, the Federal Statistical Office set a lower limit of at least 3 ha pond area, or 200 m^3 total plant volume, which does not take into account numerous small Bavarian producers [60] (p. 358). Bavaria is the biggest carp producer in Germany, composing 41% of total German production [88]. As pond farmers in Bavaria operate on a very small scale with an average pond surface area of 3.5 ha, they are often not included in the official numbers due to minimum-size limits

established by the Federal Statistical Office. For example, 52 of the 142 pond keepers in Aischgrund have ponds with surface areas of less than 1 ha [31] (p. 93). In addition, carp production is often undertaken as a part-time business—in the Aischgrund region, for example, only eight farms manage their ponds on a full-time basis, with 135 managed part-time [31,89]. According to the Bayerische Landesanstalt für Landwirtschaft [90], there are an estimated 10,000 pond farmers in Bavaria with a total pond surface area of 20,000 ha [60] (p. 358). Estimates postulate about 6000 tons of carp production per season in Bavaria [90].

In Germany, five carp regions bear the PGI label, three of which are in Bavaria, namely Fränkischer Karpfen PGI (2012), Aischgründer Karpfen PGI (2012), and Oberpfälzer Karpfen PGI (2002); the latter two are considered in this study.

In Europe, carp is mainly produced in Eastern countries [60] (p. 353). The main reason for implementing the EU label was the fact that local Bavarian pond farmers faced direct competition with imported carp from the Central and Eastern European states of Poland, Hungary, Romania, and the Czech Republic [91] (p. 19), [86] (p. 87). Large quantities of Czech carp were imported to the Bavarian and German markets, many of which were marketed as German 'locally produced' carp. In order to protect against the misuse of the name, PGI protection was introduced [92].

4.3.2. Economic Effects

Sales Development

The economic effects of Oberpfälzer Karpfen PGI and Aischgründer Karpfen PGI can be observed mainly at the local and regional levels; even though there are no concrete figures on their sales, the expert interviews consistently confirmed this. The Schutzgemeinschaft Teichgenossenschaft Oberpfalz and its producers successfully implemented measures to promote sales that were financed by the European Union—these measures included public relations work, information at points of sale, and advertising campaigns in the media. These were enacted in close cooperation and coordination with the local gastronomic scene. For example, brochures were developed on the special features of the Oberpfälzer Karpfen PGI and standardized flags were placed in front of restaurants.

A stabilizing effect on sales can also be observed for the Aischgründer Karpfen PGI. This must be taken against the background of aging pond farmers and increasing drought risks that pose considerable challenges for the carp industry. But still, the protection of origin has achieved a noticeable stabilization in carp sales. EU funds were also used for marketing measures in the Aischgrund region.

According to the experts' assessments, the advertising measures created a basis of trust among consumers, which had a lasting effect on the sales of carp in the Upper Palatinate. Even pond farmers who do not advertise directly with the PGI benefit from its positive image.

Interestingly, the introduction of the protection of origin has stimulated membership of the Teichgenossenschaft Aischgrund, the protection association for Aischgründer Karpfen PGI. While the Teichgenossenschaft Aischgrund was formerly experiencing a decline in membership, since 2014, the number of members increased by ca. 10% [63,93].

Price Development

With regard to price trends, both Oberpfälzer Karpfen PGI and Aischgründer Karpfen PGI have shown (significantly) positive trends since their registrations as protected products (see Figure 5). The price per kilogram rose from €2.00 in its initial year (2012) to €3.20 within six years [55] (pp. 11–13).

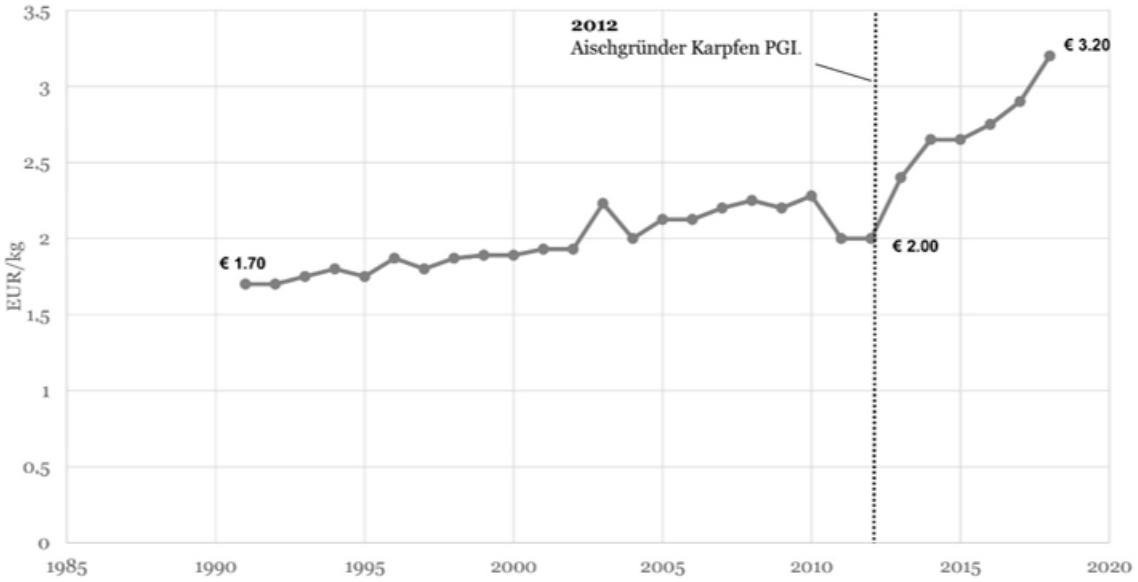

Figure 5. Price trajectory of Aischgründer Karpfen PGI. Source: Authors' own illustration; data: [63]; prices without marketing to wholesalers, data for carp sold alive.

The sales price of carp has also risen in the Upper Palatinate since registration, even if there are no concrete data and figures available on price.

These positive developments can be explained by two main arguments. Firstly, through the introduction of the protection of origin, clear quality standards were defined for carp farming. The Regulation (1096/2012) stipulates for protected carp a maximum fat content of 10% and a limit for stocking density (800 carp/ha). This ensures that quality is maintained or even improved [93]. A second major reason for the success of the protection of origin labels is the inclusion of local restaurants in both cases, which ensures consistent purchases of the 'real PGI' [55,92,93]. Sales to wholesalers do not play a role for Aischgründer Karpfen PGI [93], and Oberpfälzer Karpfen PGI only offers a small proportion of its total production on the wholesale fish market in northern Germany [92].

While the price of domestic carp has increased, it remains strongly influenced by imported Czech carp imports [92]. The Aischgründer Karpfen PGI price (€3.20) is below the selling price of other carp from aquaculture farms in Germany, which in 2017 averaged €3.70 per kilogram (averaged from direct price, retail price, and gastronomy). However, the gap has clearly decreased—in 2012 the difference was much greater (€3.70 for German carp/€2.00 for Aischgrund carp).

The Role of Consumer Information

In light of competition with imported carp from Central and Eastern European countries and the misuses of the label, the aim of introducing PGI carp in the Upper Palatinate and Aischgrund was to promote the image and reputation of local carp and to raise awareness of the regional product among consumers. Numerous rebranding campaigns and diligent advertising (e.g., marketing the Upper Palatinate as the 'Land of the 1000 ponds') fostered a basis of trust with the end consumer, which has had a long-term, positive effect on sales and, above all, on price.

5. Discussion and Conclusion

5.1. Comparative Perspective

Table 2 summarizes insights on the products discussed in this study, and provides a comparison of the results. It synthesizes the interpretations on the basis of the quantitative evidence and the experts' assessments.

Table 2. Effects of the EU protection of origin—synthetic overview.

	Bayerisches Bier PGI	Aischgründer Karpfen PGI	Oberpfälzer Karpfen PGI	Franken-Spargel PGI	Schrobenhausener Spargel PGI
Price effects	Neutral	Very positive	Fairly positive	Neutral to price-stabilizing	Price-stabilizing to price-increasing
Sales effects	Positive, especially in export	[Unclear]	Increasing sales	Promotion in retail and gastronomy, not in direct sales	Sales-stabilizing
Role in consumer information	Product definition abroad/fraud prevention	Image improvement on local/regional level	Image improvement on local/regional level	[Unclear]	Protection against misuse of names/fraud prevention
Geographic dimension	Negligible in the region of origin, but clear effects abroad	Clear local effects, but not beyond		Low impact in direct marketing, but higher in sales to food retail, wholesale, gastronomy	Notable local and regional effects

For Bayerisches Bier PGI, the European protection of origin has had an important and significant impact on the product's development in export markets. Since its implementation, the amount exported has increased significantly—in the long term, exports are expected to increase 50% (in particular to Chinese markets). However, the interviewees agreed that protection of origin has not had a noticeable influence on the price development of the protected beers from Bavaria.

In the case of Aischgründer Karpfen PGI, its protection of origin induced a significant price increase. Similarly to the Oberpfälzer Karpfen PGI, including the local gastronomic scene and customers in the overall process proved to be an important move. In both cases, a stabilization or increase in sales was reported by the experts.

For Franken-Spargel PGI, the European protection of origin has had a stabilizing effect on price and sales. For direct marketing on the farm, protection of origin is not a decisive purchasing criterion for the consumer, but it distinguishes the product from others on regional retail and gastronomic markets. The most important aspect here is the physical proximity to the local producer. Additionally, for Schrobenhausener Spargel PGI, increases in price and security of sales have been observed since its implementation.

5.2. 'Price and Sales Geography': Spatial Characteristics of Economic Effects

From a spatial perspective, the economic effects of European PGI show two general patterns (Figure 6). For some products, the economic effects are limited to the local or regional level, as is the case with asparagus and carp. Both are fresh products, mainly sold within a radius of max. 100 km from the production site, so exports play only a minor role, if any. In addition, both products are 'small PGIs' in terms of sales turnover and can be considered 'local specialties'. Typical distribution channels for these products include direct sales from the farm/stand/pond or purchases by local restaurants and (regional) food retailers. End consumers are sensitive to the quality of regionally produced products and reward higher quality with a willingness to pay a higher price. Such cases are categorized into 'Type A: Local effects'.

Spatially speaking, the economic effects can also be most pronounced on the global sales market, as is the case of the export-oriented Bayerisches Bier PGI. In contrast to asparagus and carp, European protection of origin on Bavarian beer has little effect on the price at the local and regional levels, but a significant effect for exports ('Type B: Export effects').

This leads back to the argument of economies of scale, as discussed at the beginning of this paper. Our results support the argument that protection of origin influences the economies of scale.

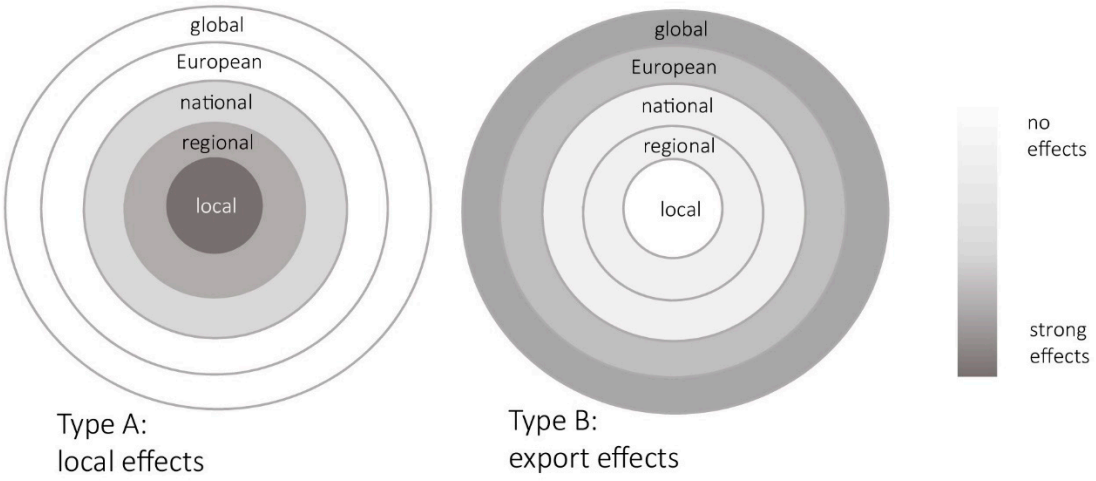

Figure 6. Sales and price geographies of Protection of Geographic Indication.

A geographically 'narrower' version of a product—e.g., Aischgründer Karpfen PGI versus carp in general—faces less competition on the side of the producer and, at the same time, limits the potentials of economies of scale. At the same time, a potentially increased willingness to pay higher prices on the demand side leads to a market situation where economies of scale are less important for a successful business.

The situation is different in the case of beer, but modified economies of scale can still be observed: In securing external sales markets, classic economies of scale can be used on markets exclusively for Bavarian breweries.

This exploratory study has only examined a limited range of products. The two developed types of 'price and sales geographies' might not be conclusive. Figure 7 shows further potential patterns of geographies, which are likely to characterize other protected products.

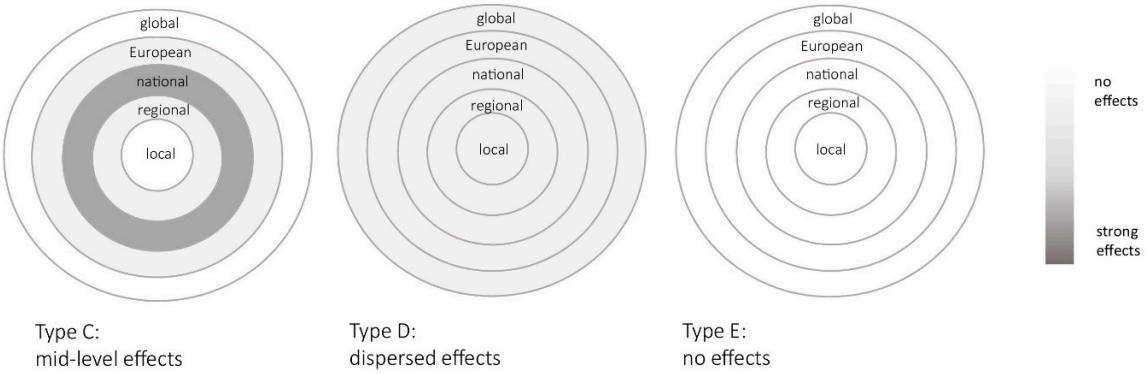

Figure 7. Potential further geographies representing economic effects of PGIs.

Type C shows significant effects in the mid-levels, particularly in national markets. This could apply to situations where protection of origin is quite broadly applied and, in principle, is effective. At local/regional levels, however, this effect may not be very visible due to factors such as market saturation; likewise, international markets may not be targeted for a certain period of time due, for example, to bureaucratic hurdles. Particularly in large states, national markets can be highly significant (e.g., Nürnberger Bratwurst PGI or Obazda PGI might be categorized as type C).

Type D covers cases where the economic effects of protection of origin are spatially dispersed across the various levels. A product can theoretically be marketed with greater specificity and generate attention simultaneously in all markets (Bayerischer Meerrettich PGI might be categorized as a type D product).

Type E represents the negative case, in which no economic effects whatsoever are noted. This is particularly true in cases where too few producers and suppliers use the protective seals; contextual conditions such as demographic change might inhibit economic effects, or a product might be unable to anchor a specific product definition within a wide range of products.

At this point, it is left open to what extent and with which frequency the constructed types can be found in practice, and whether further types exist. Nevertheless, it seems highly relevant to further scrutinize the relationship between protections of origin and spatial differentiation of their economic effects.

5.3. Conclusion and Outlook

This paper has contributed to the discussion on the economic effects of PGIs in two ways. Firstly, we have supplemented the empirical basis of the ongoing discussion with a case study on Bavarian PGI products—our results do not question the consensus that PGIs have a positive economic effect. However, the varied nature of the effects and complexity of empirical measurements call for careful reflections when studies attempt to quantify these effects. Secondly, we have presented a method for spatially visualizing these economic effects, which offers a new perspective for examining these case studies.

The European Union's funding for promoting GI products (specifically for agricultural and food products) has increased from €61 million in 2003 to more than €200 million in 2020 [94]. These funds can be used for promoting products with protected origins, while the use of domestic public funds for marketing has been restricted to products that do not undermine other protected European origins. These subsidy options, which have been increasingly expanded and simplified since 2014 (e.g., establishment of an external consulting agency and elimination of national co-financing), have been used to varying degrees by EU member states to date.

The present study's findings initially show that the economic effects of origin protection can be considerable, but vary greatly. First, their effects on prices and sales are not automatic. Secondly, the spatial dimensions of the economic effects are very different. Thus, when discussing the implementation of EU protection of origin for specific groups of products, the question of whether there will be an economic effect, and how strong it will be, is less important. Rather, the question should be whether the aim is to achieve a sales or a price effect, and in which markets this should take place. In the framework of this study, the role of collective action has often been mentioned, but to what extent they explain the observed differences in economic effects remains unanswered [95–97]. We propose that further comparative studies scrutinize this factor in greater detail. Finally, this study focuses on the economic aspects of the protection of origin designation, but it is worth mentioning that in addition to the economic effects, 'softer' effects and potentials can be observed (e.g., recognition as a tourist destination, increased numbers of members of PGI associations, enhanced sustainability).

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