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Geographical indications and quality promotion in food and agricultural markets: domestic and international issues

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Geographical indications and quality promotion in food and agricultural markets: domestic and international issues

by

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ABSTRACT

This dissertation addresses three questions concerning the economics of geographical indications (GIs) and the role of intellectual property (IP) protection in the provision of quality in food and agricultural markets. The first essay compares and contrasts different instruments (i.e., alternative certification schemes and trademarks) used to provide IP protection for GIs. From a policy perspective, this essay offers recommendations with regard to the most desirable type of IP protection instrument for GIs. The model indicates that a *sui generis* scheme based on appellations is preferable to standard instruments, such as certification marks, that are currently used in many important markets including the United States, because appellations improve the collective reputation of certified products and reduce the total cost (i.e., the sum of production and information costs) of providing quality compared to standard instruments.

The second essay investigates whether consumers recognize and value the informational content of a variety of nested geographical origin labels from foreign countries. This study disentangles three types of geographical origin labels with different levels of geographical differentiation: country-of-origin labels and two types of GIs, protected designations of origin (PDO) and protected geographical indications (PGI). Consumer data show that, within the context of a high-quality value-added commodity such as extra virgin olive oil, consumers' willingness to pay for oils from different countries varies, *ceteris paribus*, across countries, and that within a country consumers have a greater willingness to pay for GI-labeled than non-GI-labeled products. We also find evidence that consumers value PDOs more than PGIs.

The third essay investigates the incentives of GI-exporting and GI-importing countries to strengthen the current TRIPS provisions for GIs. This essay explicitly considers the role of promotion in expanding market demand when consumers lack information regarding either the existence or the features of the GI and GI-like products. The model highlights the diverging interests of GI-exporting and GI-importing countries with regard to GI provisions in international markets and provides a key to interpret the current controversy over GIs among WTO members.

CHAPTER 1: GENERAL INTRODUCTION

1.1 Introduction

The overarching topic of this dissertation concerns the economics of geographically-differentiated food and agricultural products and the role of intellectual property (IP) protection in the provision of quality in food and agricultural markets. Recent years have been characterized by a surging interest of consumers in regional cuisines, the discovery of a socio-cultural status associated with authentic food and culinary heritage and, more generally, by an increased attention to food quality. These trends provide new opportunities for the food sector but also present significant challenges. The provision of quality in food markets is, in fact, fraught with difficulties under asymmetric information and moral hazard problems. A possible solution to these problems has emphasized the role of firms' private reputation as conveyed via private brands (e.g., trademarks). In the case of geographically-differentiated products, firms – in addition to using private trademarks – have the option to signal their quality through the use of collective brands indicating the geographic origin of production. An instance of such collective brands is represented by geographical indications (GIs), a distinct form of intellectual property rights.

GIs are names of places or regions used to brand goods with a distinct geographical connotation. Many GIs pertain to wines (e.g., Champagne and Burgundy), and agricultural and food products (e.g., Boseong' green tea and Parmigiano-Reggiano cheese). The characterizing feature of GI products is that some quality attribute of interest

to consumers is considered to be inherently linked to, or determined by, the nature of the geographic environment in which production takes place (e.g., climate conditions, soil composition, local knowledge, etc.) – i.e., to the notion of "terroir" (Josling 2006).

GIs are similar to trademarks in that they identify the origin or the source of the good and help differentiate individual products among similar goods by communicating the specific qualities that are due to the geographical origin. As a result of these important economic functions, GIs have gained recognition as a distinct form of intellectual property rights in the TRIPS agreement of the World Trade Organization (WTO). However, while trademarks protection is well established and relatively harmonized across countries, the protection of GIs varies to a large degree and its implementation is a topic of intense disagreement in the ongoing negotiations at the WTO. In particular, a source of tension among WTO member countries relates to the fact that the legal instruments (e.g., certification systems) used to provide IP protection for GIs differ across countries. The European Union, for example, employs a so-called *sui generis* system based on appellations, while the United States uses a system based on certification marks.

A second source of tension among WTO member countries concerns the TRIPS agreement's built-in agenda that commits WTO members to "enter into negotiations aimed at increasing the protection of individual geographical indications" (Art. 24.1). Some countries, predominantly those with large stocks of GI products, are in favor of more stringent IP policies for GIs. In particular, these countries have put forward a proposal (hereafter the extension proposal) to extend the so-called "high level" of protection which is currently reserved only for wines to all GI products. If implemented,

the extension proposal would grant producers in GI regions exclusive rights over the use of a GI name in any labeling context (i.e., the use in commerce of geographic names for "non-genuine" products would be prohibited even if the true origin of the good were specified). Countries in opposition, including the United States, have made efforts to block measures to strengthen IP provisions for GIs.

The objective of this dissertation is to contribute to the understanding of the economic implications of IP protection for GIs and to shed light on the current debate on GIs at the WTO and on the ongoing product quality policy reform within the European Union. Specifically, the contribution of this dissertation to the economics literature on GIs is threefold. First, it provides the first analysis of the economic implications of different IP instruments currently in use for protecting GIs. Second, it offers a first investigation of how North American consumers perceive European GIs with different degrees of geographical differentiation. Third, it formalizes the open economy implications of strengthening current IP provisions for GIs in international markets.

The first essay (Chapter 3) studies firm reputation as a mechanism to assure product quality in perfectly competitive markets in a context in which both certification and trademarks are available. The proposed model extends the pioneering work of Shapiro (1983) on the role of firm reputation to reflect both collective and firm-specific reputation in competitive markets. The objective of this essay is twofold. First, it aims to understand how the alternative IP instruments used for geographically-differentiated products (e.g., trademarks, *sui generis* certification) can alter the degree of the informational problem and the efficiency in markets with asymmetric information

regarding food quality. Second, it attempts to provide policy recommendations concerning the IP instruments for geographically-differentiated products. Our model yields two primary results. First, in markets with asymmetric information and moral hazard problems, credible certification schemes reduce the cost of establishing reputation and lead to welfare gains compared to a situation in which only private trademarks are available. Hence, certification improves the ability of reputation to operate as a mechanism for assuring quality. Second, the actual design of the certification scheme plays an important role in mitigating informational problems. From a policy perspective, with regard to the instrument of choice to provide IP protection for GI products, the model favors a *sui generis* scheme based on appellations over certification marks.

The second essay (Chapter 4) consists of an empirical investigation of consumers' preferences for food products with geographical origin labels. This is the first investigation of how North American consumers perceive European GIs with different degrees of geographical differentiation. I investigate whether consumers recognize and value the informational content of a variety of nested geographical origin labels. In particular, this study disentangles and assesses three types of geographical origin labels with different levels of geographical differentiation: country-of-origin labels and two types of GIs, protected designations of origin (PDO) and protected geographical indications (PGI). Consumer data indicates that, within the context of a high quality value-added commodity such as extra virgin olive oil, consumers' willingness to pay for oils from different countries varies, ceteris paribus, across countries, and that within a country consumers have a greater willingness to pay for GI-labeled than non-GI labeled

products. I also find evidence that consumers have a greater willingness to pay for PDO-labeled than non-PDO labeled products.

The third essay (Chapter 5) represents the first formal analysis of the open economy implications of IP protection for GIs. Specifically, the aim of this essay is to shed light on the current controversy over GIs among WTO members by investigating the incentives of GI-exporting and GI-importing countries to strengthen the current TRIPS provisions for GIs. This essay contributes to fill the void left by existing literature on GIs which exclusively focuses on the specific case in which GIs are either afforded full IP protection or no protection at all. This essay shifts the emphasis to the "strength" of IP protection by allowing for intermediate (or partial) degrees of IP protection. It is precisely this generalization that facilitates an analysis of the ongoing WTO debate on GIs that primarily focuses on how much protection to provide to GIs (rather than on whether or not to provide protection at all).

This essay complements and adds to existing studies in this area by considering the role of promotion in expanding market demand when consumers lack information regarding either the existence or the features of the GI and GI-like products. Specifically, I analyze how the strength of IP protection afforded to GIs in international markets affects the incentives of producers to provide information to consumers and, in turn, how it affects the distribution of welfare among producer groups and consumers, and across international markets. The main findings are as follows. Countries that are net-exporters of GIs would benefit from a strengthening of current GI provisions. Stronger IP provisions for GIs, in fact, favor the ability of GI producers and their associations to

extract rents from the presence of scarce factors owned by producers within the GI area. GI-importing countries, on the other hand, stand to lose from a strengthening of current IP provisions. The model shows that, for importing countries, the majority of the gains from IP protection for GIs are achieved by granting a minimum level of protection that provides sufficient incentives to induce GI producers to export. Finally, the analysis also shows that domestic consumers in GI-importing countries might have little to gain from a further strengthening of current GI policies, especially when the domestic sector has limited market power.

1.2 Dissertation organization

The dissertation is organized as follows. Chapter 2 provides background information about GIs, a review of the institutional framework and a brief review of the economic literature on GIs. Chapters 3, 4 and 5 include three separate and self-contained essays. All the background information, institutional framework and literature review that is relevant for the specific question addressed by each essay is included in the respective chapter. Inevitably, some of the material discussed in chapter 2 is duplicated in the chapters that follow. Chapter 5 summarizes some general conclusions.

1.3 References

Josling T. (2006) “The War on Terroir: Geographical Indications as a Transatlantic Trade Conflict” *Journal of Agricultural Economics* 57:337-363.

Shapiro C. (1983) “Premiums for High Quality Products as Returns to Reputations” *The Quarterly Journal of Economics* 98(4):659-680.

CHAPTER 2: INSTITUTIONAL FRAMEWORK AND LITERATURE REVIEW

2.1 Historical overview of GIs

In this section, I provide an overview of the evolution of the concept of GIs from the earlier days to 1994, when GIs received international recognition as a distinct form of intellectual property (IP) with the Agreement on Trade Related Aspects of Intellectual Property Rights (TRIPS). The most rudimental, and historically the first form of GIs consisted of a word, a phrase or a symbol used to indicate the geographical origin of a good. As early as the Middle Ages, so-called guild marks were used to indicate the geographical location of products, such as Murano glass from the island of Murano near Venice (Merges 2004).

The first laws protecting GIs, introduced in France, Portugal and Tuscany, date back to the 14th and 15th centuries (Oskary 2006). These first laws, meant to prevent misrepresentation of the geographical origin of goods, paved the way for the development of today laws against unfair competition and "passing off."

A first step in the evolution of the concept of GIs into what today are known as appellations of origin (AOs) took place in France during the Phyllossera outbreak of the 19th century (WIPO 2001). At that time, to protect wine producers from the regions of Bordeaux and Champagne from fraudulent competition from low quality wines, the French government enacted laws delimiting the areas in which Bordeaux and Champagne wines could be produced. No quality requirements were included in these first laws (WIPO 2001). France saw the official birth of the concept of AO as a form of collective

IP in 1919, when it became possible for producers to register geographic names as AOs (O'Connnor 2004). But, it is only with the introduction of the system of Controlled Appellations of Origin (AOC) for wines and spirits in 1935 that the concept of AOs was fully developed. The AOC, in fact, introduced specific quality and production requirements for AOs, a feature that is critical for the concept of AO. Such quality and production requirements are supervised by the French National Institution of Appellations of Origin for Wines and Spirits (O'Connnor 2004). Over time, similar systems were introduced in other Roman law countries for wines and other products including cheese (OECD 2000).

The aforementioned French laws from the 1900s played a major role in shaping the features of the GI system that is currently in use in the European Union. In the common law jurisdictions (Australia, Canada, the United States), instead, the protection of GIs has evolved together with the laws against unfair competition. In these jurisdictions, GIs are primarily protected in the form of certification or collective marks under trademark law (OECD 2000; WIPO 2001).

Internationally, the earlier attempts to protect GIs date back to the end of the 19th century, when the following multilateral agreements were signed: the Paris Convention for the Protection of Industrial Property (hereafter Paris Convention), the Madrid Agreement for the Repression of False or Deceptive Indications of Source on Goods (hereafter Madrid Agreement) and the Lisbon Agreement for the Protection of Appellations of Origin (hereafter Lisbon Agreement).

The Paris Convention (signed in 1883) is one of the first treaties on IP and, with over 170 contracting members, one of the most widely adopted treaties. This treaty prohibits the importation of goods with "direct or indirect use of a false indication of the source of the goods or the identity of the producer, manufacturer or merchant." Whereas the original text of the Paris Convention has a limited scope, successive revisions extend the prohibition of all false indications of source and appellations of origin (independently of the concomitant use of false trade names) (WIPO 2007).

Remarkably, the Paris Convention applies to false indications of source but not to indications that are merely misleading. Protection against "deceptive" indications of source, (i.e., indications that are literally true but nevertheless misleading), was later introduced with the Madrid Agreement in 1891 (WIPO 2007). Limited membership (originally signed by 8 countries, today it counts 35 members), however, makes the Madrid Agreement of little practical significance (WIPO 2007). With the Madrid Agreement, whether a given indication is misleading is determined in the country in which protection is sought (i.e., according to the principle of "territoriality"). Finally, the "products of vine" are given special protection. Specifically, article 4 prohibits member countries from treating GIs related to wines as "generic."

The Lisbon Agreement (1958) extends the concept of AOs to international markets. For the purpose of the Lisbon Agreement, AOs are defined as names of a country, region, or locality, which designate the quality or characteristics that are "exclusively or essentially due to the geographical environment, including natural and human factors." The Lisbon Agreement facilitates the attainment of protection in

international markets (e.g., one single registration procedure suffices to receive protection of a given AO in all member countries), but, unlike the Paris and Madrid treaties, the Lisbon Agreement restricts protection to one class of GIs, AOs only.

Though restricted to AOs, the protection offered by the Lisbon Agreement goes beyond that provided by previous treaties (WIPO 2007). First, it expands protection against any imitation, even when the true origin of the product is indicated, when the appellation is used in translation or is accompanied qualifiers such as “kind,” “type,” “imitation” etc. (Art.3). Second, it extends the protection against “genericization” (earlier reserved by the Madrid Agreement to wines) to all types of products. Finally, it requires the phase out of existing trademarks conflicting with more recently registered GIs (Art. 5(6)).

As for the Madrid Agreement, a major limitation of the Lisbon Agreement is the limited membership. Currently, the Lisbon Agreement counts 26 signatories, including several but not all European Union's member countries (Italy, France, Portugal, the Czech Republic, Slovakia, Bulgaria, and Hungary).

The next opportunity that presented itself to GI advocates to extend protection to a much larger number of countries occurred in the early 1980s, when the United States started to push for a multilateral trade round that included intellectual properties. In that occasion, the European Union and Switzerland pushed for and obtained the presence of GIs on the multilateral trade round agenda (Josling 2006).

2.2 Terminology

The terminology used in the economics and legal literature on GIs is rich and diverse. As is becoming increasingly common in the economics literature, in this dissertation I use the expression "geographical indications" (or GIs for short) to refer to any type of geographically-based indications. Furthermore, only when relevant to distinguish between different "types" of GIs, I will use more specific terminology (e.g., appellation, PDO, PGI etc).

Consistently with existing literature and "technical" documentation on GIs, I will use the expression "appellations" (as opposed to marks) to distinguish the GIs protected under a *sui generis* European-style GI system from the GIs protected under the trademark system. In what follows, I list the most important types of geographically-based indications and report their official definitions.

Indication of source

An indication of source is understood as an indication referring to a country, or a place in a country, as being the origin of a product. A formal definition does not exist, but this terminology is used in both the Paris and the Madrid Agreement. An indication of source merely refers to the geographical origin and does not imply the presence of any characteristic, quality or reputation about the good (WIPO 2007). The most common example of an indication of source is "Made in country x."

Appellation of origin

The Lisbon Agreement defines appellations of origin as the "geographical name of a country, region, or locality, which serves to designate a product originating therein, the quality and characteristics of which are due exclusively or essentially to the geographical environment, including natural and human factors." Examples of Appellations of Origin registered under the Lisbon Agreement are "Bordeaux" for wine, "Noix de Grenoble" for nuts and "Tequila" for spirit drinks (WIPO 2007). The concept of appellation of origin is virtually identical to that of protected designations of origin (PDO).

Protected designation of origin

Protected designations of origin are one of the two types of GIs protected within the framework of the European Union's system through regulation 510/2006. Art. 2(1)a of regulation 510/2006 defines a PDO as "the name of a region, a specific place or, in exceptional cases, a country, used to describe an agricultural product or a foodstuff originating in that region, specific place or country, the quality or characteristics of which are essentially or exclusively due to a particular geographical environment with its inherent natural and human factors, and the production, processing and preparation of which take place in the defined geographical area."

Protected geographical indication

Protected geographical indications (PGI) are the second type of GIs protected within the European Union's framework. Art. 2(1)b of regulation 510/2006 defines a PGI as "the

name of a region, a specific place or, in exceptional cases, a country, used to describe an agricultural product or a foodstuff originating in that region, specific place or country, and which possesses a specific quality, reputation or other characteristics attributable to that geographical origin, and the production and/or processing and/or preparation of which take place in the defined geographical area." As conveyed by the definition, the link between quality and geography characterizing a PGI is weaker than the link characterizing a PDO.

Geographical indications

The most recent international definition of GIs is given by the Agreement on Trade-Related Aspects of Intellectual Property Rights of 1994 which defines geographical indications as "...indications which identify a good as originating in the territory of a Member [of the World Trade Organization], or a region or locality in that territory, where a given quality, reputation or other characteristic of the good is essentially attributable to its geographical origin." This definition encompasses AO, PDO and PGI.

2.3 Domestic framework for the protection of GIs

GIs can be protected with a variety of legal concepts which originated over time in different legal traditions and are characterized by different implications regarding conditions, scope and entitlement to protection (Oskary 2006). Two similar yet distinct legal notions, appellations of origin and marks, are considered the main tools used to protect GIs (OECD 2000). The primary difference between the two forms of protection is

that in order for a GI to qualify for protection as an appellation, evidence must be provided that there exists a special tie between the characteristics of the product and its geographical origin, while in the case of a mark no such relation is needed. Appellations of origin have historically been used in the Roman law countries (France, Italy, Spain, and Portugal) and more recently in the European Union, while marks have been utilized in the Common law countries (Australia, Canada, and the United States) (OECD 2000).

2.3.1 Sui generis system of appellations

Protection of GIs has a long tradition in some European countries with a history dating back to the nineteenth century. In 1992, as a component of the Common Agricultural Policy reform initiative, the European Union adopted Council Regulation (EEC) 2081/92 (hereafter regulation 2081/92) which establishes for all member countries a harmonized system of protection of GIs for agricultural products and foodstuffs (but excludes wines and spirits). The European system of protection of GIs is often referred to in the literature as the *sui generis* GI system.

The aim of regulation 2081/92 is to support and bolster the development of agricultural and food products, whose quality derives from a geographical origin or from a traditional method of production, by enabling differentiation through geographical labels. In 2006, regulation 2018/92 was replaced by Council Regulation (EC) 510/2006 (hereafter regulation 510/2006). Whereas the two regulations, 2081/92 and 510/2006, are

similar in their essence, regulation 2081/92 was replaced because not in compliance with some of the provisions of the TRIPS agreement.[1]

Regulation 510/2006 distinguishes between two types of GIs, protected designations of origin (PDO) and protected geographical indications (PGI). The distinction between the two types of GIs is based upon how closely a product is linked to a specific geographical area of origin (Art. 2). Of the two types, protection under a PDO mandates the more stringent association between a product attributes and the geographic environment. To be eligible for protection as a PDO, a product must meet the following two conditions: (1) the quality or characteristics of the product must be essentially or exclusively due to the natural and human factors (e.g. climate, soil quality, local production knowledge) characterizing the geographical area or origin and (2) the entire production process, including the production and processing of raw materials, must occur within the defined geographical area of origin. In contrast, the less restrictive form of GIs, PGI, merely require a portion of a designated product's characteristics and production be attributable and occur within the specific geographical area (Art. 2). In the literature, PDO and PGI are generally referred to as appellations.

[1] Regulation 510/2006 modifies regulation 2081/92 without changing the essence. Modifications, introduced to comply with the TRIPS agreements, concern (1) the abrogation of the "reciprocity principle" and (2) simplification of the bureaucratic procedure for application. With regard to the reciprocity principle, regulation 2081/92 was applicable to agricultural products from third party countries only on the condition that the third party country would accord same protection as offered by the European Community to corresponding EU products. Regulation 510/2006 abolishes this requirement. The bureaucratic simplifications introduced by Regulation 510/2006 regard (1) the introduction of a unique document for application which includes all key information (which will therefore be accessible more promptly for opposition), (2) the possibility offered to third party countries to apply for registration and to pursue opposition against the registration of a certain GI directly to the Commission.

According to the regulation 510/2006, protection can be obtained by an association of producers and/or processors working with the same agricultural product or foodstuff. To obtain protection, the association, which can also include other actors in the supply chain, must initiate and manage the application process for registration (Art. 5). The application process requires the submission of a code of rules, commonly referred to in the literature as the specifications, which define the requisites that the product must meet to bear the geographical label, including all the characteristics of the product, the production method and the geographical area of production (Art. 5). The code of rule is typically the result of negotiations among the actors in the supply chain under the supervision of national or regional authorities, and is subject to approval of national and European Union's institutions (Belletti et al., 2005). In addition to submitting detailed information regarding the code of rules, the association seeking protection must designate a third-party inspection body in charge of certification and inspection along the entire supply chain (Art. 4). Certification and inspection activities are meant to ensure that products carrying PDO or PGI labels comply with specifications.

Whereas differentiation of products through labeling is relevant and beneficial for consumers due to the information asymmetry that exists between consumers and producers, a label is effective only if consumers perceive the information embodied by the label to be true. Independent inspection envisioned by the European regulation, is crucial for ensuring that the information conveyed via labeling is verifiable and gives credibility to the GIs system. For each product, the inspection activities are defined in a control plan, an operational document that describes the entire control system (Belletti et

al. 2005). Either a designated inspection authority or an approved private body can be appointed as inspection bodies as long as they comply with certain requirements set forth by the regulator including a guarantee of objectivity, impartiality, expertise, and sufficient financial resources as stipulated in the UNI CEI EN 45011 international standards (Art. 10).

It is critical to note that once a product is registered, all producers within the geographical region who comply with the product specifications, regardless of whether they are a member of the association that originally applied for the registration, are entitled to use the PDO or PGI label on their product (Art. 8).

Wine and spirits are excluded from regulation 510/2006 and, until recently, while the Common Market Organization for wine of the European Union only provided a generic common framework for protection, Member States were largely autonomous in determining how to classify their respective wines. This led to a proliferation of different GI labels and GI classifications for wines within the Union. The recent reform of the Common Market Organization for wine (Regulation (EU) 479/2008) in April of 2008 achieved harmonization of all GI-labels in the European Union, and now also wines with geographical indications are classifies as PDOs or PGIs.

Over the past few years several Asian, North and Latin America's countries have introduced *sui generis* GI systems (WIPO 2007b).[2]

[2] Including China, Mongolia, Thailand, the Republic of Korea, Vietnam, Colombia, Venezuela, Cuba, Costa Rica among others.

2.3.2 Certification marks

Where a *sui generis* system of protection for GIs does not exist, the trademark system provides the legal framework for the protection of GIs. In the United States, certification marks, individual and collective marks can be used to protect GIs, both domestic and foreign (OECD 2000). Whereas appellations are specifically meant to certify the origin of a product, certification marks can be used to certify any aspect of a good or service (OECD 2000). For example, certification marks can be used to certify quality, mode of manufacture and the origin of the product. Certification marks differ substantially from appellations. First, certification marks are privately owned whereas appellations are not. Second, differently from appellations, certification marks do not require the existence of any special tie between the quality of the products and its geographical origin. It is up to the owner of the certification mark to establish what characteristics of the product are certified, including (if desired) the existence of a special tie between the quality of a product and its geographical origin. Finally, as for the *sui generis* system, the product that is labeled with a certification mark is subject to inspection. Inspection activities are in the case of a certification mark the responsibility of the mark's owner and not of a third party inspection body (USPTO 2007). Independence between producer and inspector is nevertheless maintained because the owner of the mark does not directly conduct industrial or commercial activity in the specific product but rather concedes the use of the mark to independent producers.

Where GIs are protected through marks, protection is based on the law of unfair competition. Essentially, the use of a GI on products originating outside of the relevant

area is regarded as an act of passing off, i.e., as in the case of trademark infringement, as an attempt to capitalize on the goodwill and/or reputation of some other producers.

2.4 International framework for the protection of GIs

Whereas GIs play a relevant economic role in the agricultural sector of several EU member countries and Switzerland, in other counties including the United States, Argentina, Australia, Brazil, Canada and New Zealand, the presence of domestic GIs is sporadic (with the exception of wines) and few of the GIs are of real economic significance. This difference in the relative importance of GIs across countries has contributes to create a divergence across countries with regard to their interest in strengthening the IP provisions for GIs in international markets.

The Uruguay Round of trade negotiations and the signing of the Agreement on Trade Related Aspects of Intellectual Property Rights (TRIPS) in 1994 represent an important milestone for the protection of GIs internationally. The TRIPS agreement is of great importance for GIs, not only because GIs were recognized as a distinct form of IP, but above all because TRIPS transformed GIs into a multilateral issue (Josling 2006). The provisions of TRIPS, in fact, apply to all WTO members (today 149 member countries). This resolves the low participation problem that plagued the Madrid and Lisbon Agreements. Moreover, TRIPS's provisions are supported by the dispute-resolution mechanisms of the WTO, which represents the currently available most effective way to enforcing rules internationally.

TRIPS builds on earlier IP treaties and sets minimum requirements for protection of IP, including GIs. Compared to the Lisbon Agreement, TRIPS protects a broader class of GIs. But, the level of protection guaranteed by TRIPS is not as extensive as that provided by the Lisbon Agreement and not all provisions included in the Lisbon Agreement were incorporated in TRIPS.

For the purpose of the TRIPS Agreement GIs are defined as "…indications which identify a good as originating in the territory of a Member, or a region or locality in that territory, where a given quality, reputation or other characteristic of the good is essentially attributable to its geographical origin." For TRIPS, a GI can be any word or phrase, not necessarily a geographical name, or even a symbol, that identifies a product with its geographic origin. In addition, according to the TRIPS definition, for a product to qualify as a GI, it is sufficient that a given quality, reputation or other characteristic of the good is essentially attributable to its geographical origin. With AOs, instead, reputation is not a sufficient condition for a product to be considered a GI. AOs require that quality and other characteristics of the product are exclusively or essentially due to its geographical origin.

TRIPS maintains the Madrid Agreement' dichotomy between the level of IP protection reserved to wines and to all other products. A minimum level of protection is provided for all products, while additional protection is reserved for wines and spirits. For all products, TRIPS prohibits the use of false or misleading indications, as well as any use of such indications which represents an act of unfair competition in the meaning of Article 10bis of the Paris Convention. The additional protection reserved for wines and

spirits is independent of whether or not consumers are misled or confused by the use of geographical indications on goods that originate outside the area indicated by the GI. WTO member countries must provide the legal means to interested parties to prevent the use of a GI on products not originating in the place indicated by the geographical indication, even where (1) the true origin of the goods is indicated, (2) the geographical indication is used in translation or (3) is accompanied by expressions such as “imitation,” “kind,” “style,” “type” (Art. 23.1). The additional level of protection for wines and spirits also include two additional elements: (a) Members must refuse or invalidate the registration of trademarks for wines or spirits which contain or consist of geographical indications (Art. 23.2); and (b) Members are committed to “enter into negotiations aimed at increasing the protection of individual geographical indication” (Art. 24.1).

For wines only (but not spirits), articles 23.3 and 23.4 provide additional protection. Article 23.3 mandates that, in the case of homonymous indications, each geographical indication needs to be protected. Finally, article 23.4 calls for the introduction of a multilateral system of notification and registration of geographical indications for wines eligible for protection in all countries participating in the system. The introduction of such a notification and registration system is part of the unresolved debate on GIs and an issue, as is explained later, that has created intense disagreement among countries.

The protection of GIs is subject to exceptions as defined in article 24. Specifically, member countries are exempted from protecting GIs that (1) are not protected in the GI's country of origin, (2) have become generic in their own markets, (3)

have been in use or registered in good faith as trademarks before a conflicting GI was granted protection. Finally, a critical feature of the TRIPS agreement is that, whereas it mandates that all member countries ought to provide legal means to prevent the use of GIs from unauthorized parties, it does not specify the form or tools that a country should use for protection.

2.5 Current debate on GIs

Whereas the signing of the TRIPS agreement represents a success for GI advocates and for the protection of GIs, several issues remain to be addressed. The TRIPS agreement itself has a built-in agenda that commits members to “enter into negotiations aimed at increasing the protection of individual geographical indication” (Art. 24.1) and calls for discussion over the introduction of a multilateral system of notification and registration of geographical indications for wines (Art. 23.4).

With regard to the system of notification and registration, two main proposals have been put forward. The European Union’s proposal calls for a system with voluntary membership and compulsory notification (i.e. countries that choose to participate must notify all the GIs protected in their own jurisdiction) and a legally binding effect (i.e., the registration of a GI implies that the term is protected in the WTO members). The United States supports a voluntary system (i.e., voluntary participation and voluntary notification) based on the creation of an international data base used for consultation purposes.

Besides the issues included in the TRIPS, the European Union is pushing its own agenda. In particular, the European Union is promoting GIs in two directions. First, the European Union supports the extension of the “additional level” of protection currently reserved for wines to all products. If the additional protection were granted to all products, the use of geographical indications on products originating outside the geographic area would be prohibited independently of whether or not consumers are confused or mislead as regard to the origin of the good. This could have significant consequences for GI producers because it would eliminate the need to provide evidence that competing products or imitations actually confuse the public in order to receive protection.

The other major issue supported by the European Union regards the (several) European GIs that are exempt from protection in the framework of the TRIPS agreement. Exemption stems from the fact that these GIs have, over time, become generic in foreign markets. Familiar examples are parmesan for the Italian Parmigiano-Reggiano, feta for the Greek Feta cheese or champagne, which in the Unites States generically refers to sparkling wines. With regard to this issue, the European Union has put forward a request, known as “claw-back”, to reserve 41 geographical indications that are either generic terms or trade marks outside the Union for the exclusive use of EU's producers. This list includes Bordeaux, Chablis, Champagne, Chianti, Grappa, Asiago, Feta, Gorgonzola, Parmigiano-Reggiano, Prosciutto di Parma and Prosciutto San Daniele.

2.5.1 System of notification and registration

One of the most controversial topics of debate in the TRIPS Council under the Doha mandate on international protection of GIs regards the introduction of a multilateral system of notification and registration for wines and spirits (hereafter "system"). This is part of the built-in agenda of the TRIPS agreement. Article 23.4 mandates that, in order to facilitate GI protection, negotiations should take place within the TRIPS Council regarding the introduction of a multilateral system of notification and registration for wines. Three proposals have been put forward so far.

In 2005, the EU, together with Switzerland and a number of other European Countries and Sri Lanka, presented a proposal that calls for an amendment of the TRIPS agreement to include a compulsory system of notification and registration with voluntary membership (WTO 2005). This means that a country can elect to participate in the system (i.e., voluntary participation), and that all participating countries must notify (i.e., provide a list of) all the GIs protected in their own jurisdiction (i.e., compulsory notification).

Another group of countries, lead by the United States and including Canada, Australia, Argentina, Japan, Chile, Costa Rica, Dominican Republic, Ecuador, EL Salvador, Honduras, Mexico, New Zealand and Chinese Taipei, proposed a voluntary system (i.e., voluntary participation and voluntary notification) in which notified GIs would be registered in a freely accessible database meant for consultation purposes (WTO 2008). Concretely, with the US proposal WTO members would have the option to "look up" a list of all GIs currently protected in other countries during the process of

granting protection to a trademark or a GI in their own jurisdiction. Based on the US proposal, countries are free to choose to notify or not to notify any GI. A third proposal, presented by Hong Kong and China, consists of a compromise between the European and American proposal (WTO 2003).

Even though with the EU proposal the eligibility requirements for registration of a GI are substantively the same as those currently imposed by TRIPS, the system proposed by the EU would shift the burden of the application procedure from the party that seeks protection to the party that grants protection (Goebel 2003). A single notification would suffice to receive protection for a GIs in all WTO member countries. It would be up to each of the other WTO members to lodge a reservation (within an 18-month timeline) against those GIs that do not satisfy the eligibility conditions in their own jurisdiction.

2.5.2 Claw back and bilateral agreements

The claw-back issue has been pushed by the European Union through bilateral agreements. The European Union has requested the phasing out of the generic use of GIs in exchange for concessions related to improved market access. Such agreements have been signed between the European Union and Australia in 1993, between the European Union and Canada in 2003, and between the European Union and the United States in 2005. From Canada, the European Union has obtained the phase out of the use as generic or semi-generic terms of all the wines included in the claw-back list. From the United States, the European Union has obtained a phase out of some European wine names that are currently considered semi-generics in the American market. In exchange the

European Union pledged to recognize US wine-making practices, facilitating access of US wines in the European market.

2.6 Related economics literature

A standard economic justification for the desirability of food labeling relates to the presence of market failures associated with the supply of high-quality goods in markets with asymmetric information. If producers of the good in question are unable to credibly signal the quality of their products, the predicament of Akerlof's (1970) lemons problem leads to pooling equilibria with lowered quality and reduced size (e.g., only low-quality goods might be transacted).

The presence of information asymmetries is common in agricultural markets where product characteristics, including overall quality, are often not ascertainable by consumers prior to purchase and/or after consumption. This is particularly true for differentiated agricultural products such as GIs that are to a large degree experience and credence goods (Nelson 1970; Darby and Karni 1973). With regard to GIs, it is presumed that some quality attributes of interest to consumers are linked to the specific geographic origin of the good and/or particular production methods used in that region, and that such attributes cannot be determined through inspection by the consumer prior to purchase the good or even after consumption. Since quality is typically costly to produce, in addition to the adverse selection issue described by Akerlof (1970), the market for GIs is also characterized by moral hazard problems. As in the case of adverse selection, market failures are typically characterized by suboptimal provisions of quality.

These types of market failures related to adverse selection and/or moral hazard can be ameliorated if firms develop reputation for quality. The notion of reputation in markets in the presence of moral hazard has been developed by Shapiro (1983). In Shapiro's model, an initial investment via the production of a high-quality product is necessary for a seller to gain reputation and, during the investment period, the product is sold at no more than cost. Once gained, reputation persists until the firm cheats by cutting its quality. In this context reputation plays the role of an implicit contract between the reputable firm and its customers. The former agrees to provide the promised quality and the latter agree to pay for quality.

Brand names, specifically private trademarks, are tools commonly used by firms to convey reputation to consumers. When trademarks are credible, consumers easily identify products with respect to the source, learn to expect a given quality from a given source and, at the same time, have a tool to retaliate against firms if quality does not meet expectations. GIs work in a way similar to trademarks by conveying information about a firm's reputation. However, while a trademark identifies a single entity as the source of a product, a GI identifies the source only up to a group of producers. A GI, and hence its reputation, is in fact shared by many firms. As is the case with other common resources, each single producer in the group has the private incentive to free ride on the group reputation by supplying a quality below the average quality of the group.

Winfree and McCluskey (2005) illustrate this point by considering the quality choice of a profit maximizing firm operating in an industry with a fixed number of

identical firms (and no entry or exit) that shares a common reputation.[3] Winfree and McCluskey show that the quality provided in a steady-state symmetric equilibrium is below the quality that is Pareto optimal for the industry (i.e., the monopolist profit-maximizing quality). Winfree and McCluskey also find that the larger the industry, the lower the quality provided in equilibrium.

The free riding problem described by Winfree and McCluskey can be partially alleviated by introducing minimum quality standards, a feature that also plays an important role for GIs. With the European style *sui generis* GI system, the identification of quality standards is a prerequisite for a product to be eligible for protection as a GI. The US system instead does not require the definition of minimum quality standards. In the United States, where GIs are protected primarily as certification marks, the only attribute subject to certification is the origin of the good.[4] This leaves ground for free riding, as illustrated by the Washington Apples example provided by Winfree and McCluskey.[5] Vidalia Onions represent another example. Until 2002, the location of production was the only requirement on producers for use of the Vidalia Onion mark.

[3] In their model, collective reputation, which determines the position of the demand curve, evolves as a Markovian process of average past quality.

[4] The patent office does not scrutinize applications based on the characteristics to be certified. When a certification mark includes a geographic name it is understood that the only attribute to be certified is the origin of the good ("…the USPTO does not care what the certification standards are…," Hughes 2003 p. 16).

[5] The "Washington Apple" logo only signal origin and does not reflect specific quality or production standard or "eating quality." (Winfree and McCluskey 2005 p.212).

Only after 2002, as a provision of the Federal Marketing Order, a minimum quality standard was put in place (Clemens 2002).[6]

To properly function, trademark- and GI-systems must be credible, i.e., counterfeiting must be avoided or contained. If such systems are not credible, free riders can, at negligible costs, duplicate reputable brands and profit, at least in the short run, on consumers' willingness to pay for the extra-quality expected from the authentic product. When consumers learn that brands are not credible their willingness to pay drops. Hence, when brands are copied, their informational content and social value vanish (Landes and Posner 2003)

The fact that reputable brands sell at a premium above costs also provides the ex ante incentives for firms to invest in reputation in much the same way as profits originating from the monopolistic control of innovations provide the ex ante incentives for firms to invest in R&D. But contrary to innovations, whose social benefit is not destroyed by unauthorized copies, the social value of trademarks is lost when trademarks are copied. This is why, contrary to other IP instruments such as patents which have an expiration date, trademarks are guaranteed protection until they fulfill the purpose of communicating the source of the product to consumers. The same holds true for GIs.

Anania and Nisticó (2004) study the effect of a non-fully credible certification on the welfare of price-taking producers. Producers are exogenously divided into high and low quality types. The certification mechanism that Anania and Nisticó envision, based

[6] U.S. #1 grade, size, pack and maturity standards.

on an inspection probability and a fine and with an error-free auditing procedure,[7] is not fully credible because it allows some of the low quality good to be sold on the high quality market. If the degree of credibility is sufficiently high, a market for the high quality good develops, otherwise it does not. Low-quality producers, who differ in their attitude towards risk, choose whether to cheat (i.e., sell their low quality product on the high quality market) or not to cheat (i.e., sell their low quality product on the low quality market). With this setup, while high quality producers would be better off with a fully credible certification mechanism, low quality producers are better off with an imperfect system. Given an imperfect system, low quality producers who cheat are better off when a market for high quality good develops, while low quality producers that do not cheat are indifferent.

Whereas it is clear that GIs are non-rival, are GIs also excludable? Granted that producers outside the geographic area and producers that do not meet the certification standards can be prevented from using a GI, can complying producers be prevented from using a GI? In the literature, GIs have been treated as public goods and club goods. This second interpretation has been discussed in Rangnekar (2004) and Langinier and Babcock (2006). In Langinier and Babcock, the government provides a GI-certification scheme to high quality producers who are free to decide the size of the club (i.e., who among the high quality producers have access to it).[8] Once established, the club prevents

[7] An error free certification mechanism means that the quality of the goods produced by inspected firms becomes known with certainty.

[8] As in Anania and Nisticó (2004), the critical underlying assumption is the exogenous distribution of producers in high and low quality types.

entry of other producers whenever potential entrants decrease the net return to the club's members. The club provides certification for the high quality produced by its members, so quality produced by the members of the club is revealed to consumers. But, if only a fraction of the high quality producers can enter the club, consumers cannot determine the quality of the non-labeled good with certainty. Without barriers, all high quality producers have the incentive to enter the club (quality would then be fully revealed), but, if all high quality producers belong to the club, the incentive to form a club may vanish. If a club is not formed, no revelation of information occurs.[9] The ability of the producer organization (i.e., the club) to limit entry is crucial in Langinier and Babcock, who suggest that it might be better from society point of view to provide the club the authority to limit access to certification.

The welfare implications of a variety of types of producer organizations in charge of GIs are investigated in Lence et al. (2007). The types of organizations they consider differ in their ability to control the amount of land allocated to and the production practices used in the production of a GI, and include the benchmark cases of a monopoly and perfect competition. Their welfare analysis shows that, conditional on the high quality market to develop (i.e., conditional on the organization to be developed), the closer the organization is to the competitive condition, the larger the increase in social welfare due to the creation of the high quality market. Nevertheless, the type of organization that, ex ante, maximizes social welfare depends on the size of the fixed cost

[9] Producers in the club compete in a Cournot game, given the cost of certification, they may be better off by not entering the club.

needed to develop the organization.[10] Specifically, Lence et al. find that there exists a non empty set of fixed development costs for which: (1) a perfectly competitive organization does not yield gains in social welfare, (2) any producer organization with market power yields at least as much social surplus as the perfectly competitive organization and (3) there exists an organization with market power that yields strictly greater social surplus than the perfectly competitive organization.

But, what is the legal environment that characterizes real-word GIs? What power do producer organizations representing GIs have over restricting the supply of GIs? Cooperatives and producer organizations have historically been created to stabilize market conditions and attenuate the negatives effects brought about by the fragmentation of the agricultural sector (Belletti et al. 2005; Crespi and Sexton 2003). In Europe, producer associations in charge of "geographically differentiated agricultural products" have existed long before the introduction of the European regulations on GIs. Traditionally, such associations have carried out a wide variety of activities ranging from promotion of the product to the provision of technical support to their membership. In addition, such associations have also played a role in protecting their products from imitation and (unfair) competition, as well as in monitoring and controlling the quality standards of production (Giacinti and Moruzzo 2003).

With the introduction of the European regulation on GIs, producer organizations not only have lost their authority over the inspection activities (which have been assigned

[10] Profits are necessary to cover the fixed cost of development hence some degree of market power is necessary to provide the ex ante incentive for the creation of the organization.

to independent bodies), but also, in exchange for the legal protection provided by the regulation on GIs, have given up their property rights over the protected name (Giacinti, Moruzzo 2003; VIII Rapporto Nomisma 2001). Today, the role of the producer organizations in charge of GIs is limited to the custody of the collective brand, whose use is granted to all entitled producers, member and outsiders (Giacinti and Moruzzo 2003).

The right to enter the market for GIs is guaranteed to all producers operating in the GI area by current GI regulations. The European regulation on PDOs and PGIs mandates that all producers in a specified area who comply with the associated product specifications are authorized to use the GI (Art. 8 regulation 510/2006). Similarly, the system of protection in the US requires that the owner of a certification mark make it available to any producer willing to adhere to the production.

With free entry and no ability by the producer organizations to control supply, the likely market structure that emerges with GIs is that of competitive conditions. A welfare analysis of GIs by Zago and Pick (2004) shows that in competitive conditions, a credible certification system makes consumers and high quality producers better off. Their assumption of an exogenous distribution of high and low quality producers drives the result that low quality producers are worse off in the presence of a certification system compared to the case in which only one market exists in which high and low quality are indiscernible by consumers. With only one market, low quality producers can take advantage of consumer willingness to pay for the average quality in the market. Moschini, Menapace and Pick (2008) by contrast allow the supply of quality to be endogenously determined. In addition, their model assumes that certification costs are

needed for GIs to serve as credible certification devices. They find that GIs can support a competitive provision of quality that partly overcomes the market failure and leads to clear welfare gains. However, GIs fall short of delivering the (constrained) first-best level of the high-quality good. The main beneficiaries of the welfare gains brought about by GIs are consumers, whereas producers may not benefit at all or may accrue some benefit if the production of high-quality products draws on scarce factors that they own.

2.7 References

Akerlof G.A. (1970) "The Market for Lemons: Quality Uncertainty and the Market Mechanism" *Quarterly Journal of Economics* 84:488-500.

Anania G. and Nisticò R. (2004) "Public Regulation as a Substitute for Trust in Quality Food Markets: What if the Trust Substitute cannot be Fully Trusted?" *Journal of Institutional and Theoretical Economics* 160:681-701.

Battaglene T. (2005) "The Australian Wine Industry Position on Geographical Indications" Paper presented at the Worldwide Symposium on Geographical Indications in Parma, Italy, June 27-29.

Belletti G., T. Burgassi, A. Marescotti, S. Scaramuzzi. (2005) "The effects of certification costs on the success of a PDO/PGI" paper presented at 92nd EAAE Seminar "Quality Management and Quality Assurance in Food Chains" Goettingen, Germany.

Barham E. (2003) "Translating Terroir: The Global Challenge of French AOC Labelling," *Journal of Rural Studies* 19:127-138.

Clemens R. (2002) "Why Can't Vidalia Onion Be Grown in Iowa? Developing a Branded Agricultural Product" MATRIC Briefing Paper 02-MBF, September 2002.

Crespi J.M. and R.J. Sexton (2003) "Competition, US Farmer Cooperatives and Marketing Orders," English translation of "Concurrence, coopératives de producteurs et Marketing Orders aux Etats-Unis" Économie Rurale (277/278):135-151.

Darby M. R. and E. Karni (1973) "Free Competition and the Optimal Amount of Fraud" *Journal of Law and Economics* 16:67-88.

EU-DG Agriculture (2008) "Geographical Indications" Background Paper to the Green Paper on Agricultural Product Quality, DG Agriculture and Rural Development, Working Document October 2008.

Giacinti R. and R. Moruzzo (2003) "I Consorzi di tutela e il sistema di controllo nell'ambito delle produzioni tipiche" *Annali Della Facoltà di Medicina Veterinaria di Pisa* 55:327-341.

Goebel B. (2003) "Geographic Indications and Trademarks - The Road from Doha" *The Trademark Reporter* 93:964-95. Retrieved November, 29 2008 at http://www.wipo.int/meetings/en/2005/geo_pmf/presentations/pdf/wipo_geo_pmf_05_goebel.pdf.

Josling T. (2006) "The War on Terroir: Geographical Indications as a Transatlantic Trade Conflict" *Journal of Agricultural Economics* 57:337-363.

Landes W. M. and R.A. Posner (2003) "The Economic Structure of Intellectual Property Law" Cambridge The Belknap Press of Harvard University Press.

Langinier C. and B. Babcock (2008) "Agricultural Production Clubs: Welfare Implications" *Journal of Agricultural & Food Industrial Organization* 6(1), Article 10.

Lence S.H., S. Marette, D. Hayes and W. Foster (2007) "Collective Marketing Arrangements for Geographically Differentiated Agricultural Products: Welfare Impacts and Policy Implications" *American Journal of Agricultural Economics* 89:947-963.

Merges R. (2004) "From Medieval Guilds to Open Source Software: Informal Norms, Appropriability Institutions and Innovations" Working Paper, UC Berkeley.

Moschini GC. (2004) "Intellectual Property Rights and the World Trade Organization: Retrospect and Prospects," in Anania, G., Bohman, M., Carter, C., and McCalla, A., eds., Agricultural Policy Reform and the WTO: Where are we Heading? Edward Elgar Publishing.

Moschini GC., L. Menapace and D. Pick (2008) "Geographical Indications and the Provision of Quality" *American Journal of Agricultural Economics* 90(3):794-812.

Nelson P. (1974) "Advertising as information" *Journal of Political Economy* 82, 729-754.

Nomisma (2001) "Prodotti tipici e sviluppo locale: Il ruolo delle produzioni di qualità nel futuro dell'agricoltura italiana," VIII Rapporto Nomisma sull'agricoltura italiana, Edizioni Il Sole 24 ore, Milano, Italy.

Oskari R. (2006) "Monopolising Names? The Protection of Geographical Indications in the European Community" Dissertation, Faculty of Law, Helsinki University.

O'Connor B. (2004) "The Law of Geographical Indications," Cameron May Ltd., International Law Publishers, London, England.

OECD (2000) Appellations of Origin and Geographical Indication in OECD Member Countries: Economic and Legal Implications, COM/AGR/APM/TD/WP(2000)15/FINAL.

Rangnekar D. (2004) "The Socio-Economics of Geographical Indications" UNCTAD-ICTSD Project on IPRs and Sustainable Development, Issue Paper No. 8, May 2004.

Réquillart V. (2007) "On the Economics of Geographical Indications in the EU" Paper presented at the workshop "Geographical Indications, Country of Origin and Collective Brands: Firm Strategies and Public Policies" Toulouse, June 14-15, 2007.

Shapiro C. (1983) "Premiums for High Quality Products as Returns to Reputations" *The Quarterly Journal of Economics* 98(4):659-680.

USPTO (2007) "Geographical Indication Protection in the United States," United States Patent and Trademark Office, undated document accessed on May 2008 at http://www.uspto.gov/web/offices/dcom/olia/globalip/pdf/gi_system.pdf.

Winfree J.A. and J.J. McCluskey (2005) "Collective Reputation and Quality" *American Journal of Agricultural Economics* 87(1):206-213.

Zago, M.A. and D. Pick (2004) "Labeling Policies in Food Markets: Private Incentives, Public Intervention, and Welfare Effects" *Journal of Agricultural and Resource Economics* 29(1):150-165.

U.S. International Trade Commission (1984) The Effects of Foreign Product Counterfeiting on U.S. Industry, USITC Publication No. 1479.

WIPO (2000) Possible solutions for conflicts between trademarks and geographical indications and for conflicts between homonymous geographical indications, SCT/5/3, WIPO 2000.

WIPO (2001) Geographical Indications: Historical Background, Nature of Rights, Existing Systems for Protection and Obtaining Effective Protection in Other Countries, SCT/6/3, WIPO 2001.

WIPO (2003) Geographical Indications and International Trade, Worldwide Symposium on Geographical Indications, WIPO/GEO/SFO/03/14, WIPO 2003.

WIPO (2007) Geographical Indications in the International Arena, the Current Situation, WIPO/GEO/BEI/07/7, WIPO 2007.

WIPO (2007b) Perspectives for Geographical Indications. WIPO/GEO/BEI/07/13, WIPO 2007.

WTO (2003) Multilateral system of notification and registration of Geographical Indications under article 23.4 of the TRIPS agreement. Communication from Hong Kong, China. TN/IP/W/8 of 23 April 2003.

WTO (2005) Communication from the European Communities TN/IP/W/11 of 14 June 2005.

WTO (2008) Proposed draft trips council decision on the establishment of a multilateral system of notification and registration of geographical indications for wines and spirits TN/IP/W/10/Rev.2 of 24 July 2008.

CHAPTER 3: QUALITY CERTIFICATION BY GEOGRAPHICAL INDICATIONS, TRADEMARKS AND FIRM REPUTATION

3.1 Abstract

We study firm reputation as a mechanism to assure product quality in perfectly competitive markets in a context in which both certification and trademarks are available. Shapiro's (1983) model of reputation is extended to reflect both collective and firm-specific reputations, and this framework is used to study certification and trademarks for food products with a regional identity, known as geographical indications (GIs). Our model yields two primary results. First, in markets with asymmetric information and moral hazard problems, credible certification schemes reduce the cost of establishing reputation and lead to welfare gains compared to a situation in which only private trademarks are available. Hence, certification improves the ability of reputation to operate as a mechanism for assuring quality. Second, the actual design of the certification scheme plays an important role in mitigating informational problems. From a policy perspective, our results have implications for the current debate and negotiations on GIs at the World Trade Organization and the ongoing product quality policy reform within the European Union. With regard to the instrument of choice to provide intellectual property protection for GIs, our model favors a *sui generis* scheme based on appellations over certification marks. Finally, our model supports the validity of the traditional specialities guaranteed scheme of the European Union as an instrument for the provision of high-quality products that are not linked to a geographic area.

3.2 Introduction

The strand of literature sparked by the pioneering work of Shapiro (1983) on the role of firm reputation offers a possible solution to the market failure identified by Akerlof (1970) in settings characterized by asymmetric information and moral hazard problems. When firms identify themselves to consumers through trademarks, product quality can be credibly signaled to consumers who cannot observe it at the time of purchase. The emergence of this information about quality is achieved in competitive markets through an equilibrium price structure that provides the necessary incentives for competitive firms to develop and maintain reputation for producing a given quality. This literature also shows that reputation is an imperfect mechanism to assure quality and that high-quality items can only be provided at a premium above production costs. The size of the premium increases with the degree of the informational problem, which, in turn, depends upon the frequency of purchase, the delay and difficulty in detecting quality and the speed at which reputations are updated. More importantly for our purpose, the extent of the informational problem can be affected by the availability of tools for reputation building (e.g., trademarks, certification).

In this paper we extend the theory of firm reputation as a mechanism to assure quality in competitive markets to a context in which both certification and trademarks are available to firms as quality indicators. The primary motivation of this paper is to show that, in such markets with asymmetric product quality information, credible certification schemes that are accessible by all firms or subsets of the firm population support the creation of information regarding quality, reduce the cost of establishing reputation and

lead to welfare gains. The reputation approach to the problem of moral hazard also draws attention to the fact that the design of certification schemes is important in determining the extent of informational problems and the distribution of benefits among heterogeneous consumers.

For concreteness, our model is specifically tailored to markets for food products with a regional identity. For these products, the geographic names of the location of production, known as geographical indications (GIs), represent an option for branding. GIs, like trademarks, are a form of intellectual property rights, and were introduced in 1994 with the TRIPS agreement of the World Trade Organization (WTO). The markets for GIs are befitting for several reasons. First, given the abundance and importance of experience and credence attributes among food products, these markets are fraught with asymmetric information and moral hazard problems (Winfree and McCluskey 2005). Second, these markets are typically characterized by the presence of numerous autonomous firms that make independent business decisions and retain their own profits, but share a geographic brand and act in competitive conditions (Fishman et al. 2008; Moschini, Menapace and Pick 2008). Third, the use of formal certifications for this category of products is common in many large export markets including the European Union (EU) and growing in popularity in emerging markets and developing economies (EU 2008; WIPO 2007). Fourth, the concurrent use of certification and trademarks for branding these products is also common (Bramley and Kirsten 2007).

GIs have recently attracted the interest of academics in economics, marketing, law and sociology. In particular, a growing economics literature has assessed the role of GIs

as a certification tool in alleviating market failures due to the presence of asymmetric information when quality cannot be credibly signaled otherwise (Zago and Pick 2004; Anania and Nisticó 2004; Lence et al. 2007; Moschini, Menapace and Pick 2008). In this paper, we assess the role of GIs when quality can alternatively be sustained through trademarks, and consider GIs and trademarks as alternative and complementary means for signaling quality. We expand the existing literature on GIs in several ways. First, we explicitly incorporate the role of reputation and hence consider a dynamic rather than a static setting. Critically, we shift the focus from considering a generic certification scheme for GIs that allows for the emergence of a high-quality market in which a single product is considered in isolation, to the design of a certification scheme that applies to a broadly defined type of product available under many different private and collective brands and potentially supplied from many different GI regions.

The model we propose in this paper relies on Shapiro's (1983) notion of reputation, which we extend to reflect both collective and firm-specific reputations in competitive markets. Specifically, an initial investment via the production of high-quality product is necessary for a firm to gain private reputation. Collective reputation is obtained through certification and is determined by the conditions required for certification (e.g., minimum quality, production technology, etc.). In equilibrium, quality in excess of the minimum commands a premium above marginal costs, which, as in Shapiro, represents a fair return on the private investment in reputation. In this setting, certification reduces the cost of building reputation by constraining the moral hazard behavior of producers.

Our model can differentiate the two primary certification schemes currently used for GIs, the European-style *sui generis* scheme based on appellations and the American-style scheme based on certification marks, and allows us to investigate the potential of the EU's traditional specialities guaranteed scheme (EU 2009a). These schemes differ substantially with regard to (i) the eligibility conditions for geographic names to receive intellectual property (IP) protection and (ii) the requirements for certification. In a second-best world with asymmetric information, these differences are relevant because they affect the collective reputation of certified products and hence the cost of providing quality.

Several instructive aspects of the role of certification in quality provision and reputation formation emerge from the model. First, we show that certification reduces the divergence between the reputation equilibrium and the equilibrium that would prevail under perfect information by lowering the cost of establishing reputation compared to a situation with only trademarks. Hence, certification improves the ability of reputation to operate as a mechanism for assuring quality. Second, we provide a motivation for industry resistance to the introduction of certification. Surprisingly we find that resistance from producers is not limited to those that are excluded from the certification but can also arise from those producers that are eligible for certification but already sell high-quality product when certification is introduced. This is because certification raises the price that entrants can command thereby reducing the cost of building and the value of established reputation.

In addition, our model has interesting implications for the current debate and negotiations over alternative forms of IP protection for GIs at the WTO and the ongoing consultations on product quality policy reform within the European Union. First, we provide a rationale to favor a *sui generis* scheme based on appellations over standard instruments such as certification marks. We show that this is the case even if the current certification mark system were to be adapted to include a screening based on the presence of a demonstrable quality/geography nexus similar to that used for appellations. Second, our model discusses the potential welfare gains associated with the traditional specialities guaranteed scheme, a scheme for traditional products used in the European Union, whose validity is currently being assessed by the EU Commission (EU 2009b). Such a scheme, based exclusively on quality (rather than on geographical) requirements, provides certification for products that meet given quality standards independently of the location of production.

In what follows, we first provide a review of the institutional setting for GIs and then introduce the model and the reputation formation mechanism. Next, we define and derive a long-run, rational-expectation, stationary Nash equilibrium under three different IP scenarios characterized by (i) the absence of a certification scheme, (ii) the presence of a *sui generis* certification scheme and (iii) the presence of a certification mark scheme. In the last part of the paper, we discuss domestic and trade welfare implications and explore the traditional specialities guaranteed scheme.

3.3 Institutional framework

Geographical indications, which are typically names of places or regions used to brand goods, are a distinct form of intellectual property rights. Many GIs pertain to wines (e.g., Burgundy), agricultural products (e.g., Thai Hom Mali rice) and foods (e.g., Parmigiano-Reggiano cheese), but also non-food products (e.g., handicrafts and textiles) are common, particularly from developing countries (e.g., Mysore silk).[1] The distinctive feature of GIs is that the quality attributes of the goods they identify are considered to be inherently linked to the nature of the geographic location in which production takes place (e.g., climate conditions, soil composition, local knowledge), i.e., to the notion of "terroir" (Barham 2003; Josling 2006).[2]

GIs are considered one of the earliest instruments used to counteract market failures resulting from asymmetric information (Rangnekar 2004) and their protection has a long tradition in Europe dating back to the fifteenth century (O'Connor 2004). However, following the EU's Common Agricultural Policy reform in 1992, which moved EU policies progressively away from price supports towards programs to promote food quality and rural development, GIs have taken center stage as the "main pillar of the EU's quality policy on agricultural products" (EU 2003). Following their recognition as a distinct form of intellectual property rights in the TRIPS agreement, GIs have also

[1] Other agricultural products not intended for human consumption are ornamental plants, flowers, cork, hay, cochineal, wool, wicker and essential oils.

[2] See the definition of GIs in the TRIPS agreement (Article 22.1).

received significant international attention outside of the EU (Moschini 2004). In particular, significant interest in GIs has emerged recently among developing countries.[3]

As for other types of brands (e.g., trademarks), the ability of GIs to alleviate market failures due to the presence of asymmetric information rests on their credibility, thus necessitating IP protection. While trademark protection is well established and relatively harmonized across countries, the protection of GIs varies to a large degree, and its implementation is a question of intense disagreement in ongoing WTO negotiations. The TRIPS agreement requires countries to provide legal means for protecting GIs against unfair competition, but it does not specify the means by which protection should be provided.

Two primary legal notions, marks and *appellations*, essentially two alternative forms of certification, are used to protect GIs. Where marks are used, generally in common law countries including the United States, GIs are protected within the trademark system and are usually registered as certification marks.[4] Certification marks simply certify that products meet given conditions and, in the case of GIs, the only such condition is the geographic area of production. It is critical to emphasize that the right to

[3]For example, several countries are introducing or expanding their own GI laws, regulations and promotion programs including China (Xiaobing and Kireeva 2007), India (Rao 2006), South Korea (Suh and MacPherson 2007), and Colombia (Teuber 2010). Noteworthy is the Kenian-Swiss ongoing project aimed at establishing a functioning GI protection scheme in Kenya and at raising awareness on GIs in the East African Community member states (see the Swiss Institute of Intellectual Property's website at https://www.ige.ch/en.html).

[4] In the United States, certification marks used for GIs are registered with the United States Patent and Trademark Office.

use a certification mark is collective in nature. In the case of a GI in the form of a certification mark, all producers that operate within the geographic area indicated by the GI have access to certification and can use (subject to obtaining certification) the GI to label their products. In contrast, usage rights over trademarks are private and belong to a single entity or firm. Only under special circumstances, specifically when a geographic term has acquired a "secondary meaning," can a GI be registered as a trademark.[5] When this is the case the rights over the GI are private and belong to a single entity or firm.

Alternatively, GIs are protected through so-called *sui generis* schemes based on *appellations*, originally developed and used in Roman law countries, and currently adopted in the European Union (OECD 2000), several Asian and a few North American and Latin American countries[6] (WIPO 2007). The main distinctive characteristic of a *sui generis* scheme is the requirement of a specific link between a good's qualities and its geographical origin. In other words, for a geographic name that identifies a given good to be eligible to receive IP protection in the form of an *appellation*, evidence must be provided that the quality or characteristics of the good are due to the natural and human factors (e.g., climate, soil quality, local knowledge) characterizing the geographic area of origin (EU Reg. 510/2006 Art. 2 and Art. 4.2.f). This requirement for *appellations* rests on the notion of "terroir," the idea that the nature and characteristics of the geographic

[5] This means that when the "secondary meaning" of a geographic name in consumers' minds is a production or manufacturing source (while the primary meaning is the geographic place), then it is possible under US trademark law to register a geographic name as a trademark, a private rather than collective IP right (USPTO 2007).

[6] These include China, Mongolia, North Korea, Thailand, Vietnam, Colombia, Venezuela, Cuba and Costa Rica.

location of production are responsible for the goods' distinct quality attributes of interest to consumers.

In addition to the existence of a specific quality/geography link, the *sui generis* scheme requires the definition of a code of rules for each GI product (commonly referred to in the literature as the specification). The specification details all the product characteristics[7] and the geographic area of production, and effectively mandates two conditions: (i) a minimum level of quality that the product needs to satisfy, and (ii) the geographic area in which production takes place (EU Reg. 510/2006 Art. 4).

The US system for GIs based on certification marks, by contrast, does not require the existence of any link between quality and geography – in fact the patent office does not scrutinize certification mark applications based on the characteristics to be certified or require the definition of quality standards. Indeed, when a certification mark includes a geographic name it is understood that the only attribute to be certified is the origin of the good (USPTO 2007).

Finally, with the *sui generis* scheme, usage rights over a GI are granted to all producers within a designated production area who comply with the product specification (EU Reg. 510/2006 Art. 8). Hence, GIs, whether in the form of certification marks or *appellations,* are a collective form of property rights (i.e., collective brands).

[7] The product characteristics include the physical, chemical, microbiological and organoleptic characteristics of the raw materials and of the final product.

3.4 Model

Our model can be characterized as a dynamic discrete time model with a period-between-sales interest rate of $r > 0$. We consider the market for an experience good (e.g., parmesan cheese, sparkling wine, dry-cured ham) that can be produced in a continuum of qualities indexed by $q \in \mathbb{R}_+$. We assume that all products in the market are subject to a minimum quality standard (MQS), $q_0 > 0$, which can be interpreted as the minimum quality necessary to ensure consumer safety and sanitary conditions. The MQS is enforced.

We assume that there are two types of production areas, the GI regions and the other regions, and that each single region is identified by a distinctive name. Two different production technologies exist: the GI technology and the standard technology. The GI technology is available in each of the GI regions but not in the other regions, the standard technology is only available in the other regions. The technologies, represented by the cost functions $c^G(q)$ and $c(q)$ respectively, satisfy standard assumptions. Specifically, $c^G(q)$ and $c(q)$, are assumed to be continuous, (strictly) increasing and (strictly) convex functions of quality, q. Hence, $c_q(q) > 0$, $c_{qq}(q) > 0$, $c^G_q(q) > 0$, and $c^G_{qq}(q) > 0$. Furthermore, we assume that the GI technology displays a comparative advantage in the production of the upper-end of the quality spectrum, $q > \tilde{q}$. Specifically,

$$\begin{aligned} &\text{for all } q \le \tilde{q}, \quad c^G(q) \ge c(q), \\ &\text{for all } q > \tilde{q}, \quad c^G(q) < c(q), \end{aligned}$$

where $\tilde{q}$ is such that $c(\tilde{q}) = c^G(\tilde{q})$. The comparative advantage assumption is intended to capture the notion of "terroir," the fact that the nature and characteristics of the conditions of production in the GI regions facilitate the attainment of quality. Specifically, we assume that the comparative advantage in the high-quality range confers the GI regions the quality/geography nexus that is necessary for eligibility to receive IP protection under a *sui generis* scheme.

We assume that all producers are price-takers and that the industry (both the standard and the GI-certified product sectors) is characterized by free entry. The role of competitive markets and free entry into the GI sector has been discussed by Moschini, Menapace and Pick (2008), and we refer the reader to their paper for additional details. While for simplicity, we assume that each active firm produces a fixed quantity of output per period, normalized to unity, we let each firm choose a sequence of qualities to maximize the present value of profits.[8]

3.4.1 Branding options: trademarks and GI labels

In addition to choosing quality, producers use brands to differentiate their products from those of other producers. A brand can be a trademark, a mix of a trademark and a GI label or a GI label. A GI label takes the form of an *appellation* or a certification mark

[8] By fixing the size of the firm, we abstract from the issues regarding the presence of economies or diseconomies of scale in establishing reputation. The issue of economies of scale in establishing collective reputation has been addressed in a recent working paper by Fishman et al. 2008. The relationship between firm size, investment in quality and individual brand reputation is investigated by Choi (1997), Cabral (2000) and Rob and Fishman (2005).

depending upon whether a *sui generis* scheme or a certification mark scheme is in place. Trademarks and mixed brands (i.e., combinations of a trademark and a GI label) are used to convey firm-specific reputations. GI labels alone convey collective reputations. We assume that each producer can, at any time, adopt and use a trademark at no cost and that there is an infinite supply of potential trademark names. Instead, to be able to use a GI label, a producer needs to obtain certification.

Whether a producer is able to obtain certification depends upon two sets of conditions – accessibility of certification and the certification requirements – which vary across certification schemes. We say that producers in a given area have access to certification when they have the right to register the geographic name of their production area as a GI. With regard to accessibility we consider two options: schemes that require the existence of a quality/geography nexus and schemes that do not. Schemes that require the existence of a quality/geography nexus (e.g., the *sui generis* scheme) limit accessibility to certification to producers that operate in a GI region (by definition, GI regions are characterized by the GI technology and the quality/geography nexus). Schemes that do not require the existence of a quality/geography nexus (e.g., the certification marks scheme) make certification available to producers in all regions.

Once a geographic name is registered, the right to use it to brand a given product is conditional on the product meeting the scheme's certification requirements. We consider two requirements: a location of production and an MQS requirement. To satisfy the location of production requirement, a product needs to be produced in the geographic area corresponding to the GI label. In other words, GI labels must be truthful with regard

to the geographic origin of the good. To satisfy the MQS requirement, a product needs to meet a GI-specific MQS, q_0^G. We assume that q_0^G is scheme specific, meaning that it can vary across different schemes but is the same for all GI labels registered under the same scheme, and is such that $q_0^G \geq q_0$. This last assumption means that the minimum quality standard imposed by a GI scheme is at least as strict as the baseline standard that applies to all products.

Consistent with the collective nature of GI rights, we assume that all producers that satisfy the certification requirements for a given GI are entitled, subject to paying the certification cost, to use the GI to brand their products. A GI label can be used in addition to, or in place of, a trademark. We assume the per-period, per-unit certification cost to be the same across all considered schemes and to be equal to ω. Finally, we postulate an economy with a fully credible trademark system and a fully credible certification scheme for GIs (i.e., there is no counterfeit product on the market and all certified products meet the requirements established by the certification scheme).

3.4.2 Reputation and information structure

In the economic literature on branding, the ability of sellers to develop a reputation rests on the ability of brands to convey information regarding the firm's actions or characteristics (or both). Consumers, who at the time of purchase cannot observe product quality but observe brands, rely for their purchase decisions on the firms' reputations captured by their brands. In the literature on the economics of information, the concept of reputation is formalized in various ways depending upon the source of the uncertainty

regarding quality (Bar-Isaac and Tadelis 2008). When quality uncertainty is due to unobservable characteristics (markets primarily characterized by adverse selection problems), reputation is commonly modeled as consumer beliefs regarding a firm's type and is assumed to evolve based on signals (e.g., the firm's performance). When, as in our case, the uncertainty regarding quality is primarily due to unobservable actions (markets characterized by moral hazard problems), reputation is conceptualized as a firm's past quality, and a "good" reputation is assumed to persist until the firm cheats by cutting its quality. The latter notion of reputation is based on the seminal papers of Klein and Leffler (1981) and Shapiro (1983).

For convenience, we adopt the simplest form of reputation building proposed by Shapiro (1983). Specifically, we assume that firms acquire reputation by selling high quality product at low prices over one period of time. We assume that reputation, R, is common knowledge among all consumers in a given market, is market-specific,[9] brand-specific, and adjusts immediately from period to period. Hence, for a brand k at time t,

$$R_t^k = q_{t-1}^k. \quad (1)$$

In our context, a brand k can be a trademark, a mix of a trademark and a GI label or a GI label. Consumers identify products of different firms through brands and make purchase decisions based on the firms' reputations for quality as conveyed by the brands. Consumers are rational and have full information about technologies, MQSs, and the other parameters of the model but cannot observe quality. In addition, consumers cannot observe which technology was used, the location of production or brand ownership.

[9] This assumption is relevant for the discussion of the trade implications of GI protection.

Consumers are heterogeneous with respect to their taste for quality but consider brands of like quality to be perfect substitutes.[10] We assume that there is a continuum of consumer types, $\theta \in [0, \bar{\theta}]$, with distribution $F(\theta)$. Consistent with previous literature, we assume that consumers purchase the quality that provides the highest positive surplus, and otherwise buy nothing, where the surplus from purchasing quality q at price $p(q)$ for a consumer of type θ is given by

$$U(q;\theta) - p(q).$$

We make the following standard assumptions regarding consumers: (i) consumers value quality; (ii) the marginal utility of quality is decreasing; (iii) consumers with higher taste for quality (higher values of θ) value quality more; and (iv) the marginal utility of quality is larger for consumers with higher values of θ. Mathematically, we have $U_q > 0$, $U_{qq} < 0$, $U_\theta > 0$, and $U_{\theta q} > 0$. Because consumers cannot observe quality at the time of purchase and rely on reputation, which evolves according to equation (1), producers can surprise consumers (for one period) with a lower quality than expected. Such a quality cut is discovered by consumers with a one-period delay, and consumers punish the seller by boycotting the brand thereafter (Allen 1984).[11]

[10] It is taste heterogeneity with regard to quality that supports a range of different qualities exchanged in equilibrium. We recognize that some consumers might value the very fact that a product is produced in a specific geographic area independently of the actual quality of the product. For simplicity, our model only considers consumer preferences over quality.

[11] Because brand ownership is not observable to consumers, a producer that has cheated and has lost all his customers could re-enter the market using a different brand.

3.5 Long-run partial equilibrium

We consider a rational-expectation, stationary Nash equilibrium in a long-run partial equilibrium setting.[12] Specifically, the reputation equilibrium we consider is a steady state configuration with a price function across qualities, $p(q)$, and a distribution of firms, $n(q)$, such that (i) each consumer, knowing $p(q)$, chooses his most preferred quality level or decides not to purchase anything; (ii) markets clear at every level of quality (thus determining $n(q)$); (iii) any firm with reputation R finds it optimal to produce quality $q = R$ rather than to deviate; and (iv) there is no entry or exit.

We focus on the case in which land and all other factors of production are in perfectly elastic supply and derive the price-quality schedule relying on cost considerations (because in a long-run equilibrium with perfectly elastic factor supplies, output prices are determined exclusively by costs) and basic assumptions regarding consumer preferences: (i) consumers are indifferent between products of equal quality; (ii) utility is strictly increasing in quality and strictly decreasing in the price paid for quality; and (iii) consumers have heterogeneous preferences regarding quality.[13] We believe that the assumption of perfectly elastic factor supply is justifiable in the context of markets for food and agricultural products that are broadly defined (e.g., extra virgin olive oil, wine). In these markets, we observe the presence of many private brands and

[12] Consumer expectations of quality are adaptive but rational in equilibrium: consumers expect firms to maintain their reputation and firms do.

[13] Assumptions (i) and (ii) rule out "irrelevant" price-quality combinations. Assumption (iii) supports a range of different qualities to be exchanged in equilibrium.

numerous GI labels from a variety of geographical areas (for example, in the European Union over one hundred GIs for extra virgin olive oil and several thousand GIs for wines are currently registered).[14]

In what follows, we consider three IP scenarios and, for each scenario, we derive the equilibrium market price-quality schedule. The first scenario, our benchmark case, is one in which trademarks are the only branding option. In the second and third scenarios, we consider two alternative certification schemes for GIs, the *sui generis* scheme based on *appellations* and the certification mark scheme respectively.

3.5.1 The benchmark case with trademarks only

In this section, we derive the equilibrium market price-quality schedule when, absent a certification scheme, trademarks are the only available branding option for producers. First, consider a representative firm that uses the standard technology and whose reputation in equilibrium is equal to q. If this firm remains honest, it earns a discounted profit equal to $\frac{1+r}{r}\left[p(q)-c(q)\right]$, while, if it cheats, the most profitable avenue is to cut quality to the minimum level thereby earning a one-period profit equal to $p(q)-c(q_0)$. The credibility constraint, which determines the range of prices at which a producer has no incentive to cheat, can therefore be written as

$$p(q) \geq c(q) + r\left[c(q)-c(q_0)\right].$$

[14] See the DOOR and E-BACCUS databases on the EU's website at http://ec.europa.eu/agriculture/quality/database/index_en.htm and http://ec.europa.eu/agriculture/markets/wine/e-bacchus/.

As in Shapiro (1983), we argue that the presence of a potentially infinite supply of fly-by-night sellers who could overrun the market with minimum quality and the fact that consumers know that product quality is at least equal to the minimum level, q_0, imply that the entry price for a new brand, p_e, is equal to the cost of producing minimum quality, $c(q_0)$. Hence, $p_e = c(q_0)$. In equilibrium, a potential entrant incurs a sure loss equal to $c(q_0) - c(q)$ in the entry period when the brand is still unknown and earns a profit equal to $p(q) - c(q)$ in any subsequent period. Free entry, which requires discounted profits of potential new brands to be non-positive, $c(q_0) - c(q) + \frac{1}{r}\left[p(q) - c(q)\right] \leq 0$, imposes a second restriction on the equilibrium price configuration, which can be written as

$$p(q) \leq c(q) + r\left[c(q) - c(q_0)\right].$$

Together the credibility constraint and the free-entry condition imply an equilibrium price-quality schedule for producers who use the standard technology equal to

$$A(q) \equiv c(q) + r\left[c(q) - c(q_0)\right] \quad \text{for } q \geq q_0. \tag{2}$$

Similar conditions can be derived for producers who use the GI technology. Given that the technology of production is undetectable for consumers, and that the cost of in-house production of minimum quality using the GI technology exceeds the cost of outsourcing production to firms that use the standard technology, $c^G(q_0) > c(q_0)$, the most profitable cheating option for these producers is outsourcing at a cost equal to $c(q_0)$. The credibility constraint for producers who use the GI technology is then equal to

$$p(q) \geq c^G(q) + r\left[c^G(q) - c(q_0)\right].$$

Being unable to detect the technology of production, consumers are willing to pay $c(q_0)$ for any reputationless brand independently of the actual technology used. The free entry condition for producers who use the GI technology is then equal to

$$p(q) \leq c^G(q) + r\left[c^G(q) - c(q_0)\right].$$

Hence, the credibility constraint and the free-entry condition for producers who use the GI technology imply an equilibrium price-quality schedule equal to

$$N(q) \equiv c^G(q) + r\left[c^G(q) - c(q_0)\right] \quad \text{for } q \geq q_0. \tag{3}$$

Because consumers are indifferent between products of equal quality (hence, they would purchase only brands with the lowest price for any given quality), and given that consumer utility is strictly increasing in quality (hence, consumers purchase only brands with the highest quality at any given price), from (2) and (3), the market price-quality schedule that prevails in equilibrium – absent a GI scheme – is

$$P(q) \equiv \begin{cases} A(q), & \text{for } q \in [q_0, \tilde{q}) \\ N(q), & \text{for } q \geq \tilde{q} \end{cases} \tag{4}$$

where $\tilde{q}$ is the quality level that separates the comparative advantage ranges of the two technologies. The market schedule, $P(q)$, is represented in Figure 1 by the bold curve.

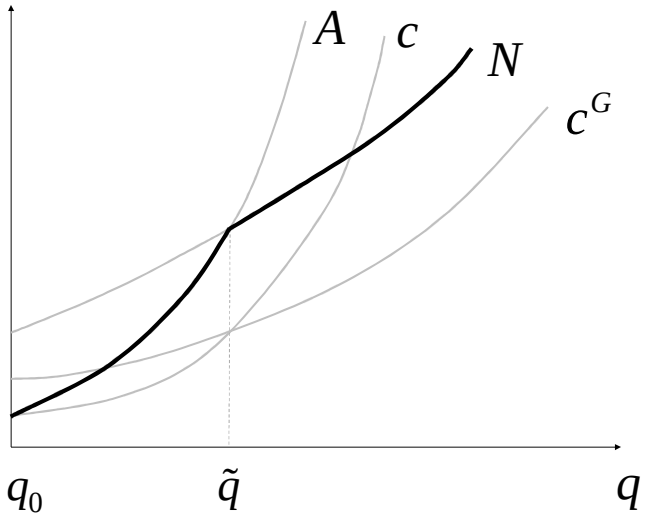

Figure 1. Market price-quality schedule with trademarks only

3.5.2 The sui generis certification scheme based on appellations

Three features (the geographic/quality nexus, the product specification and the collective nature) characterize the *sui generis* scheme and distinguish GI labels (i.e., here *appellations*) from trademarks. First, eligibility for registration and protection of a geographic name as an *appellation* requires a demonstrable link between the characteristics of a specific geographic region and the quality attributes of the product. No such nexus between geography and quality is required for registration and protection of a trademark. In our setup, only the names of the GI regions, identified through GI logos,[15] receive IP protection with the *sui generis* scheme. Hence, only producers that use the GI technology have access to certification.

[15] While trademarks are identified by the ® or the TM symbols, *appellations* with the EU's *sui generis* scheme are identified by GI-specific logos that are available at http://ec.europa.eu/agriculture/quality/logos/index_en.htm.

Second, the *sui generis* scheme requires the establishment of the product specification that includes two certification requirements: a GI-specific MQS and a location of production requirement. Hence, all GI certified product must be of quality equal to or in excess of q_0^G and must have been produced in the area identified by the GI label.[16]

Third, usage rights over a GI label are granted to all producers within the GI area who meet the MQS requirement. Hence, when a *sui generis* certification scheme is in place, all firms using the GI technology that produce a quality equal to or in excess of q_0^G can certify their product at a per-period cost ω and can use the GI label corresponding to their area of production for branding. These firms can also elect to use a trademark in addition to the GI label. Whether or not an additional trademark is used, the cost of producing and certifying quality $q \geq q_0^G$ is equal to $c^G(q) + \omega$.

The derivation of the equilibrium price-quality schedule for producers who certify requires discussing the entry price that consumers are willing to pay for a new GI-certified product, and the best cheating option for producers. By a "new GI-certified product" we mean any product that is sold on the market with a pure GI label (i.e.,

[16] In a setup like ours in which all GI regions are characterized by the same GI technology and in which consumers care about quality but have no preference over origin *per se*, the presence of a location of production requirement does not generate additional information compared to the case of a scheme that conditions eligibility to the existence of a quality/geography nexus and is characterized by an MQS requirement alone. Nevertheless, the distinction between the eligibility condition and the location of production requirement is important to meaningfully discuss the welfare properties of alternative certification schemes that are used or that could be used for food products.

without a trademark) or with a mixed brand (i.e., a GI label and a trademark) when the trademark is unknown to consumers.[17]

First, we argue that the entry price for a new GI-certified product is $c^G(q_0^G)+\omega$. To this end, we note that consumers know that a GI-certified product is produced using the GI technology and is of quality at least q_0^G. Consumers also know that the quality produced by an entrant who certifies and wants to stay in business must be such that the entrant's brand is (at least weakly) preferred over alternative brands of equal quality once reputation is built and, hence, that the quality must be above a given threshold.[18] Given these pieces of information, a new GI-certified product represents a bargain at a price $c^G(q_0^G)+\omega$. At the same time, any price above $c^G(q_0^G)+\omega$ would attract fly-by-night producers into the market hence, it is assumed that consumers protect themselves from such potential suppliers by refusing to pay more than $c^G(q_0^G)+\omega$.

Second, we note that the presence of certification limits the cheating options for producers. Once a mixed brand is known to consumers to be GI-certified, the firm must continue certifying the product; otherwise consumers would anticipate that the firm is

[17] Any GI-certified product that is sold without a trademark is expected from consumers to be of quality q_0^G. To build reputation in excess of q_0^G, the use of a trademark in addition to a GI label is needed.

[18] As explained below, the quality must be at least $q \geq \min\left\{q_0^G, \hat{q}\right\}$ where $\hat{q}$ is defined as the quality at which (5) and (2) intersect.

cheating.[19] Conditional on certifying, the most profitable cheating avenue is to produce minimum quality q_0^G at cost $c^G(q_0^G)+\omega$. Based on these considerations regarding the entry price and the best cheating option, we conclude that the price-quality schedule for producers who certify is equal to

$$G(q) \equiv c^G(q) + r\left[c^G(q) - c^G(q_0^G)\right] + \omega \quad \text{for } q \geq q_0^G. \tag{5}$$

Producers who use the GI technology can also decide not to certify. In this case, producers can choose any quality equal to or above the baseline minimum quality, $q \geq q_0$, which costs $c^G(q)$ to produce. Without certification, their only branding option is to use trademarks. Because consumers cannot observe the technology used in production, the entry price for these producers must be equal to the entry price for unknown brands produced with the standard technology, $c(q_0)$. In addition, because $c^G(q_0) > c(q_0)$, the most profitable cheating option is to outsource the production of q_0 at a cost $c(q_0)$. It follows that the price-quality schedule for producers who use the GI technology but do not certify coincides with (3). Finally, the presence of a *sui generis* scheme does not affect the price-quality schedule of producers who use the standard technology. For them, the price-quality schedule coincides with (2).

[19] In the case of a firm using a pure GI label as a brand, discontinuing certification means selling an unbranded product, which is expected by consumers to be of baseline minimum quality q_0.

To focus on the relevant case in which, for all certification schemes considered, reputation building through certification is a viable option, in what follows we assume that the following parametric condition holds:[20]

$$\omega < r\left[\min\left\{c^G(q_0), c\left(q_0^G\right)\right\} - c(q_0)\right]. \tag{6}$$

The market price-quality schedule prevailing in the presence of a *sui generis* scheme corresponds to the "lower envelope" of the three schedules in (2), (3) and (5). Its mathematical form, which is given by (7), varies depending on the value of q_0^G and requires the following implicit definitions of $\hat{q}$, $\overline{q}$, $\underline{\overline{q}}$, q_1 and q_2:

$$\begin{aligned} G(\hat{q}) &= A(\hat{q}), \\ A(\tilde{q}) &= c^G(\overline{q}) + \omega, \\ A(\underline{\overline{q}}) &= c^G(\underline{\overline{q}}) + \omega, \\ A(q_1) &= c^G(q_0^G) + \omega, \\ N(q_2) &= c^G(q_0^G) + \omega. \end{aligned}$$

Depending on the value of q_0^G, we identify three cases corresponding to (a) $q_0^G \in [q_0, \underline{\overline{q}})$, (b) $q_0^G \in [\underline{\overline{q}}, \overline{q})$ and (c) $q_0^G \geq \overline{q}$. In all cases, (a), (b) and (c), the schedule corresponds to that of the producers using the standard technology in the bottom range of the quality spectrum (for q smaller than $\hat{q}$, q_1 and $\tilde{q}$ respectively) and to that of the GI-certified producers in the upper range of the quality spectrum (for q larger than $\hat{q}$ in case (a) and larger that the GI-specific MQS, q_0^G, in cases (b) and (c)). In case (c) only, the

[20] For given functional forms of the cost functions and for given values of r and q_0, this restriction places an upper bound on the value of the certification cost, ω, or a lower bound on the value of the GI-specific minimum quality standard, q_0^G.

intermediate range of quality spectrum, between $\tilde{q}$ and q_2, is supplied by producers who use the GI technology and do not certify. Moreover, while in case (a), the schedule is continuous, in cases (b) and (c) the schedule presents a discontinuity, indicating a quality gap that is typical in the presence of production technologies with comparative advantage over different quality ranges.[21] Thus, the market price-quality schedule can be written as

$$P^G(q) \equiv \begin{cases} \begin{cases} A(q), & q \in [q_0, \hat{q}) \\ G(q), & q \geq \hat{q} \end{cases} & \text{for } q_0^G \in [q_0, \underline{\overline{q}}) \\ \begin{cases} A(q), & q \in [q_0, q_1) \\ G(q), & q \geq q_0^G \end{cases} & \text{for } q_0^G \in [\underline{\overline{q}}, \overline{q}) \\ \begin{cases} A(q), & q \in [q_0, \tilde{q}) \\ N(q), & q \in [\tilde{q}, q_2) \\ G(q), & q \geq q_0^G \end{cases} & \text{for } q_0^G \geq \overline{q} \end{cases} \tag{7}$$

The market price-quality schedule, $P^G(q)$, is represented by the bold curve in Figures 2(i) and 2(ii). Specifically, Figure 2(i) represents case (a) where $q_0^G \in [q_0, \underline{\overline{q}})$ and Figure 2(ii) represents case (c) where $q_0^G \geq \overline{q}$. To facilitate comparison, the dashed curve in Figures 2(i) and 2(ii) represents the price-quality schedule, $P(q)$, that would prevail absent a certification scheme. Finally to keep the pictures as clean as possible, the value of the certification cost, ω, is considered to be equal to zero.

[21] Quality gaps in the presence of production technologies with comparative advantage over different quality ranges appear also in Falvey and Kierzkowski (1987) and in Flam and Helpman (1987), among others.

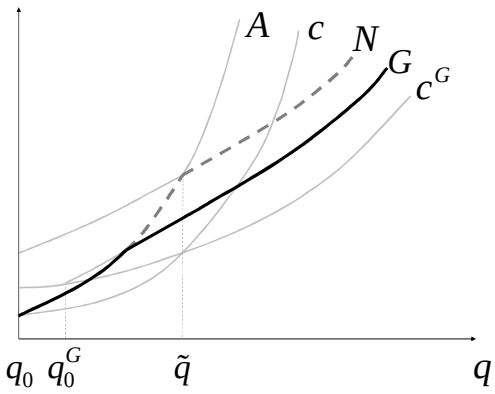

Figure 2(i): Case (a)

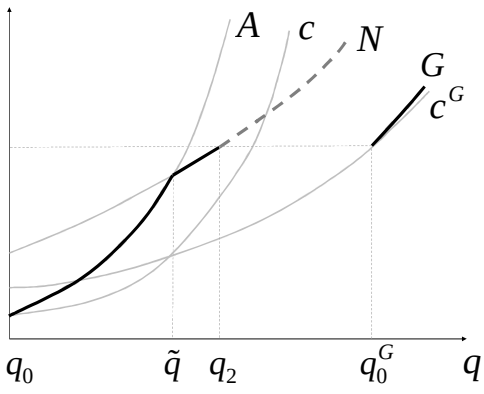

Figure 2(ii): Case (c)

Figure 2. Market price-quality schedule with a *sui generis* scheme

3.5.3 The certification scheme based on certification marks

IP protection for GIs in the United States is provided through the trademark system usually as certification marks. An example of a GI protected as a certification mark is "Washington Apples." This mark certifies that the apples are produced in the state of Washington, while no quality standard is needed to be met by producers (Winfree and McCluskey 2005). A critical feature of the trademark system is that certification marks that consist of geographic names can only be use to certify the geographic origin of products, while normally no additional requirements can be included in the mark definition. Nor is the eligibility for registration of a certification mark that consists of a geographic name conditioned upon the presence of a link between quality and geography (USPTO 2007). Given these features, the certification mark system can be framed in our setup as a scheme with no limitation regarding accessibility to certification (i.e., every region's name is eligible to be protected as a certification mark), with a location of production requirement and no MQS requirement. With this scheme, a GI label in the

form of a certification mark informs consumers that the certified product originates in the area indicated by the label.

Following the same procedure used thus far, we derive the market price-quality schedule that prevails under a certification mark scheme. Here, we assume that consumers have no knowledge regarding which technology is available in which area and hence are not able to infer the production technology from the GI label (this assumption will be relaxed in section 5.1). Now, for a producer who uses the standard technology and certifies, the cost of quality $q \geq q_0$ is equal to $c(q)+\omega$. In equilibrium, if a firm with reputation equal to q remains honest, it earns a discounted profit equal to $\frac{1+r}{r}\left[p(q)-c(q)-\omega\right]$, while, if it cheats, the most profitable avenue is to cut quality to the minimum level while continuing to certify, thereby earning a one-period profit equal to $p(q)-c(q_0)-\omega$.[22] The credibility constraint can therefore be written as

$$p(q) \geq c(q)+r\left[c(q)-c(q_0)\right]+\omega.$$

Given the potentially large number of non-GI regions (and hence of certification marks from non-GI regions), we argue that the entry price for a new certified brand under the certification mark scheme is $c(q_0)+\omega$.[23] This is based upon the argument that consumers protect themselves from potential suppliers from non-GI regions by refusing to pay more than $c(q_0)+\omega$. In equilibrium, a potential entrant incurs a sure loss equal to

[22] The firm must continue certifying the product; otherwise, consumers would correctly infer that the firm is cheating.

[23] Consistently, by a "new certified brand" we mean a GI label in the form of a certification mark or a mixed brand when the trademark is unknown to consumers.

$c(q_0)-c(q)$ in the entry period when the brand is still unknown and earns a profit equal to $p(q)-c(q)-\omega$ in any subsequent period. Free entry, which requires discounted profits of potential new brands to be non-positive, $c(q_0)-c(q)+\frac{1}{r}\left[p(q)-c(q)-\omega\right]\le 0$, imposes the following restriction on the equilibrium price configuration:

$$p(q)\le c(q)+r\left[c(q)-c(q_0)\right]+\omega.$$

Together the credibility constraint and the free-entry condition imply an equilibrium price-quality schedule for producers who use the standard technology and certify equal to

$$B(q)\equiv c(q)+r\left[c(q)-c(q_0)\right]+\omega \quad \text{for } q\ge q_0. \tag{8}$$

The cost of quality $q\ge q_0$, for producers who use the GI technology and certify, is $c^G(q)+\omega$. Because consumers cannot infer the production technology from the GI label, they are willing to pay the same amount for any new certified brand. Hence the entry price for producers who use the GI technology and certify must be equal to $c(q_0)+\omega$. Also, their best cheating option is to cut quality to q_0 and continue to certify at a cost $c^G(q_0)+\omega$. Based on the entry price and the best cheating option, we can conclude that the equilibrium price-quality schedule for producers who use the GI technology and certify is equal to

$$H(q)\equiv c^G(q)+r\left[c^G(q)-c(q_0)\right]+\omega \quad \text{for } q\ge q_0. \tag{9}$$

Finally, the presence of a certification mark scheme does not affect the price-quality schedule of producers who use the standard technology and do not certify – for whom the price-quality schedule coincides with (2) – or the price-quality schedule of producers who

use the GI technology and do not certify – for whom the price-quality schedule coincides with (3).

Given (2), (3), (8) and (9), it can be readily seen that, for any value of $\omega \geq 0$, the market price-quality schedule prevailing in the presence of a certification mark scheme coincides with $P(q)$, as given by (4), and, in fact, for any value of q, $B(q) \geq A(q)$ and $H(q) \geq N(q)$. We can conclude that, when consumers have no knowledge regarding what technology is available in which area, the market price-quality schedule prevailing in the presence of a certification mark scheme is identical to the schedule prevailing absent any GI scheme, $P(q)$.

3.6 Welfare implications

Depending on whether or not a *sui generis* scheme is in place, the market price-quality schedule that prevails in equilibrium is $P^G(q)$ or $P(q)$. As is typical in this type of reputation model, the minimum quality, q_0, for which no informational problems exist, sells at production cost. Similarly, the minimum quality guaranteed by the *sui generis* scheme, q_0^G, also sells at production cost when the product is certified.[24] Any other quality q in excess of the minimum quality, q_0, sells at a premium above production costs that is exactly equal to the one-time information cost that is needed in order to establish a reputation for quality q.

[24] Clearly, certified quality q_0^G is viable only for $q_0^G \geq \underline{\overline{q}}$.

As can be easily verified by comparing (4) and (7), the price-quality schedules $P^G(q)$ or $P(q)$ overlap in the bottom range of the quality spectrum, while in the upper range of the quality spectrum $P^G(q)$ lies below $P(q)$. This means that the presence of a *sui generis* scheme leads to lower prices for high-quality products while the prices of lower qualities are unaffected. Lower prices for high-quality products are the result of reduced costs of establishing reputation in the upper quality range under the *sui generis* scheme. The cost reduction has two components, each of which is linked to the revelation of some information regarding the GI-certified product. The first piece of information regards the fact that the GI-certified product is produced with the GI technology (i.e., that the conditions of the area of production favor the attainment of quality). For any given value of the GI-specific MQS, q_0^G, such that $q_0^G < \tilde{q}$, the availability of the information regarding the technology of production curtails producers' incentives to milk their reputation by $c^G(q_0^G) - c(q_0^G)$ thereby increasing consumers' willingness to pay for a new GI-certified product by the same amount.[25] The second piece of information concerns the fact that the GI-certified product meets a stricter MQS than does a generic product, $q_0^G > q_0$. This curtails producers' incentives to milk their reputation by an additional $c(q_0^G) - c(q_0)$ and, by the same amount, increases consumers' willingness to pay for a new GI-certified product.

To the contrary, no information is revealed under the certification mark scheme that could lower the cost of building reputation compared to the case with trademarks

[25] This effect occurs only for $q_0^G < \tilde{q}$, where $c(q_0^G) < c^G(q_0^G)$.

only. Because all geographic names can be protected as GIs, registration itself does not convey any information regarding the actual technology used in production. As well, because no GI-specific MQS needs to be met, producers' incentive to milk their reputation is unchanged compared to the case in which only trademarks are used.

Given the effect on equilibrium market prices, the introduction of a *sui generis* scheme affects consumers and producers in different ways. Consumers, to the extent that they prefer high quality, are clearly better off with lower prices, while the effect on producer surplus depends upon whether or not the investment in reputation occurred before the introduction of the *sui generis* scheme. With zero discounted profits for new brands under every IP scenario, only producers with established brands (i.e., those that have invested in reputation before the introduction of the certification scheme) can be affected by the introduction of the *sui generis* scheme. We can conclude that the introduction of a *sui generis* scheme has the potential to increase aggregate welfare because it reduces the informational cost of building reputation for high quality in a market affected by asymmetric information problems. This conclusion provides a rationale for favoring a *sui generis* scheme over a certification mark scheme to provide IP protection for GIs. Moreover, the welfare gains are more likely to be larger when the introduction of the *sui generis* scheme occurs at an earlier stage, i.e., before the investments in reputation are sunk.

When the introduction of a *sui generis* scheme occurs after investments in reputation have taken place (hereafter *ex post*), welfare considerations regarding the introduction of a *sui generis* scheme need to take into account the effect on established

producers (i.e., producers of an established brand). Starting from a situation of equilibrium in which producers have already invested in reputation, we analyze the case in which the government considers introducing a *sui generis* scheme. While established producers in the bottom-end range of the quality spectrum will not be affected by the introduction of the scheme, producers in the upper-end range of the quality spectrum might completely or partially lose their investment in reputation.

The bottom-end range of the quality spectrum in which established producers are not affected by the introduction of the scheme corresponds to $q \leq q^*$, where q^* represents the quality of the non-certified product that would be purchased by the type of consumer who is indifferent between consuming a GI-certified product under the *sui generis* scheme and a non-certified product.[26] For all other qualities, $q > q^*$, established producers are at risk of completely or partially losing their investment in reputation when the *sui generis* scheme is introduced.

Specifically, there will be established brands that completely lose their reputation and are replaced by new GI-certified brands of the same qualities. Define the quality range Q^0 as follows:

$$Q^0 \equiv \begin{cases} [\hat{q}, \tilde{q}], & \text{if } q_0^G \in [\underline{q}, \overline{\underline{q}}) \\ [q_0^G, \tilde{q}], & \text{if } q_0^G \in [\overline{\underline{q}}, \overline{q}) \\ \varnothing, & \text{if } q_0^G \geq \overline{q} \end{cases}$$

[26] The value of q^* depends upon the shape of consumer preferences and on the value of q_0^G. See Appendix A3 for details regarding consumers selection of qualities.

In an equilibrium without a *sui generis* scheme, the qualities in Q^0 are supplied by producers that use the standard technology. As shown in appendix A1, if a *sui generis* scheme were introduced, all producers with established brands in the quality range Q^0 would lose their reputation because the introduction of a *sui generis* scheme makes cheating more attractive than maintaining the same quality. Finally, if these producers have access to the GI technology (e.g., when they can relocate to a GI region) or can sell their trademarks to producers within the GI region, then the loss of reputation is only partial. That producers operating in this quality range need to switch to a different technology to remain competitive is noteworthy because the technology they switch to is characterized by higher production costs.

Established brands in the quality range Q^0 are not the only brands produced with the standard technology that stand to completely lose their reputation. Depending on the shape of consumer preferences over quality, there will be a range of qualities to the left of Q^0 produced with the standard technology, and such that $q > q^*$, that no longer represents "good deals" for consumers, who now would rather purchase GI-certified products. These qualities will no longer be exchanged in the market.

Contrary to what intuition might suggest, the reputations of established brands produced with the GI technology (all of which are of quality $q \geq \tilde{q}$) are also negatively affected by the introduction of the *sui generis* scheme. But, unlike the case of established brands produced using the standard technology, brands produced using the GI technology whose quality is at least q_0^G face a partial loss in reputation and are not forced out of the

market. As shown in appendix A2, in fact, their ability to certify affects their incentive to cheat. For them, the best response is to continue producing the same quality and to start certifying as soon as the system is introduced.[27] We conclude that, given the complete and partial losses in reputation of a subset of established producers, the *ex post* introduction of a *sui generis* scheme is desirable only if consumer gains are larger than the losses in reputation of established brands.[28]

Finally, we address the following question: if a *sui generis* scheme were to be introduced before any investment in reputation has taken place, what should the GI-specific MQS, q_0^G, be in order to maximize aggregate welfare? From an *ex ante*[29] perspective, the optimal value of the GI-specific MQS maximizes aggregate consumer surplus. The value of the GI-specific MQS affects the shape and position of the equilibrium market price-quality schedule and hence the price-quality combinations that are available to consumers. The available price-quality combinations, in turn, determine the surplus that each consumer type can derive in the market. Hence, the specific welfare-maximizing value of the GI-specific MQS will generally depend on the distribution of consumer types. Nevertheless, as discussed in appendix A3, for all distributions of

[27] This is the case independent of whether or not the introduction of the system is announced ahead of time or unexpectedly introduced.

[28] Another aspect that needs to be taken into consideration is the welfare loss that occurs during the "transition" period (i.e., the period in which investment takes place). During the transition period quality is misallocated; new entrants sell products of heterogeneous quality at the same price and consumers are unable to select the exact quality that maximizes their utility.

[29] As opposed to *ex post*, here *ex ante* refers to the case in which the introduction of the *sui generis* scheme occurs before any investment in reputation has taken place.

consumer types the optimal value of the GI-specific MQS has to balance the welfare losses of consumers whose purchase is constrained by the value of q_0^G and the welfare gains to consumers who purchase the GI-certified product. It follows that the welfare-maximizing value of the GI-specific MQS belongs in the quality range above $\underline{\overline{q}} + \varepsilon$, where $\underline{\overline{q}} + \varepsilon$ is defined as the smallest value of q_0^G such that at least one consumer type purchases the quality level corresponding to the GI-specific MQS.

3.6.1 Welfare implications of a certification mark scheme with screening

Our conclusion that a certification mark scheme for GIs does not convey any information that could lower the cost of building reputation below the cost required when only trademarks are available is predicated on two assumptions regarding consumers: (i) consumers have no knowledge regarding which technology is available in which area and (ii) consumers have no preferences over origin *per se* (rather than as a signal for quality). When either assumption is relaxed, there conceivably are welfare gains from a certification mark scheme over a situation with only trademarks. Nevertheless, as we will show, the result that a *sui generis* scheme is preferable in terms of welfare to a scheme based on certification marks holds true even when consumers have full information regarding which technology is available in which area and value origin *per se* in addition to quality.

To this end we consider the following modification of the certification mark system in which an initial screening of geographic names based on the presence of a

quality/geography nexus is introduced. We refer to this hypothetical scheme as the technology scheme. A technology scheme yields the same market price-quality schedule that a certification mark scheme would yield under the assumption that consumers have full knowledge of the production conditions in each region. This is the case because in either case (with a technology scheme or with a certification mark scheme with full information about regional production conditions) the same information – the technology used in production – is available to consumers.

Following the same procedure used thus far, we derive the market price-quality schedule that prevails with a technology scheme. The schedule can be written as follows:

$$P^T(q) \equiv \begin{cases} A(q), & \text{for } q \in [q_0, q^t) \\ T(q), & \text{for } q \geq q^t, \end{cases} \tag{10}$$

where we define q^t and q^{tt} as

$$A(q^t) = T(q^t)$$
$$A(q^t) = c^G(q^{tt}) + \omega,$$

and $T(q),$ the price-quality schedule for producers who use the GI technology and certify their product with the technology scheme, is

$$T(q) \equiv c^G(q) + r\left[c^G(q) - c^G(q_0)\right] + \omega \quad \text{for } q \geq q_0.$$

A comparison between (10) and (7) reveals that (i) for any given value of $q_0^G \leq q^{tt}$ every consumer type is at least as well off with the *sui generis* scheme as with the technology scheme because of lower prices in the upper end of the quality range; and (ii) for any given value of $q_0^G > q^{tt}$ the scheme that provides the largest welfare depends on the

distribution of consumer types. Specifically, for $q_0^G > q^{tt}$ the *sui generis* scheme leads to lower prices in the upper part of the quality spectrum, favoring consumers with relatively high values of θ, while the technology scheme might lead to lower prices in the intermediate quality range favoring consumers with intermediate values of θ. Finally, if the value of q_0^G can be chosen optimally so as to maximize aggregate welfare, the *sui generis* scheme is unambiguously better than the technology scheme for any given distribution of consumers. This is because it is always possible to set $q_0^G = q_0$.

The market price-quality schedule, $P^T(q)$, is represented by the bold curve in Figure 3. Specifically, Figure 3 represents the case with $q_0^G \leq q^{tt}$. To ease comparison, the schedule that would prevail with a *sui generis* scheme is also represented in Figure 3 by the dashed curve.

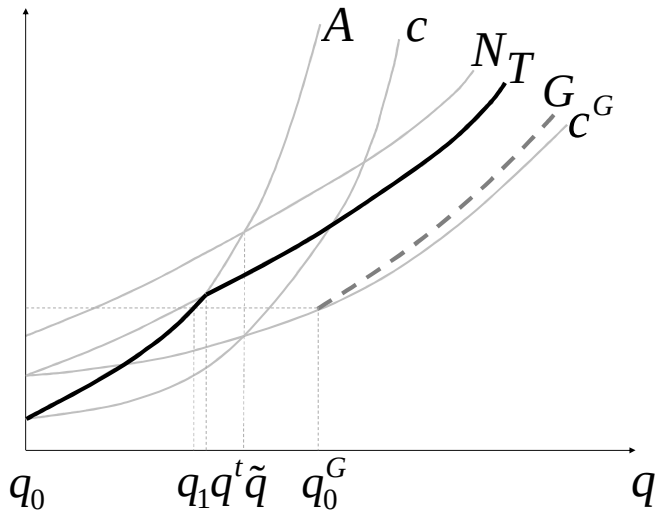

Figure 3. Market Price-Quality Schedule with a *Technology* Scheme

3.6.2 Trade implications

In this section, we briefly discuss some welfare considerations regarding the introduction of a *sui generis* scheme in a trading context when reputation must be established independently in each country. We maintain the same partial equilibrium setup, add a second country – the rest of the world (ROW) – and allow for trade. We assume that the technology available in the home country is the standard technology considered so far, $c(q)$, and that the two countries are otherwise identical; in particular, they have the same MQS, q_0, and discount rate, r. This setup is similar to Falvey (1989), but in Falvey each trading country has (only) one production technology, each with a range of comparative advantage.

We maintain the assumption that a *sui generis* scheme is in place in the country that is home to the GI (the home country) and consider two alternative scenarios for ROW: (i) ROW provides the same type of IP protection for GI as the home country (e.g., the same *sui generis* scheme), (ii) ROW does not provide IP protection for GIs. Given the setup, the general pattern of intra-industry trade is straightforward; in either scenario, ROW imports the higher end of the quality range, but the actual range depends upon whether ROW offers a *sui generis* scheme or not. Even though when reputation needs to be established independently in each country, trade alone does not "create a unified world market" (Falvey 1989, p. 611), the price-quality schedule that prevails with free trade is identical in both countries as long as they offer the same *sui generis* scheme, and coincides with (7). Instead, when ROW does not provide IP protection for GIs, the prevailing schedule in ROW is (4).

It follows directly that *ex ante* both countries have identical incentives to introduce a *sui generis* scheme, while *ex post,* ROW's producer losses involve a relatively smaller set of producers, those established producers operating in an intermediate range of the quality spectrum (using the standard technology), while the home country alone bears the losses of established producers operating in the upper range of the quality spectrum (those producers using the GI technology).

Finally, we comment on the informational role of country-of-origin labels (COOL) in markets where trademarks are important quality indicators. Falvey (1989) has shown that, in a setup in which countries are endowed with different technologies, COOL can reduce the cost of establishing reputation and can lower the price for high-quality products. Therefore in his setup, COOL regulations have a valuable non-protective role. In our framework, by contrast, when both countries have access to the same standard technology, COOL provisions are not sufficient to provide information to consumers regarding the quality of imports and hence are not a viable substitute for a *sui generis* scheme.

3.7 The traditional specialities guaranteed scheme

Next, we consider the traditional specialities guaranteed (TSG) scheme of the European Union. Like the *sui generis* scheme, the TSG scheme belongs to the set of the instruments used to foster product quality within the EU policy framework but departs from the EU's GI scheme because of the absence of a link between the certified products and the geographic area of production. The aim of the TSG scheme is to allow high-quality

products that are not necessarily linked to a geographic area to be differentiated from standard products.

Specifically, the TSG scheme certifies traditional products, such as "mozzarella" or "pizza napoletana," independently of the location in which production takes place. According to EU Regulation 509/2006, a traditional product is produced using traditional raw materials, has traditional composition or is obtained by a mode of production and processing that reflects traditional methods.[30] Even though not linked to a specific area of production, traditional products share many features with GIs. In particular, traditional product markets are also fraught with asymmetric information and moral hazard problems and are typically characterized by competitive conditions and by the concurrent use of certification and trademarks.

Similar to the case of product names registered under the *sui generis* schemes, registered TSG products are defined by a product specification, which includes "the key elements that define the product's specific character" (EU Regulation 509/2006 Art. 6). TSG certified products are subject to inspection to verify compliance with the product specification. We do not explicitly model what a traditional ingredient or a traditional mode of production or processing is, but rather interpret the traditional nature of these products as conferring them a given minimum quality, and in what follows we provide a justification for why this is a reasonable assumption.

[30] The TSG scheme offers two types of registration of a name: with or without "reservation." When a name is registered with reservation, it can only be used to label the product made in accordance with the specification. When the name is registered without reservation, it can be used for products that do not correspond to the specification but without the indication "traditional specialities guaranteed," the abbreviation "TSG" or the Community symbol (EU 2009b).

As already discussed, we have modeled the quality/geography nexus required for a GI under the *sui generis* scheme as an attribute of the production technology, while we conceptualize the conditions for traditional products as a quality requirement. There is a striking conceptual difference between the production conditions associated with a quality/geography nexus and those characterizing traditional products. The former are typically present in marginal or mountain areas, among others, where topography and climatic conditions (e.g., including exposure, humidity, daily temperature swings etc.) favor the attainment of a high level of quality while limiting the ability to cost-efficiently provide standard mass-production commodities (e.g., limited mechanization possibilities). Hence, we have assumed production technologies with comparative advantage over different quality ranges. To the contrary, the traditional feature of products under the TSG scheme has little to do with the conditions of the production environment or the technology available for production but is rather attributable to the use of ingredients and production procedures that favor the attainment of specific organoleptic characteristics, appearance, consistency, taste, aroma, chemical, microbiological and other characteristics that are associated with high quality. For example, the product specification for “pizza napoletana” defines the handling, kneading, rising and baking process (including specific conditions regarding temperature and duration) that are considered necessary for high-quality pizza (see the Official Journal C40, February 14, 2008). We conceptualize these features in a one-dimensional quality scale.

The TSG scheme is currently under scrutiny within the European Union, and several policy options have been discussed, including abandonment of the scheme. A concern is that, to date, there is only a limited use of this scheme (only about 30 products are currently registered or have been published and 14 others have applied for protection). Also, it seems that the terminology and logos used to identified TSG-certified goods have proven to be difficult for the public to understand. Despite a widespread support for the scheme from stakeholders (EU 2009b), some confusion remains on the effectiveness of the scheme as a tool for fostering the provision of quality. Our analysis offers a rationale for maintaining the TSG scheme and shows the potential welfare gains that the TSG scheme can bring about compared to the *sui generis* scheme.

We frame the TSG scheme as a scheme with no limitation regarding accessibility to certification or a location of production requirement but with an MQS requirement.[31] Certified products under the TSG scheme are identified by a TSG logo.[32] With this scheme, the presence of a TSG logo informs consumers that the product meet the MQS, q_0^S.

Following the same procedure used thus far, we derive the market price-quality schedule that prevails with a TSG scheme. The schedule can be written as follows:

[31] Outside the food sector, there are many examples of certification schemes based on quality standards only. These include, among others, the *CE* mark indicating that products meet the health and safety requirements set out in the European Directives and the certification marks administered by Underwriters Laboratories for electronic devices.

[32] TSG logo is available at http://ec.europa.eu/agriculture/quality/logos/index_en.htm.

$$P^S(q) \equiv \begin{cases} \begin{cases} A(q), & q \in [q_0, q^s) \\ M(q), & q \in [q_0^S, \tilde{q}) \\ L(q), & q \geq \tilde{q} \end{cases} & \text{for } q_0^S \in [\underline{q}, \tilde{q}) \\ \begin{cases} A(q), & q \in [q_0, q_1) \\ G(q), & q \geq q_0^S \end{cases} & \text{for } q_0^S \in [\tilde{q}, \overline{q}) \\ \begin{cases} A(q), & q \in [q_0, \tilde{q}) \\ N(q), & q \in [\tilde{q}, q_2) \\ G(q), & q \geq q_0^S \end{cases} & \text{for } q_0^S \geq \overline{q} \end{cases} \tag{11}$$

where $\underline{q}$ and q^s are defined as

$$A(q^s) = c(q_0^S) + \omega,$$
$$\underline{q} = \max\left\{ q_0, q \mid c^G(q) = \frac{\omega}{r} + c(q_0) \right\},$$

and $M(q)$, the price-quality schedule for producers who use the standard technology and certify, and $L(q)$, the price-quality schedule for producers who use the GI technology and certify, are respectively

$$M(q) \equiv \begin{cases} c(q) + r\left[c(q) - c(q_0^S) \right] + \omega, & \text{for } q \geq q_0^S \quad \text{for } q_0^S < \tilde{q} \\ c(q) + r\left[c(q) - c^G(q_0^S) \right] + \omega, & \text{for } q \geq q_0^S \quad \text{for } q_0^S \geq \tilde{q}, \end{cases}$$

and

$$L(q) \equiv \begin{cases} c^G(q) + r\left[c^G(q) - c(q_0^S) \right] + \omega, & \text{for } q \geq q_0^S \quad \text{for } q_0^S < \tilde{q} \\ c^G(q) + r\left[c^G(q) - c^G(q_0^S) \right] + \omega, & \text{for } q \geq q_0^S \quad \text{for } q_0^S \geq \tilde{q}. \end{cases}$$

$M(q)$ and $L(q)$ are piecewise defined because, depending on the value of q_0^S, the optimal cheating strategy is either producing or outsourcing the minimum quality.

Finally, implicitly define q^m as the quality at which $M(q)$ and $G(q)$ meet when the minimum quality standard of the TSG scheme, q_0^S, has the same value as the GI-specific MQS (i.e., $q_0^S = q_0^G$),

$$M(q^m \mid q_0^G) = G(q^m \mid q_0^G).$$

Given a common value of the MQS standard across schemes (equal to q_0^G), the TSG scheme and the *sui generis* scheme differ in two regards. First, compared to a *sui generis* scheme, the TSG scheme reduces the informational content of the certified product since it does not pin down the technology used in production. This expands the cheating options of producers who use the GI technology when the value of the MQS is such that $q_0^G < \tilde{q}$. As an effect, when the value of the MQS is such that $q_0^G < \tilde{q}$, the TSG scheme leads to higher prices for qualities $q > q^m$ than the *sui generis* scheme. For the other values of the MQS, the cheating options of producers who use the GI technology are unaffected. [33]

[33] For values of the MQS such that $q_0^G < \tilde{q}$, the TSG scheme expands the cheating options of producers who use the GI technology, thereby decreasing consumers' willingness to pay for new but certified brands by $c^G(q_0^G) - c(q_0^G)$, and increasing the reputation-building costs for these producers. In contrast, when $q_0^G \geq \tilde{q}$, the cost of producing the MQS quality is lower with the GI technology, $c^G(q_0^G) \leq c(q_0^G)$, and therefore outsourcing is not a cost-saving option for producers that use the GI technology. In this case, and independent of the type of certification scheme (TSG or *sui generis*), the best producers can do when cheating is to reduce quality to q_0^G.

The second difference between the *sui generis* and the TSG schemes concerns producers' access to the certification, because the TSG scheme is available to all producers independently of the technology used in production. The ability to certify lowers the cost of building reputation for producers who use the standard technology by increasing consumers' willingness to pay for their new but certified brands.[34] Hence, for $q_0^G < \tilde{q}$, the TSG scheme leads to lower prices for all qualities $q \in (\underline{\bar{q}}, q^m)$ than the *sui generis* scheme. For values of the MQS such that $q_0^G \geq \tilde{q}$, the ability to certify for producers who use the standard technology is not sufficient to make them competitive with producers who use the GI technology. It follows that, for a common value of the MQS across the two systems and such that $q_0^G < \tilde{q}$, qualities in the range $q \in (\underline{\bar{q}}, q^m)$ can be supplied at a lower cost with the TSG scheme while quality in the range $q > q^m$ can be supplied at a lower cost with the *sui generis* scheme. Hence, which scheme leads to higher aggregate surplus depends on the distribution of consumers $F(\theta)$.

Finally, we consider the possibility of choosing the values of the MQS, one for each certification scheme, so as to maximize aggregate welfare and show, in appendix A4, that when it is possible to choose the values of the MQSs optimally, the TSG scheme yields at least the same level of welfare as the *sui generis* scheme. We also show that the TSG scheme does strictly better than the *sui generis* scheme for some populations of

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[34] Consumers' willingness to pay increases by $c(q_0^G) - c(q_0)$ if $q_0^G < \tilde{q}$ and by $c^G(q_0^G) - c(q_0)$ if $q_0^G \geq \tilde{q}$.

consumers, $F(\theta)$, for which the optimized value of the MQS for the *sui generis* scheme, q_0^{G*}, happens to be such that $q_0^{G*} < \tilde{q}$.

The market price-quality schedule, $P^S(q)$, is represented by the bold curve in Figure 4, which specifically represents the case of $q_0^G = \underline{\bar{q}} < \tilde{q}$. To ease comparison, the price-quality schedule that would prevail with a *sui generis* scheme is also represented in Figure 4 by the dashed curve.

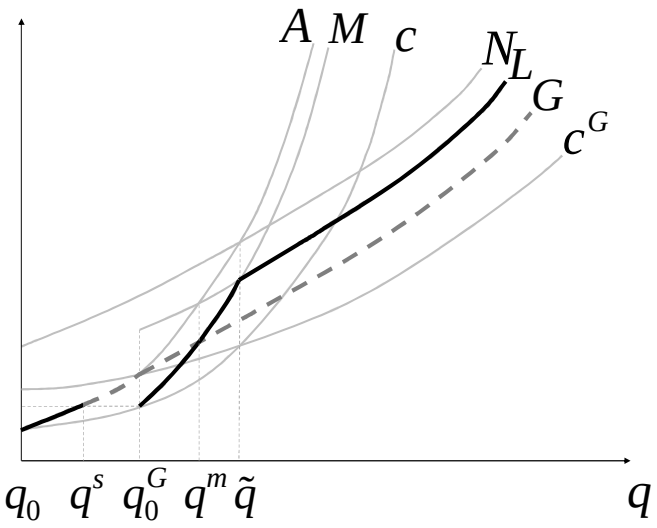

Figure 4. Price-Quality Schedule with a TSG scheme (Note $q_0^G = \underline{\bar{q}}$)

3.8 Conclusions

We contribute to the stream of literature sparked by the pioneering work of Shapiro (1983) by extending the theory of firm reputation to a context in which both certifications and trademarks are available to firms as quality indicators. We tailor our analysis to assess the role of certification and trademarks for food products with a regional identity, known as geographical indications, whose markets, typically characterized by competitive conditions, are commonly fraught with asymmetric information and moral hazard problems. Specifically, we provide a rationale for producers of such goods to use certification (in addition to trademarks) when product quality could be alternatively sustained through trademarks, a fact that is consistent with the empirical evidence that the concurrent use of certification and trademarks is common for such products.

Several instructive aspects of the role of certification in quality provision and reputation formation that are applicable to many forms of certification (not just GIs) emerge from the model. First, we show that certification reduces the divergence between the reputation equilibrium and the equilibrium that would prevail under perfect information by lowering the cost of establishing reputation compared to a situation with only trademarks. Hence, certification improves the ability of reputation to operate as a mechanism for assuring quality. Second, we show that the welfare gains are more likely to be larger when the introduction of a certification scheme occurs at an earlier stage so as to limit the potential losses in the value of already established reputations. This is because certification, by raising the price that entrants can command, reduces the cost of building a reputation and hence the value of an established reputation. This observation

also provides a rationale for industry resistance to the introduction of certification from eligible producers who have already committed resources towards building a reputation at the time the certification is introduced.

With this paper we expand the existing literature on geographical indications by shifting the focus to explicitly consider the design of the certification scheme. This is relevant because, as our model reveals, the design plays an important role in mitigating the informational problems in the market. Moreover, we show that different designs might be optimal for different populations of consumers depending on the distribution of their tastes for quality. From a policy perspective, our model offers specific recommendations concerning the current ongoing debate and negotiations on geographical indications at both the WTO and the EU levels. With regard to the type of IP protection instrument for GIs, our model indicates that a *sui generis* scheme based on *appellations* is preferable to standard instruments, such as certification marks, that are currently used in many important markets, including the United States. We have identified a feature of certification marks (i.e., the fact that eligibility for registration is not conditioned upon the presence of a demonstrable link between the characteristics of a geographic region and the quality of the product) that limits their ability to convey information to consumers regarding the quality of GIs and lower the cost of building reputation (in this sense, certification marks are no better than trademarks). In addition, we show that even if the current certification mark system were to be adapted to include an initial screening of products seeking IP protection based on the presence of a demonstrable quality/geography nexus, a *sui generis* scheme, which combines geography

and quality requirements, would still provide larger welfare gains than certification marks.

Our model also sheds light over the role of the EU's traditional specialities guaranteed scheme in the provision of high-quality products that are not linked to a geographic area. This scheme, which is currently under scrutiny by the EU commission, is used to register and protect the names of traditional products (i.e., products that are produced using traditional raw materials, have traditional composition or are obtained by a mode of production and processing that reflects traditional methods). Such a scheme, based exclusively on quality (rather than on geographic) requirements, certifies that traditional products meet given quality standards. We show that, for a given common value of the MQS, the traditional specialities guaranteed scheme more strongly reduces the cost of providing intermediate quality products compared to the *sui generis* scheme, while the *sui generis* scheme is better suited for reducing the cost of providing the higher end of the quality spectrum. Compared to the *sui generis* scheme, the traditional specialities guaranteed scheme has the advantage of extending the accessibility of certification to a larger set of producers. When it is feasible to optimally set the value of the MQS, this advantage leads to welfare gains compared to the *sui generis* scheme when the distribution of consumer preferences is clustered in the middle of the quality range. Finally, with regard to the informational role of country-of-origin labels, our model suggests that COOL provisions are not sufficient to provide information to consumers regarding the quality of imports that could lower the cost of building reputation and hence are not a viable substitute for a geographical indications scheme.

3.9 Appendix

This appendix establishes the welfare results discussed in sections 5 and 6.

Proof that the reputation of established brands in the quality range Q^0 is lost when a *sui generis* scheme is introduced

First, suppose that a *sui generis* scheme is introduced at the beginning of time t unexpectedly. At time t, producers who have access to the GI technology can invest in reputation (i.e., produce a quality $q \geq q_0^G$ and sell it below production costs). At time $t+1$, reputation, $R = q$, is established and, from time $t+1$ on, the new equilibrium schedule $P^G(q)$ prevails in the market. Anticipating the new equilibrium schedule, a producer of quality $q \in Q^0$ with an established brand will be better off deviating at time t (i.e., producing the minimum quality) than maintaining the same quality from time t on if

$$-c(q) + \frac{1}{r}\left[P^G(q) - c(q)\right] < -c(q_0).$$

As can be readily verified, the above inequality can be rewritten as $P^G(q) < A(q)$, where $P^G(q)$ and $A(q)$ are given by (7) and (2) respectively. Over the range in which $P^G(q)$ is defined, $P^G(q) < A(q)$ always holds. It follows that producers are better off by deviating at time t. This is also true for those producers operating in the quality range where $P^G(q)$ is not defined (the discontinuity range), since the price at which they would be able to sell their products at time $t+1$ is strictly less then $A(q)$ (consumers can find

higher qualities at prices $A(q)$). Knowing that it is optimal for these producers to cheat, consumers will not be willing to pay more than $c(q_0)$ for these brands at time t. It follows that established brands in the quality range Q^0 completely lose their reputation as soon as the *sui generis* scheme is introduced. Finally, if these producers have access to the GI technology (i.e., if they can relocate to a GI region) or can sell their trademarks to a producer with access to the GI technology, then the loss of reputation might be partial.

In the alternative case in which the introduction of a GI scheme at time t is announced and expected by both producers and consumers at time $t-1$, producers would immediately cheat and lose their reputation at time $t-1$. Consumers would correctly predict this behavior and would be willing to pay at most $c(q_0)$ in $t-1$. Finally, in the alternative case where in time $t-1$ only producers anticipate the introduction of a *sui generis* scheme (but consumers are unaware), producers immediately cheat. Consumers, being unable to anticipate producers' behavior, are surprised by lower-than-expected qualities while producers recoup their original investments in reputation.

Proof that the reputation of established brands of quality $q \geq q_0^G$ produced with the GI-technology is partially lost when a *sui generis* scheme is introduced

When a *sui generis* scheme is introduced, producers of established brands who use the GI-technology have the following options: (i) maintain the same quality q without certifying; (ii) cut the quality to q_0; (iii) maintain the same quality q and certify; (iv) cut the quality to q_0^G and certify.

Conditional on not certifying, producers are better off by cutting their quality to q_0, because their credibility constraint,

$$-c^G(q)+\tfrac{1}{r}\Big[G(q)-c^G(q)\Big]\geq -c(q_0),$$

does not hold for any value of $q\geq\tilde{q}$. Observing the absence of certification, consumers correctly anticipate that producers have cut their quality to q_0. Hence, conditional on not certifying, producers lose their reputation immediately and their future profits, discounted to time t, are equal to zero. Conditional on certifying, the credibility constraint is

$$-c^G(q)-\omega+\tfrac{1}{r}\Big[G(q)-c^G(q)-\omega\Big]\geq -c^G(q_0^G)-\omega.$$

Because, conditional on certifying, the credibility constraint holds (with equality) for all $q\geq\tilde{q}$, maintaining the same quality is a best response for producers. Observing the presence of certification, consumers correctly anticipate that maintaining quality is optimal for producers and, in this case, producers' future profits, discounted to time t, are equal to

$$N(q)-c^G(q)-\omega+\tfrac{1}{r}\Big[G(q)-c^G(q)-\omega\Big]=(1+r)\Big[c^G(q)-c^G(q_0)\Big]-\Big[c^G(q_0^G)+\omega-c(q_0)\Big],$$

By (6), these discounted profits are strictly positive for any $q\geq\max\left\{q_0^G,\tilde{q}\right\}$. We can conclude that, for producers of established brands of quality $q\geq\max\left\{q_0^G,\tilde{q}\right\}$ who use the GI-technology, the best response to the introduction of a *sui generis* scheme is to maintain and certify the same quality.

Finally, the future profits, discounted to time *t,* that producers would earn if no *sui generis* scheme were to be introduced are equal to $(1+r)\left[c^G(q)-c(q_0)\right]$. Hence, since for any $q \geq \max\left\{q_0^G, \tilde{q}\right\}$

$$(1+r)\left[c^G(q)-c(q_0)\right] > (1+r)\left[c^G(q)-c^G(q_0)\right]-\left[c^G(q_0^G)+\omega-c(q_0)\right],$$

the value of reputation is partially lost when the *sui generis* scheme is introduced. Finally, for producers with quality $\tilde{q} \leq q < q_0^G$ the loss of reputation is complete because these producers do not have the option to maintain the same quality and certify.

Consumer Selection of Qualities and the Optimal Value of the MQS for a *sui generis* Scheme

If a *sui generis* scheme were to be introduced before any investment in reputation has taken place, what should the value of q_0^G be in order to maximize welfare? From an *ex ante* perspective, the optimal value of q_0^G maximizes aggregate consumer surplus. Based on our assumptions regarding consumer preferences, consumers can be divided into different groups depending on the product they opt to purchase: nonpurchasers $\left(0 \leq \theta < \theta_0\right)$; those who purchase standard product of minimum quality $\left(\theta_0 \leq \theta < \theta_1\right)$; those who purchase standard product of quality in excess of the minimum $q > q_0 \left(\theta_1 \leq \theta < \theta_2\right)$; those who purchase non-certified product from the GI region(s) $\left(\theta_2 \leq \theta < \theta_3\right)$; those who purchase GI-certified product of quality q_0^G $\left(\theta_3 \leq \theta < \theta_4\right)$; and

those who purchase GI-certified product of quality $q > q_0^G$ $\left(\theta_4 \le \theta < \bar{\theta}\right)$. Depending on the value of q_0^G one or more of these groups could be empty. Whereas the specific value of q_0^G that maximizes aggregate consumer surplus depends on the specific distribution of consumer types, $F(\theta)$, the following considerations apply for all possible $F(\theta)$. First, we note that the effect on welfare of the specific value of the GI-specific MQS, q_0^G, occurs through its effect on the position of the equilibrium market price-quality schedule. Second, we argue that no value of q_0^G such that $q_0^G \in \left[\underline{q}, \bar{\underline{q}}\right]$ can be optimal. Suppose, in contradiction, that $q_0^G \in \left[\underline{q}, \bar{\underline{q}}\right]$. A small increase in the value of q_0^G from its initial value shifts down $G(q)$ while leaving $A(q)$ unaffected. The downward shift in $G(q)$ increases the surplus of those consumers who purchase the GI-certified product, the price of which has decreased. When $q_0^G \in \left[\underline{q}, \bar{\underline{q}}\right]$, at most four groups of consumers exist: (1) nonpurchasers, (2) purchasers of q_0, (3) purchasers of standard product of quality in excess of the minimum, and (4) purchasers of GI-certified product of quality $q > q_0^G$. Hence, $\theta_2 = \theta_3 = \theta_4$.

Moreover, because no consumer's purchase is constrained by q_0^G, a small increase in the value of q_0^G does not reduce the surplus of other consumers. Without costs for raising the quality standard, but with benefits due to the lower prices of the GI-certified product, welfare can be increased by raising the value of q_0^G to $\bar{\underline{q}}$. A small

increase in q_0^G also causes substitution by the marginal consumers that are indifferent between buying standard and GI-certified product, with no first-order effect on welfare. Moreover, given that consumer indifference curves are smooth, additional gains in welfare can be achieved by marginal successive increases of the value of q_0^G above $\underline{\bar{q}}$ until the quality choice of some consumers becomes constrained by the value of q_0^G. Once q_0^G has reached such value, call it $\underline{\bar{q}}+\varepsilon$, a new group of consumers is formed, $(\theta_3 \le \theta < \theta_4)$. $\underline{\bar{q}}+\varepsilon$ is defined as the smallest value of q_0^G such that at least one consumer type, θ_3, buys quality q_0^G. These consumers buy quality q_0^G. Any additional increase in the value of q_0^G above $\underline{\bar{q}}+\varepsilon$ involves welfare losses to this new group of consumers whose purchases are constrained by the value of q_0^G. We conclude that the welfare-maximizing value of q_0^G has to balance the welfare losses of these consumers and the welfare gains to consumers who purchase the GI-certified product and therefore belongs in the range between $\underline{\bar{q}}+\varepsilon$ and the value at which all consumers who purchase GI-certified product are constrained by the value of the GI-specific MQS. Finally, note that depending on $F(q)$, the optimal value of the MQS could be above $\bar{q}$. When this is the case, there might exist a group of consumers that purchase non-certified product produced with the GI technology $(\theta_2 \le \theta < \theta_3)$.

Proof that the TSG scheme (i) is at least as good as the *sui generis* scheme and (ii) can be strictly better than the *sui generis* scheme in terms of aggregate welfare

Suppose that it is possible to choose values of the MQS for the *sui generis* scheme, q_0^G, and for the TSG scheme, q_0^S, that maximize aggregate welfare. Suppose that for a given distribution of consumer types, $F(\theta)$, the optimal value of q_0^G happens to be $q_0^{G*} \geq \tilde{q}$. When this is the case, the TSG scheme is at least as good as the *sui generis* scheme because it is always possible to set the value of q_0^S in such a way that the resulting price-quality schedule coincides with the schedule under the *sui generis* scheme (by setting q_0^S equal to q_0^{G*}). Suppose instead that for a given distribution of consumer types, the optimal value of q_0^G happens to be $q_0^{G*} < \tilde{q}$. When this is the case, it is also possible to find a value of $q_0^S > q_0^{G*}$ such that $c^G\left(q_0^{G*}\right) = c\left(q_0^S\right)$. Denote this value $\hat{q}_0^S$. For such a pair of values, q_0^{G*} and $\hat{q}_0^S$, the price-quality schedule that prevails with the *sui generis* scheme, $G(q)$, and the price-quality schedule that prevails with the TSG scheme, $L(q)$, overlap in the quality range $q \geq \hat{q}_0^S$. Also, on the other side of the quality spectrum, in the range $q < q_0^{G*}$, the relevant price-quality schedules of the two schemes coincide and are equal to $A(q)$. Only the *sui generis* scheme provides the intermediate quality range, $\left[q_0^{G*}, \hat{q}_0^S\right)$. This range is provided at a price $G(q)$, which is strictly increasing in q. Specifically, the price for the minimum quality in this range, q_0^{G*}, is $G\left(q_0^{G*}\right)$. Because by

construction $M\left(\hat{q}_0^S\right) = G\left(q_0^{G^*}\right)$, at the price $G\left(q_0^{G^*}\right)$ the TSG scheme provides quality $\hat{q}_0^S$, which is the supremum of the quality range $\left[q_0^{G^*}, \hat{q}_0^S\right)$. Hence, as long as there is at least one consumer who would purchase a quality in the range $\left[q_0^{G^*}, \hat{q}_0^S\right)$ when the *sui generis* scheme is in place, the TSG scheme is strictly better than the *sui generis* scheme in terms of aggregate welfare, because this consumer can purchase a higher quality at a lower (or at the same) price.

3.10 References

Akerlof G.A. (1970) "The Market for Lemons: Quality Uncertainty and the Market Mechanism" *Quarterly Journal of Economics* 84:488-500.

Allen F. (1984) "Reputation and Product Quality" *The RAND Journal of Economics* 15(3) (Autumn 1984): 311-327.

Anania G. and R. Nisticó (2004) "Public Regulationas a Substitute for Trust in Quality Food Markets: What if the Trust Substitute cannot be Fully Trusted?" *Journal of Institutional and Theoretical Economics* 160:681-701.

Barham E. (2003) "Translating terroir: the global challenge of French AOC labeling" *Journal of Rural Studies* 19:127-138.

Bar-Isaac H. and S. Tadelis (2008) "Seller Reputation" *Foundations and Trends in Microeconomics* 4(4):273-351.

Bramley C. and J.F. Kirsten (2007) "Exploring the Economic Rationale for Protecting Geographical Indicators in Agriculture" *Agrekon* 46(1):69-93.

Cabral L. (2000) "Stretching Firm and Brand Reputation" *The RAND Journal of Economics* 31:658-673.

Choi J.P. (1997) "Brand Extension and Information Leverage" *Review of Economic Studies* 65:655-669.

EU (2003) "Why do Geographical Indications matter to us" European Union Background Note No. 01/04, visited on May 28, 2009 and available on the EU's webpage at http://trade.ec.europa.eu/doclib/docs/2003/october/tradoc_113900.pdf.

EU (2007) "European Policy for Quality Agricultural Products" Fact Sheet of the European Commission, Directorate-General for Agriculture and Rural Development, January 2007.

EU (2008) "Geographical Indications" Background Paper to the Green Paper on Agricultural Product Quality, DG Agriculture and Rural Development, Working Document October 2008.

EU (2009a) "Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions on agricultural product quality policy" Commission to the European Parliament, COM(2009) 234 final, Brussels May 28, 2009.

EU (2009b) "Agricultural Product Quality Policy: Impact Assessment Part C, Traditional Specialities Guaranteed" available at http://ec.europa.eu/agriculture/quality/policy/com2009_234/ia_annex_c_en.pdf.

Falvey R. and H. Kierzkowski (1987) "Product Quality, Intra-Industry Trade and (Im)perfect Competition" in H. Kierzkowski ed., Protection and Competition in International Trade, Oxford: Basil Blackwell.

Falvey R. (1989) "Trade, Quality Reputation and Commercial Policy" *International Economic Review* 30(3):607-622.

Fishman A., I. Finkelstein, A. Simhon and N. Yacouel (2008) "The Economics of Collective Brands" working paper available at: http://ssrn.com/abstract=1317262.

Flam H. and E. Helpman (1987) "Vertical Product Differentiation and North-South Trade," *The American Economic Review* 77(5):810-822.

Josling T. (2006) "The War on Terroir: Geographical Indications as a Transatlantic Trade Conflict" *Journal of Agricultural Economics* 57:337-363.

Klein B. and K.B. Leffler (1981) "The Role of Market Forces in Assuring Contractual Performance" *Journal of Political Economy* 89(4):615-641.

Lence S.H., S. Marette, D. Hayes, and W. Foster (2007) "Collective Marketing Arrangements for Geographically Differentiated Agricultural Products: Welfare Impacts and Policy Implications" *American Journal of Agricultural Economics* 89:947-963.

Moschini GC. (2004) “Intellectual Property Rights and the World Trade Organization: Retrospect and Prospects” in Anania, G., Bohman, M., Carter, C., and McCalla, A., eds., Agricultural Policy Reform and the WTO: Where are we Heading? Edward Elgar Publishing, 2004.

Moschini GC., L. Menapace and D. Pick (2008) “Geographical Indications and the Provision of Quality” *American Journal of Agricultural Economics* 90(3):794-812.

O’Connor B. (2004) “Sui Generis Protection of Geographical Indications” *Drake Journal of Agricultural Law* 9:359-387.

OECD (2000) Appellations of Origin and Geographical Indication in OECD Member Countries: Economic and Legal Implications, COM/AGR/APM/TD/WP(2000)15/FINAL.

Rangnekar D. (2004) “The Socio-Economics of Geographical Indications” UNCTAD-ICTSD Project on IPRs and Sustainable Development, Issue Paper No. 8, May 2004.

Rao S.S. (2006) “Indigenous knowledge organization: An Indian scenario” *International Journal of Information Management* 26:224–233.

Rob R. and A. Fishman (2005) “Is Bigger Better? Customer Base Expansion through Word-of-Mouth Reputation” *Journal of Political Economy* 113(5): 1146-1161.

Shapiro C. (1983) “Premiums for High Quality Products as Returns to Reputations” *The Quarterly Journal of Economics* 98(4):659-680.

Suh J. and A. MacPherson (2007) “The impact of geographical indication on the revitalisation of a regional economy: a case study of ‘Boseong’ green tea” *Area* 39(4):518-527.

Teuber R. (2010) “Geographical Indications of Origin as a Tool of Product Differentiation – The Case of Coffee” *Journal of International Food and Agribusiness Marketing*, forthcoming.

USPTO (2007) “Geographical Indication Protection in the United States” United States Patent and Trademark Office, undated document accessed on May 2007 at http://www.uspto.gov/web/offices/dcom/olia/globalip/pdf/gi_system.pdf.

Winfree J.A. and J.J. McCluskey (2005) “Collective Reputation and Quality” *American Journal of Agricultural Economics* 87(1):206-213.

WIPO (2007) “Perspectives for Geographical Indications,” WIPO/GEO/BEI/07, Beijing, June 26-28, 2007.

Xiaobing W. and I. Kireeva (2007) “Protection of Geographical Indications in China: Conflicts, Causes and Solutions” *The Journal of World Intellectual Property* 10(2): 79-96.

Zago M.A. and D. Pick (2004) “Labeling Policies in Food Markets: Private Incentives, Public Intervention, and Welfare Effects” *Journal of Agricultural and Resource Economics* 29(1):150-165.

CHAPTER 4: CONSUMER PREFERENCES FOR GEOGRAPHICAL-ORIGIN LABELED PRODUCTS

4.1 Abstract

Motivated by recognition that geography is often correlated with, or a determinant of, overall quality of agricultural products, geographical origin labels are important information and marketing tools and have recently become a central component of EU agricultural promotion. In contrast to previous studies of EU origin labels, we consider demand in a non-EU export market for three distinct label types: country-of-origin, protected designations of origin and protected geographical indications. Findings from choice experiments indicate that consumers value these three forms of origin labels to differing degrees and lend support for current and proposed EU promotion activates in export markets.

4.2 Introduction

The primary overarching economic motivation for product labels is to facilitate the resolution of market failures associated with the supply of high-quality goods under asymmetric information (e.g., Akerlof 1970). In the crowded heterogeneous food product space, information asymmetries are particularly problematic given the abundance and importance of credence and experience attributes. As a result, food labeling is viewed as a critical mechanism to help ensure consumers can correctly match with products, enable producers to adapt production to meet consumer demands and expectations, and promote

social or political economy objectives (e.g., health outcomes, growth in desirable sectors, increased exports).

One particular category of labels that has recently received extensive attention among regulators and trade representatives are "geographical origin" labels (i.e., labels that denote, with some degree of specificity, the location of origination of the end-product, inputs, or production). Informing consumers of the origin of food products via labeling is motivated by the recognition that geography is often correlated with a product's overall quality or, in the stronger case, geography may even be a determinant of a product's ultimate realized quality, i.e., the concept of *terroir* (Barham 2003; Josling 2006). Recently, interest in geographic origin labeling for foods has been invigorated as a result of (1) an increased demand by consumers for production and safety related information following a string of food scares,[1] (2) a surge in global culinary awareness and demand for foreign cuisine, and (3) a movement of many nations away from traditional agricultural price supports towards promotion of value-added and high quality products.

Two types of origin labels, country of origin labels (COOL) and geographical indications (GIs), have received extensive attention in the economic and marketing literature and are currently the subject of domestic and international policy debates.[2] An

[1] Examples include bovine spongiform encephalopathy (BSE), E-coli, Salmonella, botulism, and harmful bacteria.

[2] For country of origin, the debate is largely between advocates who argue that mandatory COOL requirements would provide vital information to consumers regarding safety and opponents who assert that it imposes unnecessary or costly regulatory burdens on producers and retailers which ultimately hurt consumers. Additionally, opponents

abundant economic and marketing literature has analyzed COOL as signals of a broadly defined concept of product quality (i.e., the aggregation of many intrinsic and extrinsic product attributes linked to origin). The empirical literature on COOL has grown to be quite large. Recent works focusing on agriculture include Loureiro and Umberger (2003), Alfnes and Rickertsen (2003), Umberger (2004), Tonsor, Schroeder, and Fox (2005), Carter, Krissoff and Peterson Zwane (2006), and Chung, Boyer and Han (2009). For reviews of works outside of the agricultural product space see Bilkey and Nes (1982) and Verlegh and Steenkamp (1999).

Variations in quality across countries are determined in part by differences in the natural environmental and climatic conditions as well as differences in national quality standards, production and processing technologies, quality audit systems, etc. This feature has even led to the reference of COOL as "country brands" (e.g., Unterschultz 1998; Gilmore 2002; Clemens and Babcock 2004).

In contrast to COOL, GIs are not only a form of origin labels but also a distinct form of intellectual property rights. The recognition of GIs as distinct form of intellectual property rights dates to 1994 with the signing of the TRIPS agreement by the World Trade Organization. The TRIPS agreement defines GIs as "indications which identify a good as originating in the territory of a Member, or a region or locality in that territory, where a given quality, reputation or other characteristic of the good is essentially attributable to its geographical origin" (TRIPS Art 22.1). As classified by TRIPS, GIs

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contend that COOL requirements effectively impose new non-tariff trade barriers that hamper international trade (e.g., see Rude, Iqbal and Brewin 2006). For geographical indications, the debate regards the conflicting forms of cross-country legal protection for GIs and the level of exclusiveness reserved to GI names (Josling 2006).

differ from COOL in several regards which significantly impact their informational content and potential value to both consumers and producers. Compared to COOL, GIs typically denote a much smaller geographical area of origin like a town or region (e.g., Champagne, France or Ardennes, Belgium). Hence, GIs are capable of communicating characteristics specific to a specialized area that are not necessarily reflected by the country as a whole. Most relevant, the defining feature of GIs based on the TRIPS definition is the presence of a link between the area of production and the characteristics (quality, reputation etc.) of the product. While the TRIPS agreement requires countries to provide legal means for protecting GIs against unfair competition, it does not specify the means by which protection should be provided. Protection for GIs is primarily provided through a so-called *sui generis* system based on appellations, originally developed in France and currently used by the European Union and many other countries worldwide (OECD 2000; WIPO 2007). In contrast to COOL, for a geographic name to be recognized and receive intellectual property protection as a GI – in the form of an appellation – producers must demonstrate the existence of a link between the characteristics of the geographic environment of production and the quality of the product that seeks the GI status (EU Reg. 510/2006 Art. 2 and Art. 4.2.f). Furthermore, in order for eligible producers in the delineated region to use the GI label, they must adhere (subject to third-party inspection) to established production specifications, including input and processing requirements, that are unique to the GI and beyond those of standard non-GI products (EU Reg. 510/2006 Art. 4). Finally, the European *sui generis* GI system specifically distinguishes between two distinct types of appellations, protected

designation of origin (PDO) and protected geographical indication (PGI) that differ depending upon how closely a product's quality is linked to geography. This distinction introduces an additional level of quality differentiation among GI labeled products, reserving the PDO status for the highest qualities (for additional details regarding the distinction between PDO and PGI see EU Reg. 510/2006, Art.2).[3]

Conceptually, to understand how these distinctions between different geographic labels provide information to consumers, consider a purchase situation in which a consumer faces a distribution of products over a spectrum of qualities. From the prospective of a consumer that takes the product quality distribution as exogenous, we can consider a purchase from a set of unlabelled (or generic) products as a draw from an unconditional distribution that spans the entire quality range. Similarly, a purchase of a product with a "geographical origin" label is a draw from a conditional distribution, whereby the conditional distribution varies by type of label. For country-specific products the distribution is over a sub-set of the quality spectrum and centered around a country-specific mean (that could be above or below the unconditional mean). For appellations the distribution is over a sub-set of a country-specific distribution, consisting of qualities above a truncation point determined by the appellation's quality standards. Finally, PDOs

[3] It is important to note that while the majority of GIs are protected in the form of appellations, a few others (e.g., Washington Apples) are protected through the trademark system and registered as certification marks. Certification marks differ substantially from appellations. Indeed, registration of a geographic name in the form of a certification mark does not require the existence of a link between quality and geography or the definition of product specification and quality standards. Indeed, when a certification mark includes a geographic name it is understood that the only attribute to be certified is the origin of the good (USPTO 2007). Hence, the informational content of GIs in the form of certification marks might substantially differ from that of GIs in the form of appellations.

are clustered in the upper portion of the appellation distribution. At each iteration (from COOL to appellations to PDOs), the derived conditional distribution is characterized by a higher mean and a smaller variance. Based on this conceptual framework, geographical origin labels are valuable to consumers for two reasons: (i) they provide a more precise indication of the expected quality of a given product (i.e., the expected mean of the distribution), thus improving the ability of the consumer to match with a desired quality (valued by both risk neutral and risk averse consumers) and (ii) they reduce the quality dispersion around the expected mean thereby reducing uncertainty regarding the purchase (valued by risk averse consumers).

In this paper, we investigate whether consumers indeed value the informational content of a set of geographical origin labels. Several empirical studies have attempted to quantify the value of specific GIs in isolation (see for example Bonnet and Simioni 2001; van der Lans et al. 2001; Scarpa and Del Giudice 2004; Santos and Ribeiro 2005; and Krystallis and Ness 2005). For an overview of empirical studies see Réquillart (2007). Our contribution is the first to consider three types of geographical origin labels with different levels of geographical differentiation: country-of-origin labels and two types of GIs, protected designations of origin (PDO) and protected geographical indications (PGI). As well, our study is the first to evaluate one of the primary motivations for greater promotion and utilization of GIs by European producers and regulators - expanding exports outside of the EU area. Specifically, we consider consumer preferences and demand for European GIs in a third-party country outside of the EU and not involved in the production chain. In order to disentangle and assess the value of these

origin labels, a stated-choice experiment was constructed and administered to a sample of adult Canadian consumers. The focus product, extra virgin olive oil, was selected because this type of oil represents a value-added product for which COOL and GI-labeling (specifically in the form of appellations) are a potentially powerful information and marketing tool.[4]

Our empirical findings correspond with the outlined theoretical framework of geographical origin labels. We find that consumers' willingness to pay for oils varies by country of origin, and that with regard to the oils from a given country consumers have a greater willingness to pay for GI-labeled than non-GI labeled products. We also find evidence that consumers value PDOs more than PGIs, but the result is not as strong as that found for GI versus non-GI.

Our findings provide evidence that country of origin and GI labels can assist consumers in making optimal consumption choices (i.e., what to buy and whether to buy a GI product or not) by improving the matching between consumers and products. Though the potential welfare gains due to more desirable resource allocations can only materialize when labels are credible and misleading information and counterfeited products are prevented. Hence, as a whole our finding are supportive of consumer protection policies and policy initiatives aimed at providing protection for geographical based labels. In addition, our finding that consumers are interested in and willing to pay

[4] We are not aware of extra virgin olive oil commercialized in Canada under a GI label in the form of a certification mark. Given the predominance of GIs in the form of appellations we limit our attention to this type of GIs. Moreover, a significant share of the extra virgin olive oil imported into Canada is from countries that extensively use GIs in the form of appellations.

for GI-labeled products supports the recent surge of interest by both developed and developing nations in protecting GIs and harnessing them as a marketing tool for expanding shares in export markets. [5]

In what follows, we first briefly present background information on the focus product, extra virgin olive oil. Then, we outline the choice experiment methodology employed for assessing consumers' valuations for geographical origin labels. The core of the article presents a discussion of the estimation results from a Bayesian mixed logit model with correlated coefficients using the full sample and three sub-samples obtained by partitioning consumers based on their purchasing location. Then, we conclude.

4.3 Researched product

There are several different governing bodies that establish standards for different types of olive oil. The International Standards under resolution COI/T.15/NC no. 3-25 (revised June 2003) lists nine grades of olive oil in two primary categories, olive oil and olive pomace oil. Extra virgin is the highest grade of olive oil. It is obtained solely from the

[5] The EU and member States have been at the forefront in investing substantial resources to sponsor the GI certification system and to promote specific GIs in international markets, including the United States, Russia and China (see e.g., the Italian ministry of Agriculture' website at http://www.agricolturaitalianaonline.gov.it). However, while the EU may have a longer history with GIs, other countries are introducing or expanding their own GI systems and promotion programs. Examples include China (Xiaobing and Kireeva 2007), India (Rao 2006), South Korea (Suh and MacPherson 2007), Colombia (Teuber 2007). Kenya and Switzerland have an ongoing project aimed at developing a GI system of protection in Kenya and at raising awareness on GIs in the East African Community member states (see the Swiss Institute of Intellectual Property's website at https://www.ige.ch/en.html).

fruit of the olive tree (Olea europa L.) with a chemical-free process that involves only pressure and is characterized by a natural level of low acidity (0.8%) (IOOC 2007).

As a traditional component of the Mediterranean diet, olive oil consumption has historically been significant in the Mediterranean countries. But, as this diet has gained popularity worldwide, consumption has grown considerably in many countries including Australia, Brazil, Canada, Japan, and the United States (global demand has risen at an annual rate of about 5.3% since 1995/96 according to Türkekul et al. 2007). According to the International Olive Oil council, imports of olive oil in Canada and the United States have increased from 64 million pounds in 1982 to 563 million pounds in 2005 (IOOC 2006).

Global olive oil production is concentrated in the Mediterranean countries with Italy, Greece, and Spain accounting for more than 70% of worldwide production. Smaller producing countries include Morocco, Portugal, Syria, Turkey, and Tunisia. In 2008, 23,074 tons of virgin and extra virgin olive oil were imported by Canada of which 86% were from either Italy, Spain or Greece (Italy alone represents about 70% of the total import in quantity), with a total average Free on Board (FOB) price of 3280 Euro/ton. The average price for Italian, Spanish, and Greek oils were 3258, 3469, and 3808 Euro/ton respectively (Ismea – Gtis).

Several empirical studies, all of which were conducted with domestic European consumers, have specifically considered consumer preferences for olive oil. Krystallis and Ness (2005) find that GIs are relevant cues for several consumer segments in Greece. Freitas Santos and Cadima Ribeiro (2005) find that Portuguese consumers are willing to

pay up to a 30% price premium for GI-labeled olive oil. Van der Lans et al. (2001) find for Italian consumers of extra virgin olive oil that PDO labels influence preferences only indirectly through perceived quality. Finally, a study by Scarpa and Del Giudice (2004) on extra virgin olive oil in Italy finds that origin matters differently across cities and that there is a bias in preferences towards local products.

4.4 Experimental procedure

The data for this study was collected via face-to-face interviews of consumers in the Toronto area of Ontario, Canada. Respondents were interviewed based on a convenience sample with each interview lasting approximately 15 minutes. Participants were screened for inclusion in the study based on two questions: whether they had (1) purchased and (2) consumed olive oil in the previous six months and three months respectively. Only those who answered both questions positively qualified for the study. Interviews were conducted during the course of a week at four food retail stores including one gourmet store, two medium-sized grocery stores and a farmers market in three different cities (Guelph, Hamilton, and Toronto). Different store types were chosen to capture different consumer segments.

A total of 207 individuals completed the full interview process and provided complete responses. Table 1 summarizes participants' socio-demographics.

Table 1. Socio-economic characteristics of sample

Variable	Variable definition	Count	% of Sample
Gender	Male	83	40
	Female	124	60
Age in years	19 – 34	38	18
	35 – 50	82	40
	51 – 60	49	24
	Older than 60	38	18
Education	Primary / Secondary	51	24
	Undergraduate	113	55
	Graduate	43	21
Income	Less than CAD $ 49,999	40	19
	CAD $ 50,000 – 99,999	86	42
	More than CAD $ 100,000	52	25
	No Answer	30	14
Household Size	1 Person	46	22
	2 Persons	82	39
	3 Persons	34	17
	4 Persons	34	17
	More than 4 Persons	11	5

The core section of the interview consisted of a stated-choice experiment, following standard procedures (Louviere, Hensher and Swait 2000; Street and Burgess 2007), in which the surveyed customers were shown sets of alternative product descriptions and asked to select the one they would purchase. Specifically, in each of ten product scenarios, each participant was asked to select between two different olive oils and the "none-of-them" alternative, providing a total of 2070 responses. Each alternative olive oil was defined by a full set of characteristics (full-profile) including price, appearance, color, packaging size, production method (organic vs. non-organic), country

of origin and GI-labels.[6] Following van der Lans et al. (2001), color and appearance were chosen as attributes describing olive oil visually. They are search quality attributes used by consumers to evaluate the product before purchase (Nelson 1970). Specifically, two colors (green, yellow) and two types of appearances (opaque, clear) were included. Three bottle sizes (0.5 lt., 0.75 lt. and 1 lt.) were also included. Based on the actual price range of extra virgin olive oils in the Canadian market, minimum and maximum price levels were identified. While usually the price spread should not be too large (Green and Srinivasan 1978), because of the presence of both conventional and organic olive oils, GI and non-GI labeled olive oils, as well as different bottle sizes, a price spread from 7 to 35 CAD $ was considered.[7]

With regard to credence attributes, two production methods (organic and non-organic) and several COOL and GI labels. COOL labels included oils from the three main olive oil producer countries: Greece, Italy and Spain were considered. GI-labels included three Italian GI oils: Terra di Bari PDO, Garda PDO and Tuscany PGI. As our study includes several attributes and levels, we employed a fractional factorial design to define the set of alternatives used in the experiment applying the SAS macro as described in Kuhfeld (2001).

[6] Profiles are characterized by unbalanced levels. Related studies (Van der Lans et al. 2001; Scarpa and Del Giudice 2004) also rely upon unbalanced profiles.

[7] For example, organic olive oils in Spain capture a price premium varying from 30-35% for loose oil to 100% for bottled oil (Medicamento and De Gennaro 2006).

4.5 A mixed logit model of consumers' choices

Consumers' choices of olive oils are modeled utilizing a random utility based discrete choice model, the multinomial mixed logit (MXL) with random and correlated coefficients. The MXL model is selected because, unlike the fixed coefficient multinomial logit (and related variants), it allows for taste heterogeneity unconditional on socio-economic covariates. Previous studies have shown that taste variation is only partially linked to, and poorly explained by, demographics such as age, education, gender, and income (Baker and Burnham 2001; West et al. 2003). Moreover, as Scarpa and Del Gudice (2004) note, a correlation structure across tastes for different attributes is typically present in the case of gourmet foods (such as extra virgin olive oil). This supports consideration of a correlated, over independent, distribution of taste parameters.

4.5.1 Model specification and estimation

Each of the study participants, i ($i = 1,...,N;\ N = 207$), faced ten choice situations ($t = 1,...,T;\ T = 10$). At each choice situation, the consumer was presented with a set of alternatives. Each set contained three elements: two olive oils and the "none-of-them" alternative. In total, there were twenty-one alternatives, indexed by j ($j = 1,...,J;\ J = 21$), including twenty olive oils and the "none-of-them" option. Let J_t represent the set of alternatives at choice situation t. The utility of person i from alternative j, in choice situation t is specified as $U_{ijt} = V_{ijt} + \varepsilon_{ijt}$ where

$$V_{ijt} = \left(\beta_{Oi}O_j + \beta_{Ai}A_j + \beta_{Yi}Y_j + \beta_{Ii}I_j + \beta_{Ki}K_j + \beta_{Gi}G_j + \beta_{Ni}N_j + \beta_P p_j\right)Size_j \qquad (1)$$

where ε_{ijt} is distributed iid extreme value over individuals, alternatives and time, p_j is the price per liter in CAD$ of alternative j and $Size_j$ is the size of the bottle in liters.[8] All remaining variables are dummies and described in table 2. In addition to the coefficients capturing the olive oil attributes (organic, appearance, country-of-origin and GI labels), we included one dummy variable capturing the "none-of-them" alternative (Hu, Veeman and Adamowicz 2005). In addition to the main model in equation (1) we estimated two additional alternative models (model 2 and model 3), that differ from the model in (1) with regards to their classification of the GI variable. The variables included in all the models are summarized in table 2.

Table 2. Summary of other variables used in the analysis

Variable			Variable definition
O			1 if organic
A			1 if clear, 0 if opaque
Y			1 if yellow, 0 if green
I[a]			1 if Italian oil
K[a]			1 if Greek oil
N			1 if "none-of-them"
Model 1	**Model 2**	**Model 3**	**GI variable definition**
G			1 if any GI (Tuscany, Terra di Bari, Garda)
	PGI		1 if PGI Tuscany
	PDO		1 if PDO Terra di Bari or PDO Garda
		T	1 if PGI Tuscany
		B	1 if PDO Terra di Bari
		R	1 if PDO Garda

[a] An indicator for Spanish olive oil is omitted.

[8] For the estimation purposes, the size of the "none-of-above" alternative is set to one (Alfnes et al. 2006).

The utility specification, where size multiplies all attributes coefficients, implies a proportional increase in utility with an increase in size (Alfnes et al. 2006). To investigate the effect of bottle size *per se* on consumer choices, we also test an alternative utility specification that includes size as an additional explanatory variable but rejected the model via a likelihood ratio test. Let $y_i = y_{i1},...,y_{iT}$ denote individual i's sequence of choices. Conditional on $\beta_i = \{\beta_{O,i},...,\beta_{N,i}\}$, and given the independent error structure, the probability of i's sequence of choices is equal to

$$L(y_i \mid \beta) = \prod_{t=1}^{T} \left[\frac{e^{V_{iy_{it}t}}}{\sum_{j \in J_t} e^{V_{ijt}}} \right] \tag{2}$$

which corresponds to a product of logits. The unconditional probability of individual i's sequence of choices is the integral of the expression $L(y_i \mid \beta)$ over β, $L(y_i \mid b, W) = \int L(y_i \mid \beta) f(\beta \mid b, W) d\beta$, where $f(\beta \mid b, W)$ is the multivariate distribution of the parameters. Summing the logarithm of the unconditional probabilities gives the log-likelihood function, $\sum_i \ln L(y_i \mid b, W)$. We assume a fixed price coefficient and multivariate normally distributed coefficients for the remaining variables in the model (Bonnet and Simioni 2001; Scarpa and Del Giudice 2004). The normal distribution, having support on both the negative and positive range, implies that some consumers like and some consumers dislike the considered attributes. With a fixed price coefficient, the willingness to pay is equal to the ratio of the attribute's coefficient to the price

coefficient. For example β_O / β_P is the additional WTP for one liter of organic oil compared to an otherwise equivalent but not organic oil. In addition, with a fixed price coefficient, the distribution of WTP corresponds to the scaled distribution of the attribute's coefficient.

Parameter estimates for β_P, b and W can be obtained by simulated maximum likelihood methods or via a hierarchical Bayesian procedure following the approach developed by Allenby (1997) and generalized by Train (2001). We use the second method.[9] Specifically, we estimate the mixed logit model using Matlab code written by Train for panel data with correlated coefficients based on hierarchical Bayes.[10] The Bayesian approach has been used in previous studies of consumers' preferences for food products (e.g., Hu et al. 2006).

4.6 Empirical results

As a baseline set of estimates, Table 3 presents results for the fixed coefficient multinomial logit and MXL with random (normal) independent coefficients for the utility specification in (1).

[9] For readers who may be less familiar with Bayesian methods, the Bernstein-von Misen theorem guarantees that the estimators resulting from the Bayesian procedure has the same properties as the large sample maximum likelihood estimator. "The researcher can therefore use the Bayesian procedures to obtain parameter estimates and then interpret them as if they were maximum likelihood estimates" (Train 2003: 287), where "…the mean of the posterior provides the point estimate and the standard deviation of the posterior provides the standard error" (Train 2003: 294).

[10] Available at Train's webpage http://elsa.berkeley.edu/~train/software.html.

Table 3. MNL and independent coefficient MXL parameter estimates

	Independent coefficient MXL		**MNL**
	Mean coeff.	**Variance coeff.**	**Mean coeff.**
Price	-0.253***	-	-0.194***
	(0.023)		(0.017)
Organic	2.385***	7.495***	2.525***
	(0. 515)	(1.987)	(0.359)
Clear	-0.179	1.699***	-0.039
	(0. 174)	(0.600)	(0.099)
Yellow	0.340	1.260***	0.489***
	(0. 218)	(0.588)	(0.149)
Italy	2.391***	4.192***	1.485***
	(0. 292)	(1.222)	(0.151)
Greece	0.114	1.127	0.353
	(0. 275)	(0.850)	(0.192)
GIs	1.015***	4.282***	0.790***
	(0. 262)	(1.263)	(0.159)
None-of-Them	-9.494***	17.787***	-3.778***
	(1.162)	(6.902)	(0.253)
Log-Likelihood	-1263		-1433

The asterisks indicate the level of significance at 1% for ***, 5% for **, and 10% for *.

Based on the likelihood ratio test we reject both models in favor of the MXL model with random correlated coefficients that is presented in Table 4 (model 1).

Table 4. Parameters estimates of mixed logit models with random correlated coefficients

	Model 1				Model 2				Model 3			
	Mean coeff.	**Variance coeff.**	**S>0[a]**	**WTP[b]**	**Mean coeff.**	**Variance coeff.**	**S>0[a]**	**WTP[b]**	**Mean coeff.**	**Variance coeff.**	**S>0[a]**	**WTP[b]**
Price	-0.306***	-	-	-	-0.373***	-	-	-	0.393***	-	-	-
	(0.029)				(0.046)				(0.053)			
Organic	2.576***	5.227***	77%	8.42	3.096***	4.967*	91%	8.30	5.187***	7.043***	97%	13.20
	(0.617)	(2.064)			(0.638)	(2.584)			(0.983)	(2.726)		
Clear	0.041	2.977***	67%	0.13	-0.202	6.710***	67%	-0.54	0.486	6.139***	53%	1.24
	(0.245)	(0.858)			(0.543)	(2.074)			(0.630)	(2.213)		
Yellow	0.000	3.089***	51%	0.00	0.054	5.074***	64%	0.14	1.009*	4.784***	67%	2.57
	(0.303)	(1.048)			(0.367)	(1.644)			(0.490)	(1.659)		
Italy	2.899***	9.558***	86%	9.48	2.915***	10.750***	85%	7.81	3.017***	11.801***	81%	7.68
	(0.415)	(2.951)			(0.449)	(3.231)			(0.596)	(3.786)		
Greece	0.368	5.826***	60%	1.20	0.016	6.489***	54%	0.04	0.128	8.355***	52%	0.33
	(0.395)	(2.120)			(0.412)	(2.353)			(0.442)	(3.197)		
GIs	1.451***	3.955***	70%	4.74	-	-	-	-	-	-	-	-
	(0.284)	(1.263)										
PGI Tuscany	-	-	-	-	1.669***	3.321***	76%	4.48	1.612***	3.499***	78%	4.10
					(0.296)	(1.209)			(0.327)	(1.255)		
Other GIs [c]	-	-	-	-	2.109*	20.611***	57%	5.66	-	-	-	-
					(1.278)	(7.045)						
PDO Terra di Bari	-	-	-	-	-	-	-	-	-0.769	17.963	82%	-1.96
									(1.825)	(12.500)		
PDO Garda	-	-	-	-	-	-	-	-	1.535	30.083*	60%	3.91
									(1.533)	(14.506)		
None-of-Them	-9.185***	24.452***			-10.904***	38.647***			-	24.336	96%	
	(1.070)	(7.771)	-	-	(1.857)	(16.217)	-	-	8.673***	(15.836)		-
									(2.059)			
Log-Likelihood	-1232				-1215				-1204			

The asterisks indicate the level of significance at 1% for ***, 5% for **, and 10% for *.

[a] S > 0 denotes share of consumers with positive preferences.

[b] Willingness to pay is measured in Canadian dollars per Liter.

[c] Other GI denotes a PDO Terra di Bari or PDO Garda olive oil (i.e. not a Tuscan GI)

Table 4 also presents estimates for two alternative models that differ with regards to their classification of the GI variable(s).[1] In the base model (model 1), a single dummy variable "GIs" is included (equal to 1 for PDO Terra di Bari, PDO Garda or PGI Tuscany oils). In model 2, two dummy variables are used to separate the two types of GIs, PDO and PGI (one dummy equal to 1 for PGI Tuscany and one dummy equal to 1 for PDO Terra di Bari or PDO Garda oils). Finally, model 3 includes three dummy variables, one for each of the considered GI labels (Tuscany, Terra di Bari and Garda).

In all three models price is negative and statistically different from zero as one would expect. With regard to COOL, in each of the three models the posterior mean for the Italy coefficient is found to be positive and statistically different from zero. The estimates reveal that Canadian consumers (81-86% depending upon the model) prefer Italian olive oils over Spanish oils and are willing to pay a considerable premium (ranging from 7.68 to 9.48 CAD$/Liter) for Italian oils.[2] As well, the variance coefficient for Italy is found to be significant and sizable indicating that consumers are heterogeneous in their preferences for Italian oils. The posterior mean of the Greece coefficient is not found to be significant indicating that the sample of Canadian consumers does not prefer Greek over Spanish oils or vice versa.

In model 1, the coefficient for the single included GI dummy variable is positive and significant indicating that consumers respond to and are willing to pay a premium for GI olive oils. But, when comparing the estimates for Italian labels and GI labels, an interesting

[1] Estimates of the variance-covariance matrix for the three models are available upon request from the authors.

[2] This corresponds with the "informal notion" that Italy enjoys an unrivaled international reputation for olive oil (Lusk et al. 2006; Anania and Pupo D'Andrea 2007).

result emerges. For both types of oils, Italian and Italian GI, a large percentage of consumers are estimated to have a positive preference, but the percentage is greater for Italian oils over GI oils (86% versus 70%). As well, the average WTP for Italian oils is twice that of the GI oils (9.48 versus 4.74 CAD$/Liter). This indicates that, while consumers are willing to pay a premium for Italian COOL and GI labels, the country-of-origin label captures much of the premium. This result is found to be consistent across the three models.

To test the hypothesis that consumers value PDO more than PGI, in model 2 dummy variables are included to separate the PGI (Tuscany PGI) from the PDO labels (Terra di Bari PDO and Garda PDO). Consistent with expectations, we find that consumers are willing to pay slightly more on average for the PDO than for the PGI oils (5.66 versus 4.48 CAD$/Liter). While this result provides evidence that PDOs are considered superior to PGIs (in fact, PDOs require a stronger geography-quality link in order to obtain certification than PGI), particularly given that the PGI used in this study is from a well-known tourist region associated with fine food products while the PDOs are from lesser known regions, it presents only part of the picture. We also find that for the PDOs, the estimated variance coefficient is quite large indicating sizable heterogeneity among the sample's preferences for these GIs. As well, the estimated share of consumers with positive preferences is only slightly more than half (57%). Conversely, for the Tuscan GI, the variance is magnitudes less and a larger share has positive preferences (76%). These results combined indicate that Tuscany is a more recognizable and widely valued GI, even though the premium consumers are willing to pay is lower than for the less recognized, but higher geography-quality linked, PDO oils.

Of the other considered attributes, neither of the two appearance features (opaque vs. clear and yellow vs. green) are found to play a significant role in determining consumers'

choices of oils. This falls in line with expectations that visual attributes of olive oils are not reliable cues for quality.[3]

The estimates across the three models provide strong evidence that consumers have favorable views of organic olive oils. In models 1 and 2 the estimated percentage of consumers with positive preferences for organic olive oils is 77% and 91% respectively. These results straddle the findings by Scarpa and Del Giudice (2004) that about 80% of their sample of Italian consumers prefer organic olive oils. For the two models, we estimate that consumers are willing to pay a sizable premium for organic olive oils of between 8.30 and 8.42 CAD$/Liter.

4.6.1 Taste variation based on consumer shopping location

While the results presented in the previous section provide strong evidence that consumers value both COOL and GI labels (with a greater value for the former), the models also indicate that there is significant taste heterogeneity among individuals. In lieu of considering commonly available socio-economic attributes (e.g., gender or age), which have been shown to be poor explanatory variables for taste heterogeneity, we consider differences in preferences based upon consumer shopping locations. Under the assumption that attributes unobserved by the researcher result in consumer self-selection in terms of their shopping locale, we can exploit this to compare preferences across consumer segments.

As discussed in the experimental procedure section, the sample for this study was drawn from three store types: supermarkets, gourmet stores, and farmers markets. One would

[3] The appearance (opaque vs. clear) and the color of olive oil widely depend on the olives' variety and the transformation techniques (settling and filtration) and are generally not reliable indications of the quality of olive oil.

expect preferences and unobserved individual level attributes to be related to consumers' selection of their primary shopping markets. For example, one might postulate that an individual who chooses to shop at a gourmet store would have a greater preference for ethnic or traditional products. As well, one might expect that individuals who choose to shop at farmers markets would have stronger preferences for natural, local and fresh foods when compared to shoppers at other locations.

To compare estimates across shopping locations, model 1 from the previous section was re-estimated using data from three sub-samples of consumers partitioned based upon their interview location. Table 5 presents, for each of the shopping locations, the ratio of the estimated posterior means for three measures comparing relative valuations: Italy COOL / Organic, GI / Organic, and Italy COOL / GI.

Table 5. Ratio of mean estimates

Shopping location	Sample size	Italy/Organic	GI/Organic	Italy/GI
Gourmet store	57	3.42	1.78	1.92
Supermarket	101	0.79	0.46	1.71
Farmer market	49	0.58	0.35	1.65

From the ratios presented in table 5, it is evident that there are significant differences in preferences across the three shopping location sub-samples. Ceteris paribus, gourmet store patrons prefer Italian over organic olive oils by a significant factor of 3.42. Conversely, for supermarket and farmers market shoppers, the ratios are less than one indicating that they prefer organic over Italian oils. When considering GI versus organic olive oil, the picture is similar with gourmet store patrons preferring the former and supermarket and farmer market patrons preferring the latter. Interestingly, the relative preference for Italy versus GI is fairly

similar across the three shopping locations and ranges from a factor of 1.65 to 1.92. This indicates that preference for Italy COOL over Italy GI labels is consistent across consumers in different shopping segments. As a whole, the results presented in table 5 tend to support the hypothesis that consumers who self-select in terms of their shopping location do have varying preferences. But the greatest variation is found to be between gourmet and non-gourmet shoppers in terms of their relative valuations for geographical origin labeled olive oils and organic olive oils.

4.7 Conclusions

Motivated by the recognition that geography is often correlated with, or an important determinant of, the overall quality of agricultural products – the concept of *terroir* (Barham 2003; Josling 2006) – regulators, consumer groups, and industry representatives have increasingly considered the potential role of geographical origin labels as consumer information and marketing tools. In this article we investigate whether consumers indeed recognize and value the informational content of a variety of nested geographical origin labels. In particular, this study has disentangled three types of geographical origin labels with different levels of geographical differentiation: country-of-origin labels and two types of GIs, protected designations of origin (PDO) and protected geographical indications (PGI). Furthermore, in contrast to previous studies addressing European GIs, we have considered their potential in an important export market; thus facilitating an assessment of the value and potential for GIs as a tool for expanding export share.

We find that, within the context of a high quality value-added commodity such as extra virgin olive oil, consumers' willingness to pay for oils from different countries varies,

ceteris paribus, across countries, and that within a country consumers have a greater willingness to pay for GI-labeled than non-GI labeled products. We also find evidence that consumers value PDOs more than PGIs, but the result is not as strong as that found for GI versus non-GI. Finally, to better account for taste heterogeneity among consumers, we partition the sample on the basis of consumers' choice of shopping location and find that different consumer groups vary to a large degree in their valuations for COOL, GI, and organic olive oils.

As a whole, our findings are consistent with the hypothesis that geographical origin labels are valued by consumers for their ability to provide information regarding the quality of the product and that the value is increasing with the informational content. Nevertheless, as the data show, the additional premia for GIs and PDO are relatively smaller than the premium for COOL, indicating that there might be decreasing returns to geographical labeling. Therefore, given that pursuing and receiving protected geographical indication status and meeting the required standards is not without cost, producers considering further geographical differentiation of their products beyond the country of origin level should interpret our findings with caution.

4.8 References

Alfnes F., A.G. Guttormsen, G. Steine and K. Kolstad (2006) Consumers' Willingness to Pay for the Color of Salmon: a Choice Experiment with Real Economic Incentives *American Journal of Agricultural Economics* 88(4): 1050-1061.

Alfnes F. and K. Rickertsen (2003) European Consumers' Willingness to Pay for U.S. Beef in Experimental Auction Markets *American Journal of Agricultural Economics* 85(2): 396-405.

Allenby G. (1997) An introduction to hierarchical Bayesian modeling. Tutorial Notes, Advanced Research Techniques Forum, American Marketing Association.

Akerlof G.A. (1970) "The Market for Lemons: Quality Uncertainty and the Market Mechanism" *Quarterly Journal of Economics* 84: 488-500.

Anania G. and M. R. Pupo D'Andrea (2007) The global market for olive oil: actors, trends, prospects and research needs. Paper prepared for presentation at the I Mediterranean Conference of Agro-Food Social Scientists, 103rd EAAE Seminar "Adding Value to the Agro-Food Supply Chain in the Future Euro-Mediterranean Space." Barcelona, Spain, April 23rd - 25th, 2007.

Barham E. (2003) "Translating terroir: the global challenge of French AOC labeling" *Journal of Rural Studies* 19:127-138.

Baker G.A. and T.A. Burnham (2001) "Consumer Response to Genetically Modified Foods: Market Segment Analysis and Implications for Producers and Policy Makers" *Journal of Agricultural and Resource Economics* 26: 387-403.

Bech M. and D. Gyrd-Hansen (2005) "Effects coding in discrete choice experiments" *Health Economics* 14: 1079-1083.

Bilkey W.J. and E. Nes (1982) "Country-of-origin effects on product evaluations" *Journal of International Business Studies* 8(Spring/Summer): 89-99.

Bonnet C. and M. Simioni (2001) "Assessing consumer response to protected designation of origin labeling: a mixed multinomial logit approach" *European Review of Agricultural Economics* 28(4): 433-449

Carter C., B. Krissof and A. Peterson Zwane (2006) "Can Country-of-Origin Labeling Succeed as a Marketing Tool for Produce? Lessons from Three Case Studies" *Canadian Journal of Agricultural Economics* 54: 513-530.

Chung C.,T. Boyer and S. Han (2009) "Valuing Quality Attributes and Country of Origin in the Korean Beef Market" *Journal of Agricultural Economics* 60 (3): 682-698.

Clemens R. and B.A. Babcock (2004) "Country of Origin as a Brand: The Case of New Zealand Lamb" MATRIC Briefing Paper 04-MBP 9 November 2004.

Gilmore F. (2002) "A country - can it be repositioned? Spain - the success story of country branding" *Journal of Brand Management* 9(4/5): 281-293.

Green P.E. and V. Srinivasan (1978) "Conjoint Analysis in Consumer Research: Issues and Outlook" *Journal of Consumer Research* 5 (September): 103-23.

Hu W., M.M. Veeman and W.L. Adamowicz (2005) "Labelling Genetically Modified Food: Heterogeneous Consumer Preferences and the Value of Information" *Canadian Journal of Agricultural Economics* 53(1): 83-102.

Hu W., M.M. Veeman, W.L. Adamowicz and G. Gao (2006) "Consumers' Food Choices with Voluntary Access to Genetic Modification Information" *Canadian Journal of Agricultural Economics* 54(4): 585-604.

IOOC (2006) International Olive Oil Council, http://www.internationaloliveoil.org, August 1st, 2006.

IOOC (2007) International Olive Oil Council, http://www.internationaloliveoil.org/web /aa-ingles/oliveWorld/aceite.html, December, 5th, 2007.

Josling T. (2006) "The War on Terroir: Geographical Indications as a Transatlantic Trade Conflict" *Journal of Agricultural Economics* 57: 337-363.

Krystallis A. and M. Ness (2005) "Consumer Preferences for Quality Foods from a South European Perspective: A Conjoint Analysis Implementation on Greek Olive Oil" *International Food and Agribusiness Management Review* 8 (2): 62-91.

Kuhfeld W.F. (2001) Multinomial Logit, Discrete Choice Modeling: An Introduction to Designing Choice Experiments, and Collecting, Processing, and Analyzing Choice Data with SAS. TS-643. SAS Institute Inc., Cary, NC, USA.

Lence S.H., S. Marette, D. Hayes, and W. Foster (2007) "Collective Marketing Arrangements for Geographically Differentiated Agricultural Products: Welfare Impacts and Policy Implications" *American Journal of Agricultural Economics* 89: 947–963.

Loureiro M.L. and J.J. McCluskey (2000) "Assessing Consumer Response to Protected Geographical Indication Labeling" *Agribusiness* 16(3): 309-320.

Loureiro M.L. and W.J. Umberger (2003) "Estimating Consumer Willingness to Pay for Country-of-Origin Labeling" *Journal of Agricultural and Resource Economics* 28: 287-301.

Louviere J.J., D.A. Hensher and J.F. Swait (2000) Stated Choice Methods and Analysis. Cambridge: Cambridge University Press.

Lusk J.L., J. Brown, T. Mark, I. Proseku, R. Thompson and J. Welsh (2006) "Consumer Behavior, Public Policy, and Country-of-Origin Labeling" *Review of Agricultural Economics* 28(2): 284–292.

Medicamento U. and B. De Gennaro (2006) Social Networks and Supply chain Management in Rural Areas: A Case Study Focusing on Organic Olive Oil. Poster paper prepared for presentation at the International Association of Agricultural Economists Conference, Gold Coast, Australia, August 12-18, 2006.

Moschini G.C., L. Menapace and D. Pick (2008) "Geographical Indications and the Competitive Provision of Quality in Agricultural Markets" *American Journal of Agricultural Economics* 90: 794-812.

Nelson P. (1970) "Information and Consumer Behaviour" *Journal of Political Economy* 78: 311-329.

Nelson P. (1974) "Advertising as information" *Journal of Political Economy* 82: 729-754.

OECD (2000) Appellations of Origin and Geographical Indications in OECD Member Countries: Economic and Legal Implications, COM/AGR/APM/TD/WP(2000)15.

Rao S.S. (2006) "Indigenous knowledge organization: An Indian scenario" *International Journal of Information Management* 26: 224–233.

Réquillart V. (2007) On the Economics of Geographical Indications in the EU. Paper presented at the workshop "Geographical Indications, Country of Origin and Collective Brands: Firm Strategies and Public Policies. Toulouse, June 14-15, 2007.

Rude J., J. Iqbal and D. Brewin (2006) "This Little Piggy Went to Market with a Passport: The Impacts of U.S. Country of Origin Labeling on the Canadian Pork Sector" *Canadian Journal of Agricultural Economics* 54: 401–420.

Santos J.F. and J.C. Ribeiro (2005) Product attribute saliency and region of origin: Some empirical evidence from Portugal. Paper prepared for presentation at the 99th seminar of the EAAE (European Association of Agricultural Economists), "The Future of Rural Europe in the Global Agri-Food System." Copenhagen, Denmark, August 24-27, 2005.

Scarpa R. and T. Del Giudice (2004) "Market segmentation via Mixed Logit: Extra-Virgin Olive Oil in Urban Italy" *Journal of Agricultural and Food Industrial Organization* 2(7). Available at: http://www.bepress.com/jafio/vol2/iss1/art7.

Street D.J., and L. Burgess (2007) The Construction of Optimal Stated Choice Experiments. New York: Wiley.

Suh J., and A. MacPherson (2007) "The impact of geographical indication on the revitalisation of a regional economy: a case study of 'Boseong' green tea" *Area* 39(4): 518-527.

Teuber R. (2010) "Geographical Indications of Origin as a Tool of Product Differentiation – The Case of Coffee" *Journal of International Food and Agribusiness Marketing*, forthcoming.

Tonsor G.T., T.C. Schroeder, and J.A. Fox (2005) "European Preferences for Beef Steak Attributes" *Journal of Agricultural and Resource Economics* 30(2): 367-380.

Train K.E. (2001) A comparison of hierarchical Bayes and maximum simulated likelihood for mixed logit. Working Paper, Department of Economics, University of California, Berkeley.

Train K.E. (2003) Discrete Choice Methods with Simulation. Cambridge, MA: Cambridge University press.

Türkekul B., C. Günden, C. Abay, and B. Miran (2007) A Market Share Analysis of Virgin Olive Oil Producer Countries with special respect to Competitiveness. Paper prepared for presentation at the I Mediterranean Conference of Agro-Food Social Scientists. 103rd EAAE Seminar "Adding Value to the Agro-Food Supply Chain in the Future Euromediterranean Space." Barcelona, Spain, April 23 - 25, 2007.

Umberger W.J., D.M. Feuz, C. R. Calkins and B.M. Sitz (2003) "Country of Origin Label of beef products: U.S. Consumers' Perceptions" *Journal of Food Distribution Research* 34(3): 103-116.

Unterschultz J., K.K. Quagrainie, M. Veeman and R.B. Kim (1998) "South Korean Hotel Meat Buyers' Perceptions of Australian, Canadian and U.S. Beef Canadian" *Journal of Agricultural Economics* 46: 53–68.

Van der Lans I.A., K. van Ittersum, A. De Cicco and M. Loseby (2001) "The role of the region of origin and EU certificates of origin in consumer evaluation of food products" *European Review of Agricultural Economics* 28(4): 451-477.

Van Ittersum K., M.T.G. Meulenberg, H.C.M van Trijp and M.J.J.M. Candel (2007) "Consumers' Appreciation of Regional Certification Labels: A Pan-European Study" *Journal of Agricultural Economics* 58(1): 1-23.

Verlegh P.W.J. and J-B.E.M. Steenkamp (1999) "A review and meta-analysis of country-of-origin research" *Journal of Economic Psychology* 20(5): 521-546.

West G.E., B. Laruce, C. Gendron and S.L. Scott (2003) "Consumer Confusion over the Significance of Meat Attributes: The Case of Veal" *Journal of Consumer Policy* 25: 65-88.

WIPO (2007) "Perspectives for Geographical Indications" WIPO/GEO/BEI/07, Beijing, June 26-28, 2007.

Xiaobing W. and I. Kireeva (2007) “Protection of Geographical Indications in China: Conflicts, Causes and Solutions” *The Journal of World Intellectual Property* 10(2): 79–96.

Zago M.A. and D. Pick (2004) “Labeling Policies in Food Markets: Private Incentives, Public Intervention, and Welfare Effects” *Journal of Agricultural and Resource Economics* 29(1): 150-165.

CHAPTER 5: STRENGTH OF INTELLECTUAL PROPERTY PROTECTION FOR GEOGRAPHICAL INDICATIONS: PROMOTION INCENTIVES AND CROSS-BORDER WELFARE EFFECTS

5.1 Abstract

This paper addresses the question of how a strengthening of current international intellectual property (IP) provisions for geographical indications (GIs) would affect the market outcomes and the distribution of welfare. We explicitly considers the role of promotion in expanding market demand when consumers lack information regarding either the existence or the features of GI and GI-like products. The model highlights the diverging interests of GI-exporting and GI-importing countries with regard to GI provisions in international markets and provides a key to interpret the current controversy over GIs among WTO members.

5.2 Introduction

Geographical Indications (GIs) are names of places or regions used to brand goods with a distinct geographical connotation. Many GIs pertain to wines (e.g., Champagne and Burgundy), and agricultural and food products (e.g., Boseong' green tea and Parmigiano-Reggiano cheese). The characterizing feature of GI products is that some quality attribute of interest to consumers is considered to be inherently linked to, or determined by, the nature of the geographic environment in which production takes place (e.g., climate conditions, soil composition, local knowledge, traditional production methods)—i.e., to the notion of "terroir" (Josling 2006). GIs are similar to trademarks in that they identify the origin or the source of the good and help differentiate individual products among similar goods by

communicating the "specific quality" that is due to the geographical origin (Kireeva 2009). As a result of these important economic functions, GIs have gained recognition as a distinct form of intellectual property (IP) rights in the TRIPS agreement of the World Trade Organization (WTO).

Whereas the TRIPS agreement requires WTO member countries to provide a minimum level of protection for GI names,[1] the form and strength of IP protection granted to GIs varies greatly among countries. In the European Union (EU), GI laws require that only products genuinely originating in a given area can be labeled with the area's geographic name (i.e., the rights over the use of GI names for branding are exclusive to the producers operating in the designated production areas). The strong protection of GI names enforced in the EU is not mirrored by many countries internationally where it is legally permissible to use GI names to label products that do not originate within the denoted geographical region (i.e., IP rights are not exclusive). For example, in the United States it is permissible to label sparkling wines produced in California as Champagne and to label a cheese made in Wisconsin as Romano.[2]

These conflicting forms and strengths of IP protection among countries is a source of ongoing controversy internationally and is a topic of current debate among WTO members. Some countries, predominantly those with large stocks of GI products, are in favor of more stringent IP policies for GIs. They are requesting for IP rights over GIs to become exclusive,

[1] Specifically, the TRIPS agreement requires WTO member countries to provide legal means to prevent any use of GI names "which constitutes an act of unfair competition" (TRIPS Art.22.2).

[2] This branding practice is subject to some restrictions including the fact that the "real origin" of the product must be specified on the label.

effectively reallocating IP rights from producers outside to producers inside the GI regions. Countries in opposition, including the United States, have made efforts to block measures to strengthen IP provisions for GIs. This paper represents the first contribution that formalizes the open economy implications of GIs and addresses the timely question of how a change in the current IP policy for GIs would affect market outcomes and the distribution of welfare internationally.

The focus of our analysis is on the "strength" of IP protection. Specifically, we analyze how the strength of IP protection affects the incentives of producers to promote (i.e., to provide information to consumers about products) and, in turn, how it affects the distribution of welfare among producer groups and consumers, and across international markets. The polar case of strongest IP rights is represented by EU regulations on GIs which, as explained above, guarantee protection in any labeling context. To comply with EU regulations, labels used by producers outside a given GI area must be significantly different from the area's geographical name so as to avoid even the "evocation" of the GI in the minds of the consumers. For example, the trademark Cambozola for blue cheese, which arguably sounds similar to Gorgonzola, was challenged on the basis of evocation of the protected designation of origin Gorgonzola. The other polar case is represented by the lack of any protection for GI names, a hypothetical case in which (plain) counterfeiting is allowed. Currently, US laws fall in between these two polar cases. As discussed earlier, US law allows, under certain conditions, the use of a GI name (or similar-sounding names) to label products independently of the product's origin.

In line with existing literature on GIs (e.g., Zago and Pick 2004; Anania and Nisticó 2004; Lence et al. 2007; Moschini, Menapace and Pick 2008), our analysis is based on the

assumption that GI products possess some "specific quality" valued by consumers that is due to the geographical origin and cannot be replicated elsewhere, and that consumers value, albeit to a lesser extent, a "generic version" of the product that can be produced anywhere but is devoid of the "specific quality." Moreover, our analysis complements and adds to existing studies by explicitly considering the role of promotion. When consumers lack information regarding the existence or the features of a product, there is scope for producers to expand market demand through promotion. Promotion, in this context, has an "informational function" similar to the "extending reach" function of advertising discussed by Norman, Pepall and Richards (2008). In their words, advertising (here promotion) "…informs consumes how to extract utility from the product, either by telling them of its existence in the first place or, instead, how properly to make use of it" (Norman, Pepall and Richards 2008 p. 720).

By affecting the labeling options for producers, the strength of IP rights indirectly affects the ability of promotion to inform consumers in two possible ways. First, weak IP rights might favor spillovers of information across products. For example, a promotional effort that informs consumers that "Pecorino Romano" is a "hard, salty and sharp" cheese also informs consumers that all Romano labeled cheese is "hard, salty and sharp." Hence, promotion by either GI or GI-like-product producers expands the demand facing all firms when products share similar labels. Other things equal, the presence of spillovers increases the amount of information generated by each dollar spent in promotion, but also creates the potential for free-riding behavior. Second, weak IP rights might favor the dilution of the "specific" informational content of GI promotion. When products share the same name, it might be more difficult for GI producers to successfully inform consumers about the

distinctive features of the GI so that, with some probability, the piece of information regarding the GI "specific quality" goes unnoticed. *Ceteris paribus*, dilution reduces the amount of information produced by each dollar spent by GI producers, thereby reducing the incentive of GI producers to promote.

In this market environment, producers of the GI-like product have two types of incentives to use brand names that resemble the GI. One consists of the counterfeiting motive, i.e., firms producing a lesser quality product have the incentive to pass off their products as that of a better quality competitor to capture the price premium associated with the better quality. A second motive—a novel feature of our paper in the GI literature—is that firms can free ride on information spillovers (and information dilution) of the promotion of a substitute good. Therefore, even when consumers are not confused or misled by the generic firms' labels into believing that the their product is a GI, producers of the GI-like product might still be better off by choosing labels that are as similar as legally permissible to the GI. In this paper, we limit ourselves to the second of these two motives and assume that the strength of the IP policy effectively determines the labeling choice of the firms producing the GI-like product thereby determining the degree of information spillover and information dilution.

The presence of information spillovers/dilution in the absence of exclusive IP rights has been ignored in previous research and, hence, implicitly assumed to be of no value/cost for producers or consumers. As is explored in this article, this omission in previous research has a significant impact on welfare analysis of IP protection policies for GIs.

In what follows, we specify a model that parsimoniously captures the key elements of the IP policies concerning GIs and the critical elements that characterize GI markets.

Specifically, with regard to the supply of GIs, our model allows for the existence of both economies of scale at the industry level due to the collective behavior of the GI producers (i.e., GI producers share fixed costs), and diseconomies of scale at the industry level that could arise from the geographic limitations characterizing GIs. In line with empirical literature documenting the existence of market power in oligopolistic food markets, with regard to the GI-like (or substitute) product we consider an oligopolistic industry. The effects of different IP provisions for GIs are then analyzed in a two-stage game framework. In the first stage, producers decide how much to promote and, in the second stage, firms compete in quantities.

We show that GI-importing and GI-exporting countries have divergent interests when it comes to the degree of IP protection to afford to GIs in international markets. Specifically, we show that exporting countries would likely benefit from a strengthening of current GI provisions. Stronger IP provisions for GIs, in fact, favor the expansion of the GI industry and increase the ability of GI producers to extract rents from the presence of scarce factors owned by producers within the GI area. Importing countries, on the other hand, stand to lose from a further strengthening of current IP provisions. We show that, for importing countries, the largest gains from IP rights are achieved by granting an intermediate level of protection that maximizes GI producers' incentives to provide consumer information through promotion. The information provided through promotion benefits the producers of the GI-like good by expanding the demand for their product. For producers of the GI-like good stronger IP rights are likely to yield losses for two reasons. First, with stronger IP rights we find that GI producers tend to reduce the amount invested in promotion. Second, the promotion by GI producers is less likely to expand the demand for GI-like products because the degree of

substitutability between GI and GI-like products declines in consumers' eyes as IP rights strengthen. Finally, we show that domestic consumers in the GI-importing country also might have relatively little to gain from stronger GI policies, especially when the domestic sector has limited market power.

In the next section, we present the structure of the model and derive equilibrium conditions. Next, we discuss the welfare implications of various degree of IP protection for GIs for producer groups, consumers, GI-importing and GI-exporting countries. Finally, we conclude.

5.3 Structure of the model

We consider a market with two goods, G and S. Good G represents a GI product and good S represents the GI-like product (S stands for substitute). Both products G and S are characterized by the same basic attributes measured by the parameter $u > 0$. Product G, in addition, is characterized by a "specific quality" that is measured by the parameter $h > 0$. Both u and h are exogenous.

Good G is assumed to be produced by a competitive industry with free entry, characterized by numerous potential firms and diseconomies of scale at the industry level (Moschini, Menapace and Pick 2008). Specifically, we assume that each potential firm either produces at an optimal efficient scale, equal to $\ell > 0$, or stays out of the market. Firms are heterogeneous with respect to their production cost, which is determined by the inefficiency parameter η. We let the variable cost of a firm of type η be equal to $c(\eta) = v + \delta\eta$. For simplicity, we assume that the distribution of producers types is uniform over the interval, $\eta \in U[0, \infty)$.

Active firms also incur promotion costs. Whereas firms act as independent profit-maximizers when deciding whether to produce or not (i.e., whether to join the industry) and take prices and promotion costs as given, the decision of how much to promote is made collectively by the producer association representing the industry so as to maximize the aggregate industry profit (Lence et al. 2007; Moschini, Menapace and Pick 2008). Promotion costs are shared equally on a per-firm (or, equivalently, per-unit) basis. We denote by $F \geq 0$ the aggregate investment in promotion by sector G.

We assume that good S is produced by an oligopolistic industry. The presence of oligopolistic instances and market power in the food sector has been extensively documented by a rich empirical literature (e.g., Gisser 1982; Bhuyan and Lopez 1997; Sexton 2000; Buccirossi, Marette and Schiavina 2002; Connor 2003). Specifically, we assume that good S is produced by an oligopolistic industry with $N \in \mathbb{N}$ firms and a constant marginal cost of production equal to $c \geq 0$. Each firm $j = 1,...,N$ invests an amount $k_j \geq 0$ in promotion. We denote the aggregate amount of promotion invested by firms producing good S by $K \geq 0$. Hence, $K = k_1 + ... + k_j + ... + k_N$.

5.3.1 Promotion, consumer information and the strength of IP rights

We assume that, before promotion takes place, consumers have no knowledge regarding the products' characteristics, u and h. Hence, before promotion takes place, all consumers are in the "no information" set (information set 1 in table 1). Consumers can nevertheless become informed about u and h through promotion.

The promotional message of the S-producers consists of one piece of information regarding u. The message of group G consists of two pieces of information regarding u and h. Given the aggregate dollar amount invested in promotion by the producer group of good G and by the firms producing good S, $F \geq 0$ and $K \geq 0$, the shares of the potential market, $\alpha \in [0,1]$ and $\beta \in [0,1]$, reached by the promotion of good G and good S are assumed to be equal to

$$\alpha = 1 - e^{-2t\sqrt{F}} \tag{12}$$

$$\beta = 1 - e^{-2\tau\sqrt{K}} \tag{13}$$

respectively. Functions (12) and (13) are increasing and globally concave in their arguments, F and K. This means that larger shares of consumers can be reached by increasing the amount of promotion but at a decreasing rate. In addition, as F and K tend to zero, the marginal share of the potential market that can be reached by promotion tends to infinity. *Ceteris paribus*, greater values of the parameters $t \geq 0$ and $\tau \geq 0$ correspond to larger shares of the potential market reached by promotion. Finally, we assume that each consumer is equally likely to be reached by either promotional message.

After promotion has taken place, consumers will be in one of the information sets in table 1. With regard to product S, consumers have either no knowledge (information sets 1, 2 and 3) or consumers know that the product is characterized by u (information sets 4, 5 and 6). With regard to product G, consumers can either have no knowledge (information sets 1 and 4), or consumers know that the product is characterized by u (information sets 2 and 5), or that the product is characterized by both u and h (information sets 3 and 6). With regard

to product G, we rule out the possibility that consumers know about the "specific quality" but do not know about the basic attributes of the product.

Table 1. Possible information sets

		Product G		
		No Info	u	$u+h$
Product S	*No Info*	*1*	*2*	*3*
	u	*4*	*5*	*6*

The strength of IP rights for product G affects the ability of promotion to inform consumers about the products' characteristics. Specifically, for given values of α and β, the strength of IP rights determines the shares of the potential market that reach each of the information sets of table 1. The strength of IP rights is measured by the parameter $\gamma \in [0,1]$, where a higher value of γ corresponds to stronger IP rights for the G-producers. The shares of the potential market in each information set after promotion has taken place are summarized in table 2.

Table 2. Shares of potential market in each information set

		Product G		
		No Info	u	$u+h$
Product S	*No Info*	$(1-\alpha)(1-\beta)$	*0*	$\gamma\alpha(1-\beta)$
	u	$\gamma(1-\alpha)\beta$	$(1-\gamma)(\alpha+\beta-\alpha\beta)$	$\gamma\alpha\beta$

To illustrate the content of table 2, we focus on two special cases, full IP protection, $\gamma = 1$, and absence of IP rights, $\gamma = 0$. The case of $\gamma = 1$ represents a situation in which IP rights over GI names are exclusive to producers in the GI area so that competing producers are prevented from using GI-like labels that could generate spillovers of information across goods or the dilution of the information regarding the "specific quality" of the GI message.

When $\gamma = 1$, consumers are in one of the information sets 1, 3, 4, and 6. Consumers who have not been reached by either promotional message have no information about either product, and remain in information set 1. Given α and β and given the fact that each consumer is equally likely to be reached by either promotional message, the share of the potential market that is not reached by either message is equal to $(1-\alpha)(1-\beta)$. Consumers who are reached by the promotional message of good S but not by that of good G, a share equal to $(1-\alpha)\beta$, learn that good S is characterized by u but have no information regarding good G (they move to information set 4). Conversely, consumers who are reached by the promotional message of good G but not by that of good S, a share equal to $\alpha(1-\beta)$, learn that good G is characterized by $u+h$ but have no information regarding good S (they move to information set 3). Finally, consumers who are reached by the promotional message of both goods, a share equal to $\alpha\beta$, learn that good S is characterized by u and that good G is characterized by $u+h$ (they move to information set 6).

At the other extreme with $\gamma = 0$, in absence of IP rights for GI products, both the GI and the GI-like products bear identical looking labels and are therefore identical in the eyes of consumers. With identical labels across products, both spillovers of information across goods and the dilution of the "specific" information of the GI promotional message occur. When $\gamma = 0$, consumers can be in either information sets 1 or 5. As before, consumers who are not reached by either promotional message, a share equal to $(1-\alpha)(1-\beta)$, have no information about either product and remain in information set 1. All other consumers instead move to information set 5. Consumers who are reached by the promotional message of good S but not by that of good G, not only learn that good S is characterized by u but also

learn that good G is characterized by u because, since the labels are identical, the information spills over from good S to good G. Consumers who are reached by the promotional message of good G but not by that of good S, learn that both products are characterized by u. This occurs because of the presence of both information spillovers and the dilution effect of identical looking labels. First, the "specific" content of the G message is diluted, so that consumers learn that product G is characterized by u and learn nothing about h. Then, the information about product G spills over to product S so that consumers learn that both goods are characterized by u. Finally, consumers who are reached by both promotional messages, learn that both goods are characterized by u but do not learn anything about h because of the dilution effect of similar labels.

5.3.2 Consumer preferences

We assume a population (i.e., potential market) of mass $M \in \mathbb{R}_{++}$ of heterogeneous consumers, with uniformly distributed types, $\theta \sim U[0,1]$ and unit demand (Mussa and Rosen 1978). Consumer preferences under full information about both products (consumers in information set 6) are represented as follows

$$U = \begin{cases} \theta(u+h) - p_G & \text{if one unit of product G is purchased} \\ \theta u - p_S & \text{if one unit of product S is purchased} \\ 0 & \text{if nothing is purchased} \end{cases}$$

where p_G and p_S are the price of good G and S respectively. Consumers in all other information sets make purchasing decisions based on limited information they possess at the time of purchase. The only option for consumers in information set 1 is not to purchase the

product, yielding utility equal to zero. Consumers in information set 3 choose between purchasing product G and not purchasing anything based on the following options

$$U = \begin{cases} \theta(u+h) - p_G & \text{if one unit of product G is purchased} \\ 0 & \text{if nothing is purchased} \end{cases}$$

Consumers in information set 5, who erroneously assign quality u instead of $u+h$ to good G, make their purchase decisions based on the following options

$$U = \begin{cases} \theta u - p_G & \text{if one unit of product G is purchased} \\ \theta u - p_S & \text{if one unit of product S is purchased} \\ 0 & \text{if nothing is purchased} \end{cases}$$

Finally, consumers in information set 4 choose between product S and nothing based on the following options

$$U = \begin{cases} \theta u - p_S & \text{if one unit of product S is purchased} \\ 0 & \text{if nothing is purchased.} \end{cases}$$

5.3.3 Timing of the game

The game develops in two periods. At the beginning of period 1 all consumers are in information set 1. In period 1, promotion by both sectors takes place simultaneously. Each producer of good S, $j = 1,...,N$, independently chooses k_j and the producer association representing sector G chooses F. At the end of period 1, consumers reach new information sets according to table 2.

In period 2, production takes place. Each firm producing good G decides whether to produce or stay out of the market. Firms producing good S compete in quantities in a Cournot game. There is no discounting between periods.

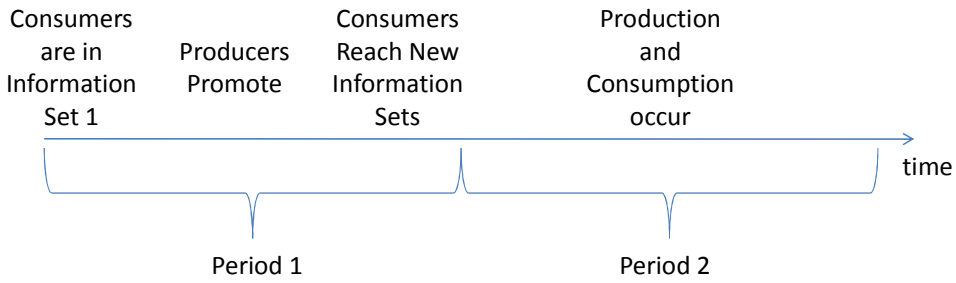


Figure 1. Timing of the game

5.4 Equilibrium

By backward induction, we solve for the pure strategy Nash equilibrium that is symmetric in the S market. First, we analytically solve the second-period production game, find equilibrium prices as a function of the shares of the potential market in each information set (which are determined in the first-period) and obtain the objective functions that each of the S-producers and the producer association representing good G maximize in period one. Then, we solve for the optimal first-period promotion numerically. Whereas our analytical and numerical computations take into consideration the fact that the demand functions for good G and good S take different functional forms depending on prices, in what follows, for expositional simplicity, we report the analytic solution only for the case in which prices satisfy the following condition:

$$\frac{p_S}{u} \leq \frac{p_G - p_S}{h} \leq 1. \tag{14}$$

Condition (14) implies that $p_G > p_S$.

Period 2 – Consumer Demands

Define

$$x \equiv \gamma\alpha\beta \tag{15}$$

$$y \equiv \gamma\alpha(1-\beta) \tag{16}$$

$$z \equiv \alpha+\beta-\alpha\beta-\gamma\alpha \tag{17}$$

Given the assumed preference structure and under the price restriction (14), then: (i) x is the share of the potential market for which producers of good G and S compete, (ii) y represents the share of the potential market that is exclusively supplied by the producers of good G, and (iii) z is the share of the potential market that is exclusively supplied by the producers of good S. Note that x, y and z are functions of the amounts invested in promotion F, $k_1,\ldots,k_N$. Given x, y and z, market demands for good G and good S can be written as, respectively

$$Q_G = M\left[x(F,K)\left(1+\frac{p_S}{h}\right)+y(F,K)-\left(x(F,K)\frac{1}{h}+y(F,K)\frac{1}{u+h}\right)p_G\right] \tag{18}$$

$$Q_S = M\left[x(F,K)\frac{p_G}{h}+z(F,K)-\left(x(F,K)\frac{u+h}{uh}+z(F,K)\frac{1}{u}\right)p_S\right] \tag{19}$$

where, again, $K = k_1+\ldots+k_j+\ldots+k_N$.

Period 2 – The Production Decision of the Firms Producing Good S

In period 2, each firm $j=1,\ldots,N$ producing good S chooses the quantity q_j to solve (20),

$$\max_{q_j}\left[\left(p_S(Q_S)-c\right)q_j\right]\geq 0 \tag{20}$$

where $p_S(Q_S)$ is the inverse market demand for good S and $Q_S = \sum_{j=1}^{N} q_j$. In a symmetric equilibrium with $q_j = q_i$ for all $i, j = 1,...,N$, the price of good S, p_S, and the aggregate quantity supplied, Q_S, are equal to

$$p_S(F,K,p_G) = \frac{1}{N+1}\left[cN + \frac{x(F,K)\frac{p_G}{h} + z(F,K)}{x(F,K)\frac{u+h}{uh} + z(F,K)\frac{1}{u}}\right] \tag{21}$$

$$Q_S(F,K,p_G) = \frac{NM}{N+1}\left[x(F,K)\left(\frac{p_G}{h} - \frac{c(u+h)}{uh}\right) + z(F,K)\left(1 - \frac{c}{u}\right)\right] \tag{22}$$

Period 2 – The Production Decision of the Firms Producing Good G

With regard to sector G, a firm of type η incurs a unit cost equal to $v + \delta\eta + \frac{F}{\ell\eta}$, the sum of the unit cost of production, $v + \delta\eta$, and the unit cost of promotion, $\frac{F}{\ell\eta}$. Taking the price p_G and the unit cost as given, all producer types who can make a non-negative profit enter the industry. The producer type who is indifferent between entering the industry and staying out, η^*, is determined by (23)

$$p_G = v + \delta\eta^* + \frac{F}{\ell\eta^*}. \tag{23}$$

Equation (23) effectively defines the competitive industry supply function of good G. We rely on Marshallian stability to identify the larger of the two roots of the quadratic

equation in (23) as the indifferent producer type in a stable equilibrium.[3] Hence, the indifferent producer type is

$$\eta^* = \frac{(p_G - v)\ell + \sqrt{(p_G - v)^2 \ell^2 - 4\delta\ell F}}{2\delta\ell},$$

and the industry supply of good G is

$$Q_G = \eta^* \ell = \frac{(p_G - v)\ell + \sqrt{(p_G - v)^2 \ell^2 - 4\delta\ell F}}{2\delta}. \tag{24}$$

Good G is produced in equilibrium only if

$$(p_G - v)^2 \ell^2 - 4\delta\ell F \geq 0.$$

Setting demand, as given by equation (18) derived earlier, equal to supply, equation (24), yields a quadratic equation in the price of good G. Again, we rely on Marshallian stability to identify the stable equilibrium price as the smaller of the two roots. We denote this price by[4]

$$p_G(F, K, p_S). \tag{25}$$

The stable equilibrium is shown in figure 2. Finally, industry's profit is equal to $\frac{\delta\ell}{2}(\eta^*)^2$. The shaded area in figure 2 represents the industry's profit when the scale of production, ℓ, is equal to 1.

[3] We rely on Marshallian stability rather than on Walrasian stability to identify the stable equilibrium because of the nature of the forward-falling supply curve that reflects the existence of industry-wide economies of scale (see e.g., Moschini, Menapace and Pick 2008). The Marshallian stable equilibrium is the larger root in quantity space and the smaller root in price space.

[4] $p_G(F, K, p_S)$ is a long expression that we do not report for the sake of space.

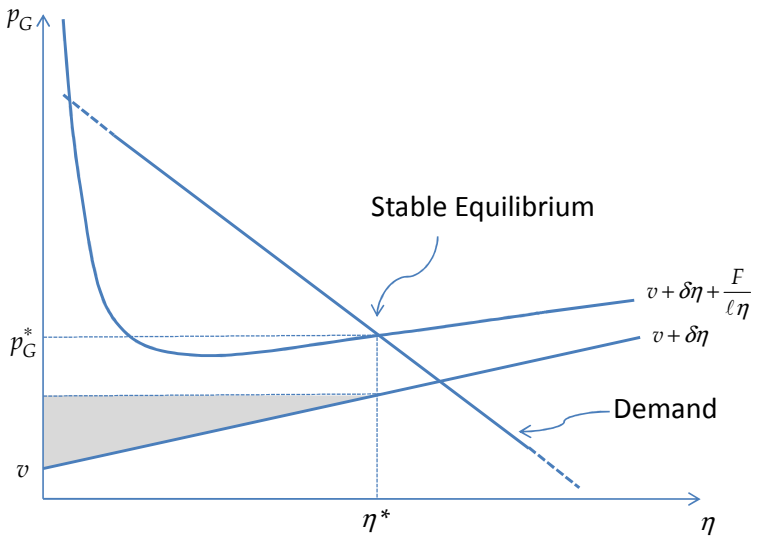


Figure 2. The market of good G ($\ell = 1$)

Finally, (21) and (25) provide a system of two equations in the two unknown second-period equilibrium prices, $\hat{p}_G(F,K)$ and $\hat{p}_S(F,K)$. We explicitly solve for this price pair as functions of the $N+1$-tuplet $F,k_1,...,k_N$.

Period 1 – The promotion decision of firms producing good S

In period 1, each of the N firms producing good S maximizes expected profits by choosing the amount of promotion k_j. Specifically, each firm solves problem (26)

$$\max_{k_j}\left[\frac{M}{(N+1)^2}\frac{1}{x(F,K)\frac{u+h}{uh}+z(F,K)\frac{1}{u}}*... \right. \\ \left. ...*\left(x(F,K)\left(\frac{\hat{p}_G(F,K)}{h}-\frac{c(u+h)}{uh}\right)+z(F,K)\left(1-\frac{c}{u}\right)\right)^2-k_j\right]\geq 0. \tag{26}$$

where, again, $K=k_1+...+k_j+...+k_N$.

The first order condition of problem (26) yields the best response function $k_j(F,k_1,...,k_{j-1},k_{j+1},...,k_N)$. We have N such best response functions, one for each of the firms producing good S.

First stage – The promotion decision of the producer association representing good G

The producer association representing good G maximizes the expected profit of the industry by choosing F. Specifically, the producer association solves problem (27)

$$\max_F \left[\frac{1}{8\delta\ell} \left(\left(\hat{p}_G(F,K) - v \right) \ell + \sqrt{(\hat{p}_G(F,K) - v)^2 \ell^2 - 4\delta\ell F} \right)^2 \right] \geq 0. \qquad (27)$$

The first order condition of problem (27) yields the best response function $F(K)$.

Numerical solution and equilibrium types

We numerically approximate the $N+1$ best response functions $F(K)$, $k_j(F,k_1,...,k_{j-1},k_{j+1},...,k_N)$, $j=1,...,N$, and solve for a pure strategy equilibrium (symmetric in the S market) for several values of the policy parameter γ (that cover the entire range, [0,1]) and for given sets of values of the other parameters of the model.

The discussion that follows focuses on the case in which, in equilibrium, the price of good G is higher than the price of good S. We believe this case to be the most representative for GI products. A competitive price of good G above the oligopolistic price of good S is the result of higher costs for the G-producers compared to the S-producers. That GI products are typically characterized by significantly higher costs compared to substitute products has been documented in empirical studies (e.g., Belletti et al. 2007) and is a typical assumption of the existing theoretical investigations of GIs (e.g., Zago and Pick 2004; Anania and Nisticó

2004). The higher costs of GI products can be in part attributed to more expensive raw materials and/or ingredients and/or more "difficult" production conditions (e.g., marginal and mountain areas where topography and climatic conditions limit the possibilities for mechanization), and in part to additional costs associated with monitoring and certification of the GI product.

For any given set of the parameter values that we have considered in the numerical analysis, we find the "type of equilibrium" to vary with the value of the IP parameter. Specifically, for the sets of parameter values that we have considered we find that in the upper range of values of γ the prevailing prices satisfy the restrictions imposed by condition (14). The corresponding equilibrium is one in which producers of sectors G and S compete for consumers who have full knowledge of both goods (i.e., S-producers supply the share z, G-producers supply the share y and both S- and G-producers supply the share x). In the lower range of values of γ instead the prevailing prices are such that producers of good G supply all the consumers that know h, the "specific quality" of good G (i.e., G-producers supply both the shares y and x and S-producers supply the share z). The properties of the equilibrium and the welfare implications of the strength of IP rights are discussed next.

5.5 Welfare effects of IP rights

A first general result that emerges from our numerical analysis is that the S-producers tend to be better off with weak IP rights and G-producers tend to be better off with strong IP rights. Although this is not a surprising result, it is not fully in line with intuition. Weak IP rights, in

fact, decrease the return on promotion in terms of the ability to expand demand of both G- and S-producers, with a potential adverse effect on the profitability of both sectors.

Specifically with regard to sector G, as IP rights get weaker (i.e., γ is smaller), less expansion of demand can be achieved through an increase in the promotional effort by sector G (i.e., by an increase in α) for any given level β of promotion in sector S. Recall that $y \equiv \gamma\alpha(1-\beta)$ is the share of the market that is exclusively supplied by good G, and $x \equiv \gamma\alpha\beta$ is the share of the market in which both goods S and G are considered by the consumer. Then, holding β constant, we find

$$\frac{\partial y}{\partial \alpha} = \gamma(1-\beta),$$
$$\frac{\partial x}{\partial \alpha} = \gamma\beta.$$

Note that as γ gets smaller (IP rights get weaker), the effectiveness of α for the purpose of expanding demand (through the market shares x and y) diminishes. Also note that two factors contribute to reduce the return on the amount of promotion α by the G-producers. First, weak IP rights favor spillovers of information about good G's basic attributes to good S, so that a larger fraction of consumers who become informed about good G through promotion also learn about good S being a substitute for good G. Second, weak IP rights dilute the informational content of the promotional message of good G so that fewer consumers learn about good G's specific quality for each dollar spent in promotion by sector G. In the model, information spillovers and dilution result in a "reallocation" of consumers from information set 3 to 5 (i.e., a decrease in y through the information spillovers from

good G to good S and contemporaneous dilution of the G-message) and from information set 6 to 5 (i.e., a decrease in x through the dilution effect).

Even though spillovers of information are symmetric across products, no gains come to sector G from information spillovers from the promotion of good S as long as the prevailing prices are such that $p_G > p_S$. When $p_G > p_S$, G-producers are unable to exploit the potential windfall of demand resulting from the promotional effort of the S-producers because learning the basic attributes of good G (i.e., u) through spillovers of information about good S is not sufficient to convince consumers to purchase good G, a product that is more expensive but has the same quality as good S in the eyes of those consumers who do not know the specific quality (i.e., h).

But, the negative effect on the return on promotion of weak IP rights is not limited to the G-producers. Recall that $z \equiv \alpha + \beta - \alpha\beta - \gamma\alpha$ is the share of the market that is exclusively supplied by good S, and $x \equiv \gamma\alpha\beta$ is the share of the market in which both goods S and G are considered by the consumer. Then, holding α constant, we find

$$\frac{\partial z}{\partial \beta} = 1 - \alpha,$$
$$\frac{\partial x}{\partial \beta} = \gamma\alpha.$$

Note that as γ gets smaller (IP rights get weaker), the effectiveness of β for the purpose of expanding demand through the market shares x diminishes.

But, in spite of the negative effect of weak IP rights on the return on promotion of both sectors, we find that in equilibrium sector G's investment in promotion and sector's S profits tend to increase as IP rights weaken (over a large – even though not the entire – range

of values of the IP parameter γ). As extensively discussed in the next section, both the increase in promotion by sector G and the increase in the profits of sector S are mainly brought about by the existence of industry-level inefficiencies in sector G. For given levels of promotion, sector G faces a smaller demand when IP rights are weak, hence, because of the presence of diseconomies of scale in sector G, weaker IP rights tend to be correlated with a smaller, more efficient G-sector. Only the most efficient firms (i.e., firms with lowest production costs) are active when sector G contacts so that the sector's marginal production cost associated with an increase in promotion is smaller when sector G is smaller. As a result, as sector G contracts under weaker IP rights, it expands promotion, while the sector's aggregate profits fall. Concurrently, sector S enjoys a windfall of profits from expanded demand and reduced demand elasticity that occur because of the increased promotional effort in sector G. Specifically, the share of the potential market over which S-producers can exert monopolistic power (in the sense that sector S is not competing with sector G for the share z) increases as IP rights become weaker, partially at the expense of the share of the potential market that is exclusively supplied by the producers of good G (i.e., share y) and partially at the expense of the share of the potential market over which producers of good G and S compete (i.e., share x).

5.5.1 The form of the best responses in promotion

In this section, we discuss how the strength of IP rights affects the firms' first-period best responses in promotion, i.e., the optimal amount of promotion by the G- and S-producers for the other sector's anticipated promotion. Our model yields a system of $N+1$ best responses as implicit functions of the dollar amount spent in promotion by group G (i.e., F) and the

dollar amount spent in promotion by each producer of good S (k_j, for $j=1,...,N$). Assuming symmetry in the S market (i.e., $k_j = k$ for all $j=1,...,N$), the system of best responses reduces to two equations in two variables F and K (where $K = Nk$), one best response for sector G and one for sector S. For convenience, instead of representing the best responses in the unbounded promotion space in dollars, we represent the best responses in the bounded promotion space expressed in shares of the potential market reached by promotion, $(\alpha,\beta) \in [0,1]^2$, where α is related to F via equation (12) and β to K via equation (13).

In the α,β space, the best response of the G-producers, $\alpha(\beta)$, represents the optimal share of the potential market reached by the promotion of sector G for any given share reached by the promotion in sector S. Similarly, the best response of the S-producers, $\beta(\alpha)$, represents the optimal share of the potential market reached by the promotion of sector S for any given share reached by the promotion in sector G.

Figure 3 represents the first-period best responses for several values of the IP rights strength, γ; continuous curves represent the best response of sector G and the dashed curves the best response of sector S.[5] The shape (slope and position) of the best responses varies depending on the type of equilibrium and the value of the IP parameter.

For low values of γ, when at the prevailing prices all consumer types who know h prefer good G over good S, the best response of sector G is insensitive to the value of β (in figure 3 the best response of sector G is vertical). In addition, as the IP rights strength increases, the best response of sector G shifts to higher levels of promotion (it shifts to the

[5] The parameter values used to plot all figures are $u=10$, $h=10$, $\delta=.11$, $v=7.5$, $c=5$, $M=1000$, $\ell=1$, $N=2$, $t=\tau=.1$.

right as γ increases). Here, an increase in the IP rights strength increases the ability of the G-producers to expand demand through promotion (for given levels of promotion by sector S) because the G-producers can capture more of the consumers they reach with promotion as spillover of information and dilution decrease. Over the same range of values of γ, the best response of sector S is insensitive to the value of γ (note that the return on promotion of sector S is independent of γ), but the optimal amount invested in promotion by sector S decreases as sector G promotes more (i.e., as α increases). Consumer information provided through the promotion by sector G in fact spills over to sector S and reduces the incentive of sector S to provide information.

For all other values of γ, when the prevailing prices satisfy the restrictions imposed by condition (14) so that producers of sectors G and S compete for consumers who have full knowledge of both goods, the best responses of both sectors slope down, i.e., promotional efforts are strategic substitute (Bulow, Geanakoplos and Klemperer 1985). As the IP rights strength increases starting from low values of γ, the best response of sector G tends to shift first to higher levels of promotion and then to revert and move back to lower levels of promotion (the best response of sector G shifts to the right and then to the left as γ increases).

This non-monotonic behavior is the result of two counteracting forces. First, an increase in the IP rights strength increases the ability of the G-producers to expand demand through promotion (for given levels of promotion by sector S) because of less spillover of information and less dilution. Second, as demand expands with stronger IP rights, it is satisfied, at the margin, by less and less efficient producers. Holding promotion constant (i.e.,

for given α and β), as γ grows larger the demand of good G expands and, with free-entry, sector G also expands. But, because of the presence of industry-level inefficiencies, measured by the parameter δ, the sector's expansion can only occur through progressively less efficient firms. Hence, not only the marginal benefits of expanding promotion but also the marginal costs are higher with stronger IP rights.

These two counteracting forces, the increased ability and cost of expanding demand that are associated with an increase in γ cause the best response function of sector G to move in a non monotonic fashion as the strength of IP rights increases: when IP rights are relatively weak, an increase in their strength induces the producer association to promote more at first, as the net effect of promotion on the industry's profits is positive, but, as the strength of IP rights increases and the sector expands, the negative effect of less and less efficient producers dominates and sector G reduces the promotional effort.

Consistently, we observe that with higher values of δ, lower values of v and larger values of M, i.e., when the negative effect of the industry-level inefficiencies on the return on promotion dominates at lower levels of the IP rights strength, the best response of sector G starts reverting to lower levels of promotion at smaller values of γ. A more concentrated S sector also favors, but to a lesser extent, the predominance of the negative effect of the industry-level inefficiencies at lower values of γ. Industry concentration in the S sector, in fact, affects the best responses only through the second-period production decisions. As a general pattern, as the S industry become more concentrated, reduced competition in the S sector leads to a higher ability for S producers to restrict output and to charge prices above marginal costs. Other things equal, this leads to a smaller surplus from consuming good S

and a larger demand facing sector G. The higher demand facing sector G, at the margin, is satisfied by less efficient producers. Hence, as concentration in sector S increases, the optimal investment in promotion by group G (for given β and given γ) increases (because the returns on promotion increase as more consumers would choose to purchase good G over good S), but the negative effect of the industry-level inefficiencies becomes dominant at lower values of γ.

With regard to the slope, as γ increases the optimal amount of promotion by sector G tends to become more responsive to a change in the value of the promotion in sector S, i.e., the slope of the best response in sector G increases. The decrease in the return on promotion in sector G in terms of expanding demand due to an increase in β is larger with stronger IP rights (i.e., at bigger values of γ). This is shown by the following derivatives, where we need to remember that each additional unit of x expands demand for good G by a smaller amount than a unit of y.

$$\frac{\partial\left(\frac{\partial y}{\partial \alpha}\right)}{\partial \beta} = -\gamma$$

$$\frac{\partial\left(\frac{\partial x}{\partial \alpha}\right)}{\partial \beta} = \gamma$$

With regard to sector S and for parameters values such that condition (14) is satisfied, a change in the strength of IP rights affects the position and slope of the S-producers' best response in the following way. An increase in the strength of IP rights shifts the best response to higher values of promotion and makes the best response less responsive to a

change in the promotion by sector G (i.e., the best response of the S sector in figure 3 shifts upward and becomes flatter as γ increases).

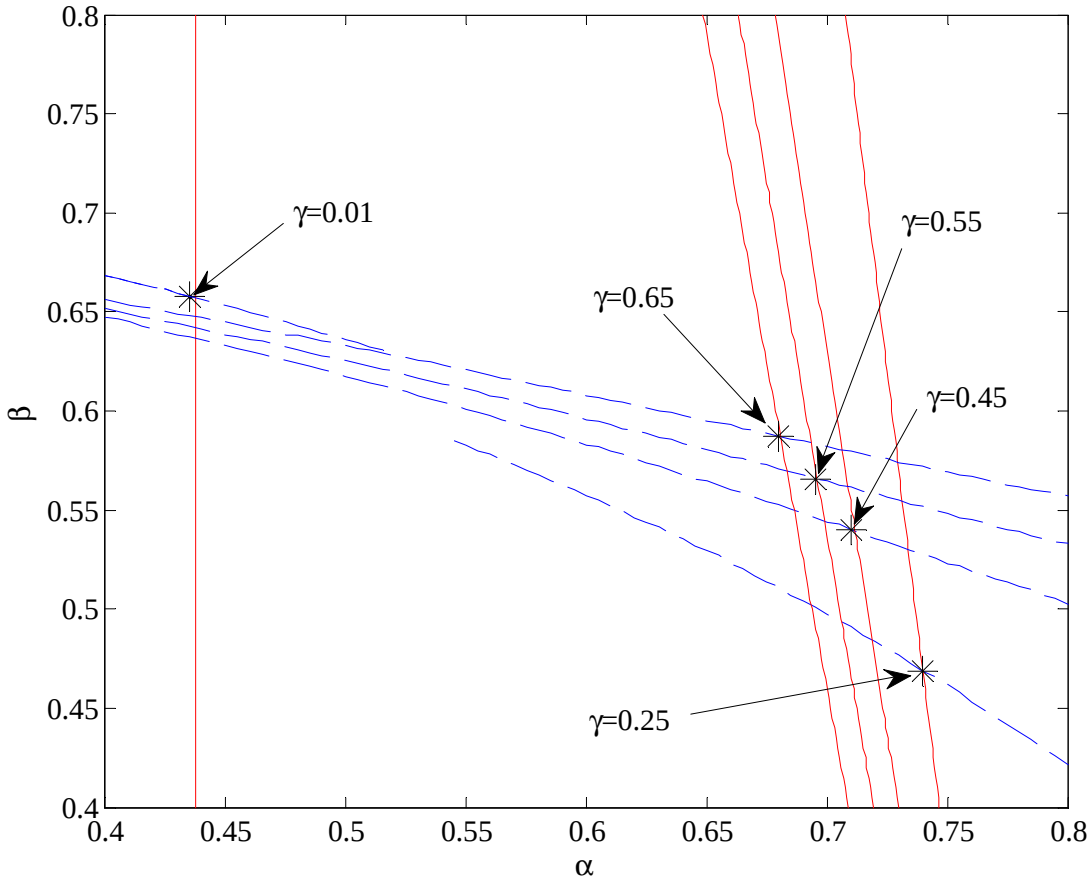


Figure 3. Best responses

As the strength of IP rights increases (i.e., as the rights over GI names shift from S- to G-producers), S-producers are less able to free ride on sector G's promotion and the only way they can expand demand is through their own promotion. Clearly, the free-riding effect is more pronounced for larger values of α and vanishes at low values of α (i.e., this is why the best responses of sector S fan out). Concurrently as the strength of IP rights increases, the

optimal promotion by sector S become less responsive to a change in promotion by sector G (i.e., the best responses in figure 3 become flatter) as the result of two counteracting forces. On one side, the return on promotion by sector S in terms of capturing consumers over whom sector S can exert market power (i.e., in terms of capturing z) decreases with α and the decreases are independent of the IP rights strength. On the other side, the return on promotion in terms of expanding market shares over which producers of good G and S compete (i.e., in terms of expanding x) increases with α and the increase is larger with stronger IP rights. Hence, as γ increases, larger returns in terms of x better counteract the negative effect of stronger IP rights on returns in terms of z, and the drop in the optimal amount of promotion by sector S as α increases is less pronounced. These effects can be seen in the following derivatives.

$$\frac{\partial\left(\frac{\partial z}{\partial \beta}\right)}{\partial \alpha} = -1$$

$$\frac{\partial\left(\frac{\partial x}{\partial \beta}\right)}{\partial \alpha} = \gamma$$

Both effects of an increase in γ on the best response of sector S (i.e., higher levels of promotion and reduced responsiveness to change in the promotion in sector G) are stronger as the number of firms in the industry, N, decreases (i.e., as concentration increases). The number of firms in the industry not only affects the ability of S producers to charge prices above marginal costs but also affects the *intra*-sector ability to free ride on each other's promotion (because of "generic advertising" nature of promotion). As concentration increases, market power increases and the incentives to free ride within sector S decrease

thereby pushing the best response of the S-producers to higher levels of promotion and reduces their sensitivity to a change in α.

5.5.2 The equilibrium investment in promotion

Figure 4 represents the equilibrium investment in promotion as a function of the IP rights strength in terms of shares of the potential market reached through promotion by sector. Figure 4 shows that the equilibrium promotional efforts of the two sectors tend to behave symmetrically. Symmetry emerges in part from the fact that the promotional efforts are strategic substitutes and in part from the fact that the S-producers react to the promotion in the sector G by reducing their own promotion as they can free ride on G-producers' promotion.

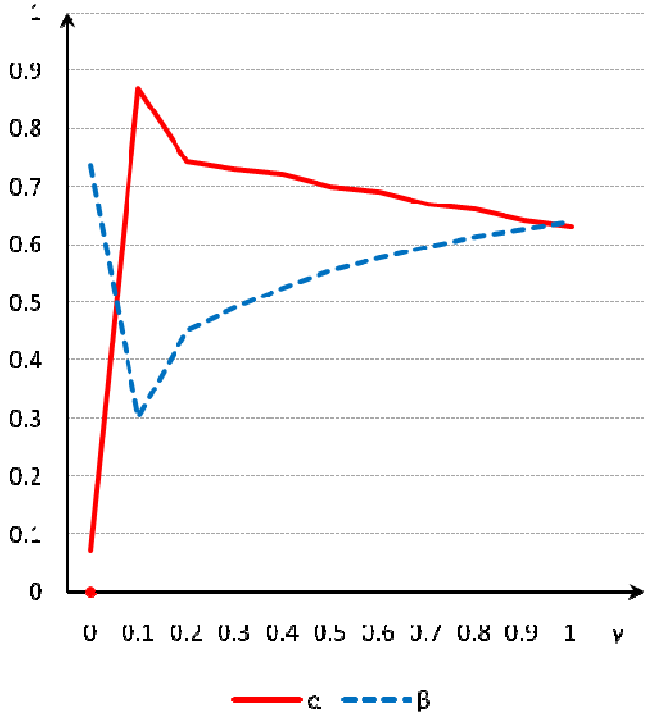


Figure 4. Equilibrium promotion

Figure 4 also shows that the equilibrium promotional effort of sector G (S) increases (decreases) with the strength of IP rights over the lower range of values of γ, i.e., the range in which the positive effect of stronger IP rights on the return on promotion in term of expanding demand by sector G dominates the negative effect of the industry-level inefficiencies of a growing – but still relatively small – G sector, and decreases (increases) with the strength of IP rights over the upper range of values of γ, where the negative effect of the industry-level inefficiencies dominates. This general pattern for α and β is invariant to the choice of parameters' values, but the size of the range over which promotion by the sector G increases (and the promotion by sector S decreases) tends to contract with larger values of δ, smaller values of v, larger values of M and smaller values of N.

5.5.3 Equilibrium prices and profits

With free entry in sector G, variations in the equilibrium price of good G with the strength of IP rights fully reflect the change in the unit promotion cost and the marginal production cost. Also with industry-level inefficiencies and free entry, an increase in the aggregate profits for sector G can only occur as a result of an increase in the size of the industry.

In the upper range of values of γ (i.e., the range over which the promotion of good G "smoothly" decreases in the strength of IP rights), the equilibrium price of good G increases with γ, a feature of the equilibrium price of good G that is invariant to the choice of the parameters' values. In this range of values of γ, the sector's aggregate profits as well as the industry's marginal costs of production increase as sector G expands. In this range, the increase in the marginal cost of production more than compensate for the decrease in the unit

promotion cost leading to an increase in the equilibrium price of good G. Both the increases in the equilibrium price of good G and in the sector's profits over the upper range of values of γ are features that do not depend on the choice of parameter values. Equilibrium prices and profits are shown in figure 5 (right panel) and in figure 6 (left panel) respectively.

At the other end of the range of values of γ, the behavior of the equilibrium price of good G and the behavior of sector G's profits show more variability with the choice of parameter values. For the set of parameters' values of figures 5 and 6, we observe the following. With very weak IP rights (i.e., in the range of γ over which promotion by sector G rapidly increases), the equilibrium price of good G increases with γ. In this range, the sector does not significantly expand (hence, sector G's profits remain substantially unchanged) and the increase in price is mainly the result of higher unit promotion costs. For slightly higher values of γ (i.e., the range over which promotion by sector G drops sharply), the equilibrium price of good G also drops as a result of reduced unit cost of promotion while the sector's size (and hence aggregate profit) remains substantially unchanged.

As we increase the value of δ, i.e., with larger diseconomies of scale, we observe that the equilibrium price of good G tends to become monotonically increasing over the entire range of values of γ (stronger diseconomies of scale cancel out the effect on price of decreasing promotion costs). The general behavior of the profits instead remains unchanged as we increase the value of δ. If we decrease the value of t and τ (we reduce the efficiency of promotion in reaching consumers), we observe that the profits of sector G tend to steadily increase over the entire range of values of γ (instead of remaining substantially unchanged

over the lower range of values of γ). The general behavior of the price instead remains unchanged as we change the value of t and τ.

With regard to sector S, figures 5 and 6 capture the characterizing features of good S's equilibrium price and sector S's profits. Specifically, the equilibrium price of good S decreases as the strength of IP rights increases, reflecting the more limited ability of the S-producers to exert market power. Profits also decrease in the strength of IP rights with the exception of an initial increase over the bottom range of values of γ. The initial increase in the profits of sector S occurs in correspondence of the spike in promotion by sector G, where with weak IP rights S-producers enjoy a windfall of profits due to the expansion of their demand brought about by the spillovers of information from the promotion of sector G.

5.5.4 Welfare effects of IP rights on consumers

Thus far we have discussed how one main effect of a change in the strength of IP rights is to "reallocate" the promotional effort and profits across producer groups. For values of the IP rights strength below a given threshold, a small and efficient G-sector expands promotion in response to stronger IP rights protection, while sector S, which with weak IP rights is in a good position to free ride, captures the majority of the profits generated by the promotional expansion by sector G. For values of the IP rights strength above the threshold, a strengthening of IP rights induces a larger, less efficient G-sector to contract promotion while sector S, which with strong IP rights is no longer in a good position to free ride, has no other option than to expand its own promotion. In this range, stronger IP rights effectively transfer profits from producers in sector S to producers in sector G. But, how are consumers affected?

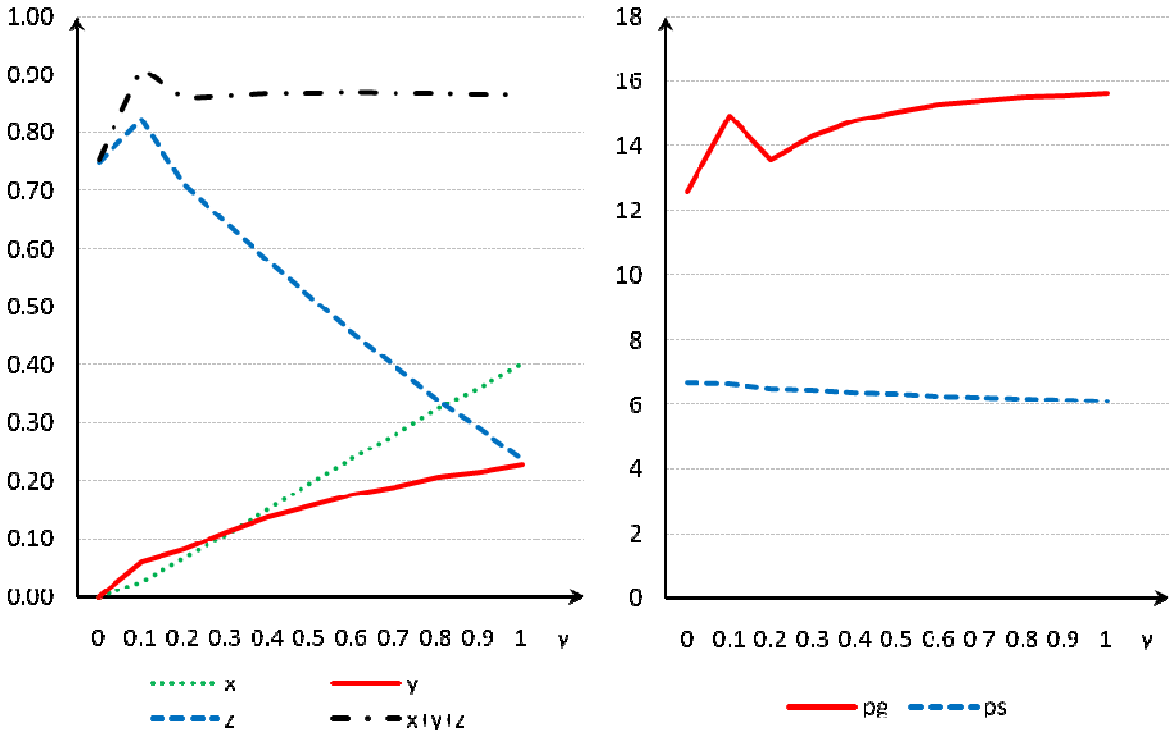
The effect of the strength of IP rights on consumer surplus stems from two sources. First, the strength of IP rights directly affects the "informational content" of promotion. Second, it indirectly affects the incentive of firms to promote (this, in turn, occurs through the effect of the strength of IP rights on the informational content). The effect of the strength of IP rights on the incentive to promote has been already discussed. With regard to the effect of the strength of IP rights on the informational content of promotion, weak IP rights have both a positive and a negative effect. The positive effect, i.e., an increase in the informational content, concerns the spillovers of information about the basic attributes of the goods, u. The weaker the IP rights, the more likely a consumer who learns about the basic attributes of one product also learns about the basic attributes of the other product. As already explained, in an equilibrium with $p_G > p_S$, spillovers of information effectively "work" in only one direction from good G to good S. The negative effect, i.e., a reduction of the informational content of promotion, concerns the dilution of the G-message. As IP rights weakens, fewer of the consumers who are reached by the promotion of good G learn about the specific quality of good G.

5.5.5 The size of the market and the ability to match

By affecting the informational content of promotion directly and firms' incentives to promote indirectly, the strength of IP rights affects consumer surplus through the following channels: (i) the "size" of the market, i.e., how many consumers manifest a "positive demand" for at least one of the two goods, $x + y + z = 1 - (1 - \alpha)(1 - \beta)$ (i.e., measured in terms of the share of the potential market reached by at least one of the promotional messages), and (ii) the ability

of consumers to match with the preferred product, x (i.e., measured in terms of the share of the potential market who has full information about both goods).

Figure 5 shows the "size" of the market, the "ability to match" with the preferred good (left panel) and equilibrium prices (right panel) as a function of the strength of IP rights.



(a) Shares (b) Prices

Figure 5. Equilibrium shares of the potential market and equilibrium prices

Numerical analysis suggests that the number of consumers who can match with the preferred variety increases with the strength of IP rights. Figure 5 specifically illustrates how the increase in the "ability to match," measured by x as a share of the potential market, is monotonically increasing over the entire range of values of γ. Figure 5 also shows that the

number of consumers who are knowledge about good G (but do not know good S), measured by y, increases with the strength of the IP rights. To the contrary, the number of consumers who are knowledgeable only about the basic attributes of at least one of the products, measured by z, decreases in the strength of IP rights over all but the lower range of values of γ. The increase in z over the lower range of values of γ, where IP rights are weakest, is due to the spike in the promotion by sector G which to a large extent spills over to sector S.

Finally, the equilibrium "market size" ($x + y + z$) tend to be relatively insensitive to a change in the strength of the IP rights. This relatively moderate effect of a change in the strength of IP rights on the "market size" (compared to the effect on the "ability to match") is due to the fact that a change in IP rights strength predominantly changes the informational content of promotion and redistributes promotion across producer groups, whereas the aggregate promotion level remains relatively unchanged. The general patterns for x, y, z and their sum illustrated in figure 5 are robust to the choice of parameters' values.

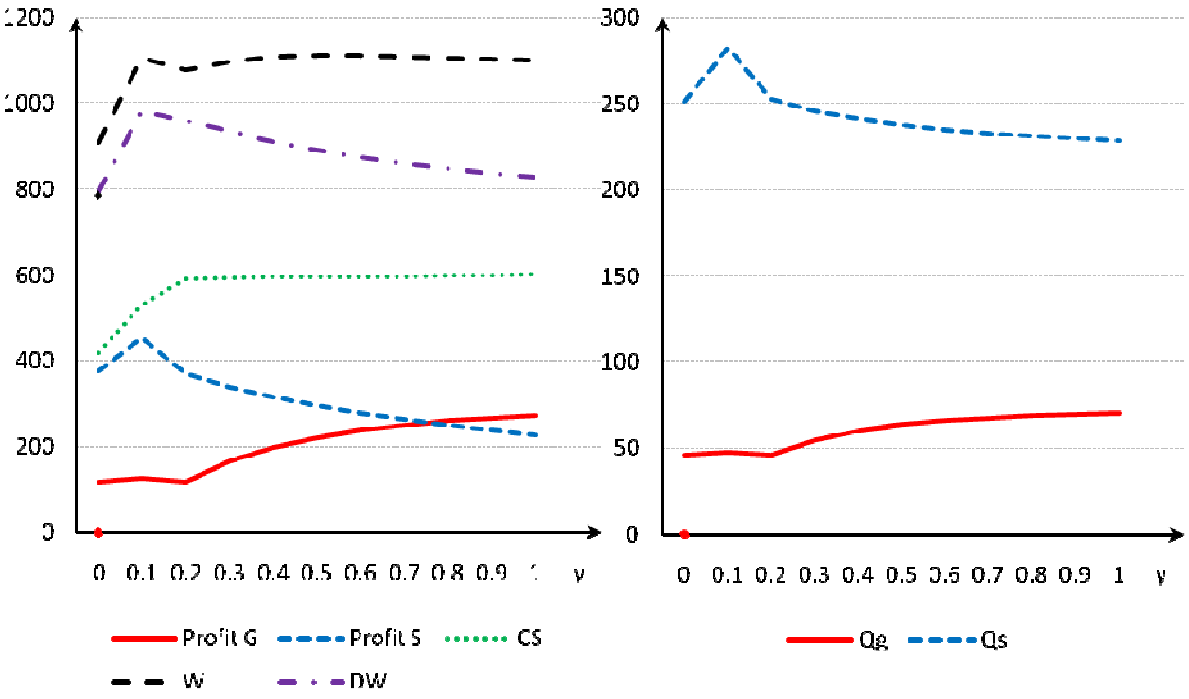
5.5.6 Consumer surplus

In addition to the two mentioned channels, the "size" of the market and the "ability to match," consumer surplus is affected by the strength of IP rights through equilibrium prices, which, in turns, depend on the ability of the S-producers to exert market power, the presence of industry-level inefficiencies in sector G and the ability of producers to enter the G-industry. The behavior of the equilibrium prices as a function of the strength of IP rights has been already discussed.

Given the multiplicity of channels through which consumers are affected by an increase in the IP rights strength it is a priori difficult to assess what the net effect on consumer surplus could be. Nevertheless, numerical analysis shows a clear pattern regarding the behavior for consumer surplus which is largely invariant to the choice of parameter values. First, there are gains from having some degree of IP protection. When $\gamma = 0$ (i.e., in absence of IP protection) the only possible equilibrium entails only good S and consumers surplus reaches its minimum value. On the other extreme with strong IP rights, a change in the strength of IP rights has a moderate effect on consumer surplus. For large values of γ, the main positive effects of stronger IP rights – an increase in the "ability to match" and a decrease in the market power of sector S (i.e., a decrease in the price of good S) – are mitigated or eliminated by the negative effect on consumer surplus of a higher price of good G. Over the upper end of values of γ, depending on the concentration of sector S, the net effect of stronger IP rights on consumer surplus tends to be positive (as concentration increases) or negative (as concentration decreases).

Most of the change in consumer surplus in response to a change in the strength of IP rights occurs for the lower and/or intermediate range of values of γ. With regard to the specific set of values of the parameters represented in figure 6, consumer surplus shows a rapid increase with the strength of IP rights over the lower range of values of γ, where IP rights are weakest. Within this range of values of γ, we can distinguish two sub-ranges. In the sub-range corresponding to a rapid expansion in the promotion by sector G, i.e., for the smallest values of γ, the positive effect on consumer surplus of an expansion in "market size" (i.e., the number of people that have some information about the products) more than

compensates the negative effect of a steep increase in the price of good G. In the sub-range corresponding to the fall in the promotion by sector G, the positive effect on consumer surplus of an increase in the "ability to match" and a decrease in the price of good G more than compensates the negative effect of a contracting market size.



(a) Welfare (b) Quantities

Figure 6. Welfare and equilibrium quantities

For other sets of values of the parameters, the range of values of γ over which consumer surplus grows "significantly" might also include the intermediate range of values of γ. According to what intuition suggests, an increase in the value of δ, the parameter measuring the industry-level inefficiencies of sector G, reduces consumer surplus and consumers' gains from increasing the strength of IP rights. Also, as sector S becomes less

concentrated, the gains in consumer surplus from stronger IP rights tend to be smaller in relative terms. Intuitively, as concentration increases, market power by the S-producers increases as well as their propensity to invest in promotion (because of less free riding among S-producers). Therefore, stronger IP rights mostly benefit consumers when they limit the excessive market power of a concentrated industry while sector S's promotion remain high.

5.6 Cross borders implications of the strength of IP rights

Our model provides a framework to analyze the open economy implications of IP protection for GIs and allows us to address the question of how a change in the current IP policy for GIs could affect the distribution of welfare internationally. To this end, we reinterpret our setup as a two-country model in which sector G, the sector supplying the GI product, is located in the exporting country (i.e., exports the GI product) and sector S, as well as consumers, are located in the importing country (i.e., imports the GI product). In this context, we interpret equation (24), which represents the industry G's supply, as the residual supply of sector G net of the exporting country's domestic demand.

With this interpretation, the optimal IP policy from an importing country's point of view is represented by the value of γ that maximizes domestic welfare, the sum of consumer and the S-producer surplus. Domestic welfare (DW) is represented in figure 6 (left panel). From an exporting country's point of view the optimal IP policy is represented by the value of γ that maximizes the aggregate profits of sector G.

Our analysis reveals that, from the exporting country's perspective, domestic welfare is maximized when $\gamma = 1$, i.e., with the strongest possible form of IP rights for GIs. Stronger IP rights, in fact, favor the expansion of the GI sector and the farmers' ability to extract the

rents associated with the presence of scarce factors in the GI area (e.g., land). This finding helps to explain the current position in the WTO negotiations over GIs hold by the group of countries lead by the European Union. These countries, the majority of which are exporters or have the potential to become exporters of GI products, favor more stringent international IP policies for GIs than those currently provided under the TRIPS agreement (see the group's "Joint Proposal" – document TN/C/W/52 – available at http://www.wto.org).

Our analysis also reveals that the strongest possible form of IP rights for GIs does not maximize the domestic welfare of an importing country. As IP rights for GIs grow strong (above a given threshold), consumers' gains from additional protection tend to be moderate, nil or even negative while domestic producers' losses are sizable and increasing with the strength of IP rights. At the other extreme, starting from a situation in which GIs receive essentially no protection, a "small" increase in the strength of IP rights benefits both consumers and domestic producers. Consumers gain from the availability of a higher-quality product whereas producers gain from the ability to free ride on the consumer information provided by the GI group. From the point of view of an importing country, therefore, domestic welfare is likely maximized by an intermediate level of IP protection. This finding sheds light on the current position hold by the group of countries led by the United States, primarily net importers of GIs, that oppose any further strengthening of GI provisions. These countries deem that the "basic" level of protection provided to all types of GIs by article 22 of the TRIPS agreement is sufficient to protect consumers' interests, whereas an "extension" of the "higher" level of protection (currently reserved to only wines by article 23) to all GI products would mainly benefit European producer groups of specialty products at the expenses of the domestic food industry and consumers (see the group's "Joint Proposal" –

document TN/IP/W/10/Rev.2 – available at http://www.wto.org). Our findings are largely consistent with this view at least in the case in which the domestic industry supplying the GI-like product is not too concentrated.

Finally, from a global welfare point of view, our analysis suggests that the larger welfare gains to be expected from providing IP protection for GIs might have already been achieved with the introduction of some basic level of IP protection. Additional gains are possible by further strengthening the international provisions for GIs, but these gains might be modest.

5.7 Conclusions

This paper represents the first formal analysis of the open economy implications of IP protection for GIs. Specifically, we aim to shed light on the current controversy over GIs among WTO members by investigating the incentives of GI-exporting and GI-importing countries to strengthen the current TRIPS provisions for GIs.

This paper also contributes to fill the void left by existing literature on GIs which exclusively focuses on the specific case in which GIs are either afforded full IP protection or no protection at all. Our analysis shifts the emphasis to the "strength" of IP protection by allowing for intermediate (or partial) degrees of IP protection. It is precisely this generalization that allows us to address the ongoing WTO debate on GIs that primarily focuses on how much protection to provide to GIs (rather than on whether or not to provide protection at all).

Our analysis also complements and adds to existing studies in this area by considering the role of promotion in expanding market demand when consumers lack

information regarding either the existence or the features of the GI and GI-like products. Specifically, we analyze how the strength of IP protection afforded to GIs in international markets affects the incentives of producers to provide information to consumers and, in turn, how it affects the distribution of welfare among producer groups and consumers, and across international markets.

Our main findings confirm the conjecture that GI-importing and GI-exporting countries might have divergent interests when it comes to the degree of IP protection to afford to GIs in international markets. We find that the welfare of GI-exporting countries is monotonically increasing with the strength of IP rights. These countries would clearly benefit from a strengthening of current GI provisions. Stronger IP provisions for GIs, in fact, favor the ability of GI producers to extract rents from the presence of scarce factors owned by producers within the GI area.

GI-importing countries, on the other hand, stand to lose from a strengthening of current IP provisions. The model shows that, for importing countries, a significant share of the gains from IP rights for GIs are achieved by granting a minimum level of protection that provides sufficient incentives to induce GI producers to export. Also, an additional but moderate strengthening of IP protection beyond this minimum level might benefit domestic producers of GI-like products (as well as consumers) because it increases the incentive for GI producers to provide consumer information which spills over to GI-like product producers.

But, as IP rights strengthen even further domestic producers are more likely to lose. As IP rights become stronger and the GI sector expands, the marginal ability of GI producers to provide information declines (because of the presence of industry-level inefficiencies) so that less information is provided on which producers of the GI-like products can free ride. As

well, the information provided by GI producers is less likely to expand the demand for GI-like products because the degree of substitutability between GI and GI-like products declines in consumers' eyes as IP rights strengthen. Finally, the analysis shows that also domestic consumers might have little to gain from a further strengthening of GI policies, especially when the domestic sector has a low level of concentration (and hence limited market power).

Whereas it is hoped that this paper helps clarifying the current contrasting positions of the WTO members with regard to GIs, the modeling approach that we proposed has some limitations. In particular, we have not explicitly modeled the labeling choice of producers. Specifically, we have assumed that GI-like product producers choose product labels/brands that resemble GI names as much as possible (as the law permits) – in order to free ride on the information spillovers from the promotion of the GI – and hence that the labeling choice of the GI-like product producers is constrained by IP laws. IP laws, therefore, effectively determine the degree of information spillovers and dilution. A possible extension of this paper would entail endogeneizing the labeling choice of the producers of the GI-like product. The IP policy (which in the present model works as an equality constraint) would be modeled as an inequality constrain with the following interpretation: The strength of IP rights limits how similar to GI names labels used on GI-like products can be. Hence, the stronger the IP rights the more limited are the labeling options available to producers outside the GI area and the smaller is the likelihood of information spillovers and information dilution. Concretely, the strength of IP rights could be measured as the maximum allowed likelihood that consumers "confuse" and/or "associate" the GI-like product labels with the corresponding GI label. Measures of the likelihood of consumer confusion are used by courts to determine cases of trademark infringement or trademark dilution (Landes and Posner 2003).

A possible modeling strategy would be to add an initial period to the game discussed in this paper during which the producers of the GI-like product choose their labeling strategy so as to maximize profits subject to the IP policy. Thereafter, the game would remain unchanged. For the special case of an S-sector with a single monopoly, the extension is straightforward. We would treat γ as the labeling choice variable of the monopolist (deciding how distant to locate its brand from the GI-name, or equivalently the amount of information spillovers and dilution) subject to the constraint $\gamma \geq \hat{\gamma}$ where $\hat{\gamma}$, the IP policy parameter, represents the minimum allowed distance (i.e., the largest share of consumers who would be "confused" by the monopolist's brand). As long as the IP policy parameter is above a given threshold, $\hat{\gamma} \simeq 0.1$ for the parametric case used to illustrate the model's results, the monopolist would choose to locate its brand as close as possible to the GI name (since its profits are monotonically decreasing in γ) and the IP policy would be binding. If the IP policy parameter is below the threshold, the monopolist would instead choose its brand in such a way to limit the amount of information spillovers so as to induce the GI producers to increase their promotional effort. For the general case with $N > 1$, the generalization is not as straightforward and to verify the existence of an equilibrium with a binding IP constraint we would need to verify that producers have no incentives to change their labeling policy given that the other producers locate their brand as close as possible to the GI name.

5.8 References

Anania G. and R. Nisticò (2004) "Public Regulation as a Substitute for Trust in Quality Food Markets: What if the Trust Substitute cannot be Fully Trusted?" *Journal of Institutional and Theoretical Economics* 160:681-701.

Belletti G., T. Burgassi, A. Marescotti and S. Scaramuzzi (2007) "The effects of certification costs on the success of a PDO/PGI" in *Quality management in food chains* edited by Ludwig Theuvsen, Achim Spiller, Martina Peupert and Gabriele Jahn, 2007:107-124.

Bhuyan S. and R.A. Lopez (1997) "Oligopoly power in the food and tobacco industries" *American Journal of Agricultural Economics* 79:1035–1043.

Buccirossi P., S. Marette and A. Schiavina (2002) "Competition Policy and the Agribusiness Sector in the European Union" *European Review of Agricultural Economics* 29:373-397.

Bulow J., P. Geanakoplos and P. Klemperer (1985) "Multimarket Oligopoly: Strategic Substitutes and Complements" *Journal of Political Economy* 93:488-511.

Connor J.M. (2003) "The changing structure of global food markets: dimensions, effects, and policy implications" Department of Agricultural Economics, Purdue University staff paper 03-02.

Gisser M. (1982) "Welfare implications of oligopoly in U.S. food manufacturing" *American Journal of Agricultural Economics* 64:616– 624.

Josling T. (2006) "The War on Terroir: Geographical Indications as a Transatlantic Trade Conflict" *Journal of Agricultural Economics* 57:337-363.

Kireeva I. (2009) "European case law and the WTO ruling on conflicts between geographical indications and trademarks" ERA Forum 10:199-214.

Landes W. M. and R.A. Posner (2003) The Economic Structure of Intellectual Property Law, Cambridge The Belknap Press of Harvard University Press.

Lence S.H., S. Marette, D. Hayes, W. Foster (2007) "Collective Marketing Arrangements for Geographically Differentiated Agricultural Products: Welfare Impacts and Policy Implications" *American Journal of Agricultural Economics* 89, 947-963.

Moschini GC., L. Menapace and D. Pick (2008) "Geographical Indications and the Provision of Quality" *American Journal of Agricultural Economics* 90(3):794-812.

Mussa M. and S. Rosen (1978) "Monopoly and Product Quality" *Journal of Economic Theory* 18(2):301-317.

Norman G., L. Pepall and D. Richards (2008) "Generic Product Advertising, Spillovers, and Market Concentration" *American Journal of Agricultural Economics* 90(3):719-732.

Sexton R.J. (2000) "Industrialization and Consolidation in the U.S. Food Sector: Implications for Competition and Welfare" Frederick V. Waugh Memorial Lecture, Annual

meeting of the American Agricultural Economics Association, Tampa, Florida. August 2.

Zago M.A. and D. Pick (2004) “Labeling Policies in Food Markets: Private Incentives, Public Intervention, and Welfare Effects” *Journal of Agricultural and Resource Economics* 29(1):150-165.

CHAPTER 6: GENERAL CONCLUSIONS

The overarching topic of this dissertation concerns the economics of geographically-differentiated food and agricultural products and the role of intellectual property (IP) protection in the provision of quality in food and agricultural markets. Specifically, this dissertation addresses three questions concerning the economics of geographical indications (GIs).

The first essay (Chapter 3) expands the existing literature on geographical indications by considering the economic implication of the different instruments (i.e., alternative certification schemes and trademarks) used to provide IP protection for GIs. Specifically, the proposed model can differentiate the two primary certification schemes currently used for GIs, the European-style *sui generis* scheme based on appellations and the American-style scheme based on certification marks. These schemes differ substantially with regard to (i) the eligibility conditions for geographic names to receive IP protection and (ii) the requirements for certification. In a second-best world with asymmetric information, these differences are relevant because they affect the collective reputation of certified products and hence the cost of providing quality.

From a policy perspective, this essay offers specific recommendations concerning the current ongoing debate and negotiations on GIs at both the WTO and the EU levels. With regard to the type of IP protection instrument for GIs, the model indicates that a *sui generis* scheme based on appellations is preferable to standard instruments, such as certification marks, that are currently used in many important markets, including the United States. The model allows us to identify a feature of certification marks (i.e., the fact that eligibility for

registration is not conditioned upon the presence of a demonstrable link between the characteristics of a geographic region and the quality of the product) that limits their ability to convey information to consumers regarding the quality of GIs and lowers the cost of building reputation (in this sense, certification marks are no better than trademarks). In addition, the model shows that even if the current certification mark system were to be adapted to include an initial screening of products seeking IP protection based on the presence of a demonstrable quality/geography nexus, a *sui generis* scheme, which combines geography and quality requirements, would still provide larger welfare gains than certification marks.

The second essay (chapter 4) investigates whether consumers recognize and value the informational content of a variety of nested geographical origin labels. In particular, this study disentangles three types of geographical origin labels with different levels of geographical differentiation: country-of-origin labels and two types of GIs, protected designations of origin (PDO) and protected geographical indications (PGI). Furthermore, in contrast to previous studies addressing European GIs, this essay considers the potential of geographically-based labels in an important export market, thus facilitating an assessment of the value and potential for GIs as a tool for expanding export share. Consumer data show that, within the context of a high-quality value-added commodity such as extra virgin olive oil, consumers' willingness to pay for oils from different countries varies, *ceteris paribus,* across countries, and that within a country consumers have a greater willingness to pay for GI-labeled than non-GI-labeled products. We also find evidence that consumers value PDOs more than PGIs, but the result is not as strong as that found for GIs versus non-GIs. As a whole, the findings are consistent with the hypothesis that geographical origin labels are

valued by consumers for their ability to provide information regarding the quality of the product and that the value is increasing with the informational content. Nevertheless, as the data show, the additional premia for GIs and PDO are relatively smaller than the premium for COOL, indicating that there might be decreasing returns to geographical labeling.

The third essay (chapter 5) specifically aims to shed light on the current controversy over GIs among WTO members by investigating the incentives of GI-exporting and GI-importing countries to strengthen the current TRIPS provisions for GIs. This essay extends the existing literature on GIs (which exclusively focuses on the specific case in which GIs are either afforded full IP protection or no protection at all) by allowing for different "strength" or different degrees of IP protection. It is precisely this generalization that makes this essay suitable to address the ongoing WTO debate on GIs that primarily focuses on how much protection to provide to GIs (rather than on whether or not to provide protection at all). This essay also complements and adds to existing studies in this area by considering the role of promotion in expanding market demand when consumers lack information regarding either the existence or the features of the GI and GI-like products.

The model shows that GI-exporting countries would benefit from a strengthening of current GI provisions. Stronger IP provisions for GIs, in fact, favor the ability of GI producers and their associations to extract rents from the presence of scarce factors owned by producers within the GI area. GI-importing countries, on the other hand, stand to lose from a strengthening of current IP provisions. The model shows that, for importing countries, the majority of the gains from IP rights for GIs are achieved by granting an intermediate level of protection that maximizes GI producers' incentive to promote. As IP rights strengthen even further domestic producers are more likely to lose. As IP rights become stronger and the GI

sector expands, the marginal ability of GI producers to provide information declines (because of the presence of industry-level inefficiencies) so that less information is provided on which producers of GI-like products can free ride. As well, the information provided by GI producers is less likely to expand the demand for GI-like products because the degree of substitutability between GI and GI-like products declines in consumers' eyes. Finally, the analysis also shows that domestic consumers might have little to gain from a further strengthening of GI policies, especially when the domestic sector has a low level of concentration (and hence limited market power).