THE GRADUATE INSTITUTE | GENEVA
INSTITUT DE HAUTES ETUDES
INTERNATIONALES ET DU DÉVELOPPEMENT
GRADUATE INSTITUTE OF INTERNATIONAL
AND DEVELOPMENT STUDIES

Graduate Institute of
International and Development Studies Working Paper
No: 10/2010

The Economics of Geographical Indications: GIs modeled as club assets

Daniela Benavente
Graduate Institute of International Studies

Abstract

Geographical Indications (GIs) for products (Basmati rice, Champagne sparkling wine, Antigua coffee, etc.) were regulated at the international level in 1995 (WTO TRIPS Agreement, Part II, Section 3). This paper sets a general framework of analysis for GI-labeled goods, based on the modeling of a GI as a club asset (partial excludability and no rivalry in benefits to the firms that lawfully label their products with the GI). A model of club reputation is developed which includes Shapiro (1982) and Winfree & McCluskey (2005) as special cases. Reputation is assumed to be traceable through the GI label; quality is endogenously determined at the firm level, with reputation as the state variable. In contrast with previous research, it is shown that the TRIPS legal construct around GIs is potentially compatible with an equilibrium involving a self-fulfilling level of quality (and reputation) that is above the minimum, under the condition that the GI club has a reduced membership of firms. However, the establishment of a minimum level of quality is still the first best policy to improve firm profits. It is also shown that under bottom-up firm-driven processes of club formation (maximization of firm profits), firm levels of quality and profits are higher, and levels of club membership are lower, than under top-down State-driven processes (maximization of club profits). When quality is taken as exogenous, the model evolves into a static partial equilibrium framework, where the GI is subject to potential dilution phenomena due to membership crowding and oversupply. GI-related expenses, output, membership, and club finance are all determined simultaneously. It is shown that under partial rivalry in benefits, both output and membership are reduced, in an equilibrium that approaches the cartel equilibrium. State subsidization is shown to lead to potential inefficiencies stemming from price and incentive distortions. The geographical confinement of output is shown to impact factor prices and quantities. Finally, issues concerning potential monopsonistic concerns and the replication of GIs are briefly sketched.

The Economics of Geographical Indications: GIs modeled as club assets

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List of Abbreviations

AO	Appellation of origin
EC	European Communities
ECJ	European Court of Justice
EU	European Union
FTA	Free Trade Agreement
GATT	General Agreement on Tariffs and trade
GI	Geographical indication
IPR	Intellectual Property Right
Lisbon Agreement	Lisbon Agreement for the Protection of Appellations of Origin and their International Registration
OECD	Organization for Economic Co-operation and Development
TBT Agreement	Agreement on Technical Barriers to Trade
TRIPS Agreement	Agreement on Trade-Related Aspects of Intellectual Property Rights
WIPO	World Intellectual Property Organization
WTO	World Trade Organization

Geographical indications as club assets

1 Introduction

This paper argues that a geographical indication can be modeled as a club asset for a club membership consisting of firms located in the territory to which the GI is attached, and that share the reputation of the GI. These assumptions can be very precisely linked to the legal construct implied by the TRIPS Agreement (Agreement on Trade-Related Aspects of Intellectual Property Rights; refer to Appendix C for a note on the international legal regime for geographical indications). When modeled as a club, important issues regarding the organizational and market structure of GI varieties can be assessed, together with their allocative, competitive and welfare effects. These issues, however, are today practically absent from the policy debate regarding the eventual strengthening of the TRIPS Section on GIs at the Doha Round, the attention being more on the right to protection than on the impact of international law regarding GIs on the market structures around a particular GI variety.

In section 2, a simple model of club reputation is developed, which asserts the role of shared costs in the establishment of the equilibrium quality/reputation level within a club of producers bearing a particular GI. The model involves the dynamic optimization of quality (the choice variable) of an isolated profit-maximizing firm subject to a certain process of club reputation (the state variable). The model is proved to include as special cases the two main references on this matter in the extant literature, Shapiro (1982) and Winfree and McCluskey (2005), models on individual and collective reputation respectively.

In Section 3, the same model is developed in a static framework to determine the optimal size of the club operating around a GI, in terms of output and membership, as well as its optimal financing. The model considers the reputation of the GI as a localized club asset for the firm, with partial exclusion (outsiders to the GI region are excluded from its benefits) and no, or partial, rivalry in benefits among insiders. The GI is an asset and not an input because it is not consumed over the production process, but it can appreciate (or depreciate) just like any other asset following an increase (decrease) in demand or in reputation (dilution). Special attention is given to dilution caused by crowding and over-supply, potential capacity limitations due to the geographical confinement of the GI, State subsidization of GI-related costs, cartel, oligopolistic and monopsonistic concerns.

1.1 GIs characterized as club assets

A GI is an intangible asset, non-transferrable, linked to a product for which production is geographically confined, standardized, and collectivized, with strong oversight and often subsidization from the State. The GI is protected as an IPR; as such, protection is territorial, not universal. Last but not least, GIs present a strong rural bias linked to a cultural heritage. which makes some argue that there is a public good dimension to its protection, with social benefits that go beyond the profits of the firms involved in the production of the GI good. These properties, and chief among them, the features of excludability and no rivalry in benefits from the reputation of the GI, allow the characterization of the GI as a localized club asset for a club membership consisting of the firms producing the GI good.

Like all intellectual property rights, a GI is an intangible asset: an identifiable, non-monetary resource, not physical in nature, which constitutes a legal claim to future benefits through the special rights and privileges attached to it. Its useful life is indefinite *a priori*. **GIs, however, may not be sold, transferred, licensed, rented or exchanged**, since these are either collectively owned (certification marks), or controlled by the State. Right-holders to other IPRs such as trademarks, copyrights or patents do not have this limited control over their IP asset.

Production of GI-labeled products is geographically confined, implying potential capacity limitations in supply and impacts in land and factors prices. However, in most jurisdictions, any producer established in the GI area meeting the product specifications may label its product with such a GI, which implies that a GI may be used by a number of different producers.

As an IPR, a GI is protected from its unlawful utilization by non-right holders. While free-riding by insiders may imply dilution of the GI and partial rivalry of benefits, it is even more the case when 'outsiders' to the GI club use the GI to label their products.

> Once countries start protecting their GIs at the national and international levels, the process of dilution of the GI in the past is hard to revert, as vested interests are well positioned. The European Commission reports that 2.7 billion and 10 billion kg of Antigua Coffee and Darjeeling tea are produced in Guatemala and India respectively, although eight and three times as many kg are sold under those names around the world (European Commission 2003).

Standards of production and product specifications must be fulfilled to qualify to use the GI label. The all-encompassing term that is frequently used is the 'code of practice' of the GI (Vandecandelaere 2009); however the term 'standard' is maintained here to relate more easily to the literature on quality standards. This feature of GIs

ensures both a strong homogeneity and a minimum level of quality in final products, limiting free-riding from 'insiders'. It is important to note here that GI production methods and standards are not protected as such (they are not patented). This distinction is crucial for the issue of the 'replication' of GI clubs.

Collective action among GI-right-holders is required to coordinate activities, and avoid free-riding on the reputation of the GI and prisoner's dilemma type of opportunistic behavior (Rangnekar 2003b). Close coordination, however, has often led to uncompetitive behavior. The OECD has documented anticompetitive practices in the GIs Cantal, Parmigiano Reggiano and Grana Padano, Parma and San Daniele and Gorgonzola (OECD 2000).

Cost-sharing, value-added sharing and profit-sharing agreements are present all along the production, marketing and distribution chain of a GI product. The term used is what the French call the 'cahier des charges' of the GI ('book of specifications' in English), which refers to the duties of each agent involved in the lifetime of a GI product but which also reflects on costs, pricing, sustainability of the GI product business model and strategic interactions among agents. Conformity assessment activities often constitute a big proportion of shared costs, although cost sharing involves other expenses as well on erection, maintenance and exclusion of the club, such as advertising campaigns, lobbying activities, legal actions, etc.

In some cases, part of these costs is subsidized by the State. The enforcement of legal national and international protection is subsidized by all States, but often expenses related to specific GIs are subsidized as well. In some countries, GIs involve State monopolies (Habanos in Cuba for example).

Finally, GIs are subject to the territoriality principle for their legal protection, just like any other intellectual property right. This principle says that protection is granted in each territory under national laws. This means that as long as there is no registry with universal membership (which is the case), GIs are recognized, and the TRIPS protection is enforced, on a national basis or through bilateral agreements recognizing individual GIs.

> Mexico protects 206 European GIs in exchange for the protection for Tequila and Mezcal in the European Union, [1] but such a protection is not automatically extended to other WTO

[1] Agreement between the European Community and the United Mexican States on the mutual recognition and protection of designations for spirit drinks, Official Journal L 152 of 11 June 1997, p. 16-30.

members, as territoriality, grand-fathering or genericity clauses may apply. Trevor Clarke, Chair of the negotiations on IPRs at the Doha Round, recommended five guiding principles for future work on the register of GIs for wines and spirits, one was that "the 'territorial nature' of intellectual property rights should be preserved (i.e. the countries' right to determine how to protect intellectual property within their own territories)".[2]

1.2 Literature review

1.2.1 Club goods theory

Club goods are impure public goods characterized by partial excludability, no or partial rivalry of benefits, and congestion phenomena (Buchanan 1965). Table 1.1 is an expansion of the classic taxonomy of goods developed by Paul A. Samuelson (1954), according to which a GI can be characterized as being a voluntary, imperfectly excludable (due to free-riding on the GI from outsiders), shared, non-rival but congestible (due to potential dilution phenomena from within) club asset with a limited membership.

Cornes and Sandler (1996) define a club as a voluntary group deriving mutual benefit from sharing one or more of the following: production costs, the members' characteristics, or a good characterized by excludable benefits. Besides excludability and rivalry, these authors stress four features of club goods.

A first difference with pure public goods is that a club is voluntary (which is not the same as being excludable). Members choose to belong because they anticipate a benefit from membership, but they have a right of exit. An individual can sell its share to a sports club or a yacht marina, but can not opt out from national defense or traffic lights. Thiedig and Sylvander (2000) contend that voluntarism is not really there for GIs, since it is often the case that "within a certain geographical area, the use of a GI is compulsory". I would argue that a producer in a delimited GI area may exit the GI market or opt for not using the GI label. What is compulsory is what is done with the said GI owing to the product specifications, just like an individual must follow the rules at its tennis club.

Second, clubs involve sharing, although sharing often implies, as of some specific level, partial rivalry of benefits through a "congestion" or crowding phenomenon. To avoid congestion, a club is excludable and has finite membership. In the case of GIs, a dispersion in the quality of the products bearing the GI (technically: the "dilution" of the

[2] WTO 2009 News Items, 27 November 2009, TRIPS Chair suggests way forward in intellectual property talks, available at http: //www.wto.org/english/news_e/news09_e/trip_27nov09_e.htm.

Table 1.1: Expanded Samuelson taxonomy of goods

	private	**club**	**common**	**public**
voluntary	yes	yes	yes	no
excludable	**yes**	**yes**	**no**	**no**
shared	no	yes	yes	yes
rival	**yes**	**no**	**yes**	**no**
congestible	yes	yes	yes	no
membership	no	yes	no	no
examples	plasma	cable TV	video store	open broadcast
	weapon	shooting club	hunting	national defense
	car	racing club	roads	traffic lights
	brand	GI	Haute Couture?	safety regulations

GI) should decrease the market value of the GI as a consequence of a lower valuation by consumers. Such a dilution could be due to an increase in output or in the number of firms using the GI, low-quality firms free-riding on the reputation of the GI, standards compliance being loosely assessed, etc. The geographical confinement of production may impede this phenomenon to appear, although *a priori*, congestion may be caused by extra-regional producers bearing the GI (for lack of protection or generic status).

Third, a club has an exclusion mechanism at some cost. For GIs, the exclusion mechanism is the legal protection of the GI, with the -often prohibitive- cost of enforcement. Finally, the optimal levels of membership to the club and of provision of the club good must be determined together.

Some authors have studied geographical indications in the club goods framework. Thiedig and Sylvander (2000) analyze GIs as club goods by using a simple but telling graphical analysis, they do not derive formally the production, provision and membership conditions for a GI club. Langinier and Babcock (2005 and 2006) analyze GIs as non-rival, congestible (through membership) and excludable clubs. Their main interest lies in comparing competing regimes (nothing, certification, GI-label). They develop a model with two types of goods (high and low quality) and heterogeneous consumers and perform a welfare analysis.

1.2.2 Individual and collective reputation

Several theoretical papers have addressed the issue of reputation in the firm and in other contexts. To our knowledge, none has attempted to model the reputation of a club, although Winfree & McCluskey (2005) model the collective reputation of a group of firms as a common resource good and apply their model to a geographical indication, Washington apples. What follows is a brief review of the extant literature regarding reputation. One theme that is common to all these papers (and the model proposed in the next section is no exception) is that the first best policy to sustain a high level of reputation (individual, collective or club) is the adoption of a minimum standard of quality.

Shapiro (1982) shows that a profit-maximizing monopolist subject to a state equation for reputation commands a steady-state equilibrium with a markup that stems exclusively from being in an imperfect information setting. He also shows that if the monopolist could credibly commit to the level of quality where marginal revenue equals marginal cost (the perfect information equilibrium), both quality and profits would increase compared to the steady state. In a second related paper (Shapiro 1983), he shows that premia for high-quality products are returns on the asset value of reputation (thought as an initial information cost). He uses a dynamic model with perfect competition but imperfect consumer information (the quality of the product is observable only after purchase, but brand reputation is common knowledge). He shows that the role of reputation in ensuring higher quality is imperfect at most, that it need not confer market power nor imply a barrier to entry. He considers heterogeneous consumers in a welfare analysis made through comparative statics, as responses to shifts in minimum quality and high quality premia.

Winfree and McCluskey (2005) build on Shapiro (1982) to model collective reputation as a common property extracted by firms. They set up a model of simultaneous dynamic optimization over continuous time. A number of risk-neutral, identical firms is assumed to produce a specialty product (experience good), with no entry, no exit, no firm-level traceability. The firm maximizes profits with respect to quality subject to the state equation for reputation. They show that the steady-state Cournot-Nash equilibrium is a saddle-point, and that as the number of firms rises, the steady-state level of quality is reduced, showing a free-rider problem, as returns to quality are diluted but not the costs. With the monopoly as a benchmark (quality and reputation had both been proved to be higher by Shapiro), the policy implication is the interest for

the industry to set a minimum quality standard to eliminate free-riding and achieve a higher collective reputation, a Pareto improvement compared with the Cournot-Nash equilibrium. They also show that there is room for potential trigger strategies, with the group working as a quality cartel, the problem being that quality wars have lagged effects on reputation (as proved by Tirole 1993, reference below) that price wars don't have.

In this line, a recent paper (dated 2008, not to be quoted) develops a framework where both quantity and quality are choice variables. The authors first show that in the context of a constant per unit cost of production strictly convex in quality, a single level of quality is chosen by a firm and that a unique symmetric and interior Nash equilibrium exists, an important result since these features were *assumed* in previous models (and the one proposed here). As the market becomes less concentrated, the equilibrium quality level is found to decline, so that minimum quality standards can improve economic welfare. The real novelty of the paper is to assess the Nash equilibrium when the final product is assembled from components manufactured in-house by each Cournot competitor. Minimum quality standards can then be imposed on the final product or, alternatively, on a single component. Rouvière and Soubeyran (2008) deal with the issue of entry into an industry where firms share a collective reputation. They show that free entry is not socially optimal; and that the imposition of a minimum quality standard is optimal and does not necessarily constitute a barrier to entry.

Fleckinger (2007) explores the situation in which consumers know the average quality offered by a set of producers, but not the quality of one given product. First, they show that when the strategic variables are quantity and quality, the equilibrium welfare function is convex in the number of competing firms as a consequence of decreasing quality and increasing quantity. Second, they assess the potential trade-offs on quantity against quality through a number of regulatory tools, to show that among one-instrument policies, entry and quantity regulations perform better than price-based regulation.

Tirole (1993) addresses the issue of reputation from yet another angle. He studies the joint dynamics of individual and collective reputations and derives the existence of stereotypes from history dependence (the key concept), "rather than from a multiplicity of equilibria (theory of conventions) or from the existence of a common trait as is usually done in the literature". He models a group reputation as an aggregate of individual reputations. The reputation of a firm (the principal) results from the actions of its employees (the agents), which are of three types: honest, dishonest and random. He uses a matching game, agents don't meet the same principal twice, once hired, and agents

decide if they cheat based on their type and payoffs. After episodes of bad behavior, either the group is stuck in a bad reputation steady-state or trust takes several periods to re-establish to get to the high reputation steady-state. A stochastic version of Tirole's model was recently developed by Levin (2009).

2 Club reputation dynamics (quality endogenous)

> «À l'égard du vin, de l'huile, et des autres choses que l'on est dans l'usage de goûter avant d'en faire l'achat, il n'y a point de vente tant que l'acheteur ne les a pas goûtées et agréés.» Art. 1587 of the French Civil Code of 1804.

The reputation of a firm (goodwill) is a valuable asset; although building-up a reputation only makes sense in a world of imperfect information, and for an experience good (i.e. goods for which quality is unobservable until they are consumed). If products' attributes were perfectly observable prior to purchase, previous production of high quality items would not enter into consumers' evaluations of a firm's product quality; quality beliefs could be derived from inspection. But when product attributes are difficult to observe prior to purchase, consumers may plausibly use the quality of products produced by the firm in the past as an indicator of present or future quality. Thereby a firm or a group of firms has good reputation if consumers believe its products to be of high quality (Shapiro 1982 and 1983).

Now, compared to individual reputation, the *collective* reputation of a group of firms is similar to a common property resource. If there is unconstrained use of a particular designation of origin, firms might perceive the shadow price of such a use to be zero and decide to free-ride on reputation by "cheating" on quality, making short term profits and degrading the rent-value of the GI. A firm's decision to produce high quality items is dynamic since the benefits accrue in the future. Reputation formation is then a type of signaling activity, a seller cannot command a price associated with high quality until his reputation is established (Winfree and Mc Cluskey 2005).

Translated into economics, the TRIPS Agreement implies that a GI is used to differentiate a variety of higher-than-generic quality level for which supply is restricted due to the geographical confinement of production. The TRIPS Agreement does not require that a particular standard be associated to a GI-protected good, it only stipulates some intrinsic quality. The GI label gives traceability to the variety (through the legal protection of its use) but not at the firm level (either because traceability is not possible or because the brands using the GI are weak). Restricting the use of the GI label does not constitute *per se* a barrier to entry, since a GI, in its weakest version, is simply a label

indicating origin. Nothing prevails firms to make identical copies of the GI good as long as the GI label is not used to differentiate such products as originating in the GI region (TRIPS basic protection) or as long as the firms do not state to have a "like" product (TRIPS extra protection granted to wines and spirits).

Protection of the GI is legitimated on two grounds: as a means to prevent the use of a GI "in a manner which misleads the public as to the geographical origin of the good" (consumer protection); or in a manner "which constitutes an act of unfair competition" (protection of the investment and goodwill of the firms establishing the reputation of the GI).

In this section I develop a simple model of **club reputation**. The model is a generalization of Shapiro (1982) and Winfree and McCluskey (2005), who focused on individual and collective reputation respectively, and includes these models as special cases, with additions inspired from club goods theory.

2.1 Equilibrium level of quality as a function of membership

The set-up is identical to that of Shapiro (1982) and Winfree and McCluskey (2005), in continuous time; with additions inspired from club goods theory. The model assumes N identical, risk-neutral, profit-maximizing firms, indexed by i. Each firm is assumed to produce a fixed number of items of an experience good, fixed at one for simplicity, of a level of quality q.[3] There is a minimum level of quality q_0 under which sales are not possible, which might be a legal minimum (technical regulation in place), a level at which quality reductions may be detected by inspection or a warranty level (Shapiro, 1983) or a level of quality at which profits are zero.

Current quality is the control variable for the firm; it is not observed by consumers before purchase but predicted based on reputation. Reputation is the state variable and is assumed to be common knowledge for consumers and firms. Club reputation evolves with a lag γ, which "captures the notion that quality information may be forthcoming only after a significant time period" (Shapiro 1982), but that is used here to represent the fact that reputation is built over time, and that club reputation, based on perceptions of

[3] The assumption of a firm producing one item of a single quality is made without loss of generality, as proved by Timothy McQuade, Stephen Salant and Jason Winfree (on a paper requested NOT to be quoted, dated August 27, 2008), who show that starting from a similar model in which firms are allowed to produce multiple qualities at different levels of output, the solution involves a single mass point of quality for each firm and an interior equilibrium on output and quality that is symmetric for all firms.

average quality is time-sensitive and implies and adaptative process. Quality q and reputation R are normalized and assumed to be in the same unit. At the steady-state, reputation equals quality $q = R$.

Production costs are a function of quality, while inverse demand is a function of reputation ($c(q)$ and $p(R)$ are positive and increasing). The cost function is strictly convex, with marginal costs increasing at a higher pace than marginal revenue (implying $p'(R) > 0$; $c'(q) > 0$; $c''(q) > 0$ and $c''(q) > p''(R)\big|_{q=R}$).[4] Per period firm profits are assumed to be time-additive. The discount rate is assumed to be fixed at r. Following Shapiro (1982), prices are assumed to be independent of demand (firms are price-takers), although there may be no consumers (and thereby no "active sellers") at a given price-quality combination. This would be analogous to the fact that price is determined solely by costs under perfect competition.

The model departs from previous models in two broad aspects:

1. Winfree & McCluskey assumed no entry, no exit, and no firm-level traceability. For this model on club reputation, the assumptions, inspired on the TRIPS Agreement are that:
   - The good has traceability at the club level through the GI label ("Geographical indications are indications which identify a good…")
   - The GI club has limited membership due to the geographical confinement of output ("…as originating in the territory of a Member, or a region or locality in that territory,…")
   - The GI good constitutes a differentiated variety within its broad product category ("…where a given quality, reputation or other characteristic of the good is essentially attributable to its geographical origin." Article 22.1 of the TRIPS Agreement)
2. Following club goods theory, "club-house" costs are assumed, $G(R)$, which are shared by the members of the club, so that each firm pays a fee $f = G(R)/N$. These costs of erecting, maintaining and sustaining the GI club (lobbying, marketing, advertising, administrative costs, etc.) are a function of reputation (the higher the reputation, the higher the incentive to have a club-house; alternatively,

[4] Since the quantity sold by the firm is normalized to one, marginal price equals marginal revenue.

the higher the investment in the GI, the higher its reputation). $G(R)$ is increasing and strictly concave, since sustaining a reputation is costly, but once the whole system is in place, at the margin, sustaining a slightly higher quality level (at the steady state $q = R$) involves only marginal adaptations of the facilities. The assumption thereby is that $G'(R) > 0$ and $G''(R) < 0$.[5]

2.1.1 The firm's maximization problem

The firm's problem is to maximize the present value of profits subject to the state equation for reputation and to the constraint that profits be non-negative:

$$\max_{q_i \geq 0} PV\pi_i = \int_0^{\infty} e^{-rt}\left[p(R) - c(q_i) - \frac{G(R)}{N} \right] dt \quad i = 1,\ldots,N$$

$$s.t.: \; p - c - \frac{G}{N} \geq 0$$

$$: \dot{R} = \gamma\left(\bar{q} - R\right) \; R(0) = R_0 > 0$$

$$: G(R) > 0, G'(R) > 0$$

$$where: \bar{q} = \sum_{j=1}^{N}\left(\frac{q_j}{N}\right) = \bar{q} = \frac{q_i}{N} + \frac{N-1}{N}\phi(R)$$

Where, following Winfree & McCluskey (2005), it is assumed that firms follow a stationary Markovian strategy (the firm conditions its actions at a certain period only at the state of affairs at that given period), so that $q_j = \phi(R)$. The current-value Hamiltonian is:

$$\tilde{H}_i = p(R) - c(q_i) - \frac{G(R)}{N} + \lambda_i \gamma\left[\frac{q_i}{N} + \frac{N-1}{N}\phi(R) - R \right]$$

Where λ_i is the current-value shadow price of reputation, a co-state variable. Apply the Pontryagin recipe to obtain the isoclines (derivations in Appendix A):

$$\dot{q} = \frac{\gamma}{N} \frac{c'(q_i)\frac{N}{\gamma}\left[r + \gamma - \gamma\frac{N-1}{N}\phi'(R)\right] - p'(R) + \frac{G'(R)}{N}}{c''(q_i)}$$

$$\dot{R} = \gamma\left[\frac{q_i}{N} + \frac{N-1}{N}\phi(R) - R \right]$$

[5] It is shown below that the main findings hold for an S-shaped $G(R)$ function ($G'' > 0$ at low-quality levels, $G'' < 0$ up from some quality level) or for a convex $G(R)$ function, but at the cost of a loss of generality.

2.1.2 Steady-state equilibrium

The steady state equilibrium is found at the intersection of the isoclines $\dot{R}=0$ and $\dot{q}=0$, with the symmetry assumption, the solution is:

$$\begin{cases} R^* = q^* \\ p' = \left(1+\frac{rN}{\gamma}\right)c' + \frac{1}{N}G' \end{cases}$$

$p'\left(R^*\right)$ is the marginal revenue of the representative firm (because output is set at unity); $c'(q^*)$ is the output marginal cost and $G'\left(R^*\right)/N$ is the club-house marginal cost per firm. The solution involves a price schedule where marginal revenue covers for marginal costs at a premium $\frac{rN}{\gamma}c'(q^*)$. Under the assumption that $p''(R)<0$ (downward sloped marginal revenue curve) the model implies a lower equilibrium level of quality/reputation than under collective reputation (in the latter case $G=0$).

2.1.3 System stability: saddle-point path equilibrium

The Jacobian matrix is:

$$J = \begin{bmatrix} -\gamma & \gamma \\ \frac{\gamma}{Nc''}\left(-p''+\frac{1}{N}G''\right) & r+\frac{\gamma}{N} \end{bmatrix}_{q^*,R^*}$$

$$D = \frac{\gamma^2}{Nc''}\left[p''-\left(1+\frac{rN}{\gamma}\right)c''-\frac{1}{N}G''\right] < 0 \text{ for stability}$$

$$\begin{cases} c''>0 \\ c''>p'' \Rightarrow D<0 \\ G''>0 \end{cases}$$

The determinant of the Jacobian matrix at the steady state gives information about the behavior near the steady state. Under the assumptions of the model ($c''>0$; $G''\geq 0$ and $c''>p''$), the determinant is unambiguously negative, implying eigenvalues of opposite signs and a saddle point path equilibrium. The stability condition $D<0$ is a curvature condition that asserts that the firm's marginal revenue is either declining $\left(p''<0\right)$, or if it rises, it rises no faster than the "relevant" marginal cost increases (which includes the premium).[6]

[6] Although a concave marginal revenue function is usually assumed, the model does not rule out a convex marginal revenue function ($p''>0$), which happens for example for extremely rare wine vintages -say Champagne- for which it is the case that increases in quality are marketed at huge price premia:

$$\begin{cases} c''>0 \\ c''>p''>0 \end{cases} \Rightarrow D<0 \text{ iff } 0<p''<\left(1+\frac{rN}{\gamma}\right)c''+\frac{G''}{N}$$

2.1.4 Quality is a function of membership

The implicit derivative of quality with respect to number of firms at the equilibrium point is:

$$\frac{dq^*}{dN} = 0 \Rightarrow \frac{1}{N}G' = \frac{rN}{\gamma}c'$$
$$\frac{dq^*}{dN} \geq 0 \Leftrightarrow \frac{1}{N}G' \geq \frac{rN}{\gamma}c'$$
$$\frac{dq^*}{dN} \leq 0 \Leftrightarrow \frac{1}{N}G' \leq \frac{rN}{\gamma}c' \text{where} \frac{rN}{\gamma}c' > 0 \text{ and } \frac{1}{N}G' > 0$$

As the number of firms increases, the average quality might decrease or not depending on the parameters of the model. At low levels of membership, quality will increase if:

- The discount rate r is low. A low discount rate implies a relatively high value of future cash flows, making it not profitable to cash early on the extra profits obtained on cheating on quality, a firm-level optimization process that implies, in the aggregate, a higher quality level.
- The speed of consumer learning γ is relatively high. This is an intuitive result, if consumers are fast in adapting their expectations over quality based on consumption; the payoff of increasing quality is not delayed, making it profitable to increase quality.
- Marginal costs of production c' are low. The lower the additional cost from marginal increases in quality, the more it pays to increase quality.
- Marginal GI-related costs G' are relatively high. High marginal GI-related costs imply high benefits from cost sharing, something difficult to achieve at low levels of membership.

Rearranging terms, these conditions reduce to one simple condition: quality will increase with the number of firms as long as the premium over production cost $\frac{rN}{\gamma}c'$ is

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In addition, under the assumption that the function G is concave $(G'' \leq 0)$, a saddle-point path equilibrium is not completely ruled out either, however it comes at the price of an additional condition.

$$\begin{cases} c'' > 0 \\ c'' > p'' \\ G'' \leq 0 \end{cases} \Rightarrow D < 0 \text{ iff } p'' - \left(1 + \frac{rN}{\gamma}\right)c'' < \frac{1}{N}G'' \leq 0$$

Wherever the determinant is positive, the system is unstable; i.e. "there is a direction in a 2-dimensional space in which the system will not tend to return back to the equilibrium point." (Wikipedia).

lower than the per-firm GI-related marginal cost $\frac{1}{N}G'$, quality will decrease otherwise. This determines a potential scenario in which there is an inflexion point as of some level of N, up to which the equilibrium quality increases and after which it decreases.

This result departs from most theoretical papers on collective reputation. Winfree and McCluskey (2005) find that as the number of firms increases, the average quality unambiguously decreases due to a free-rider problem; essentially because the returns to quality are diluted, while the costs are not. Once shared costs are included, the optimum is affected.

2.2 The bottom-up, firm-driven, approach to optimal membership

Proposition 1 *A GI club with club-house shared costs increasing with reputation will exhibit a steady-state saddle-path point equilibrium with a self-fulfilling level of quality which is a function of the level of membership N, whereby quality increases with the number of firms as long as the premium over production cost $\frac{rN}{\gamma}c'$ is lower than the per-firm GI-related marginal cost $\frac{1}{N}G'$. In this case, there exists a level of membership N_f that maximizes profits at the firm level and that does NOT correspond to the monopolist.*

Figure 2.1: Equilibrium quality/reputation $q = R$ given membership N

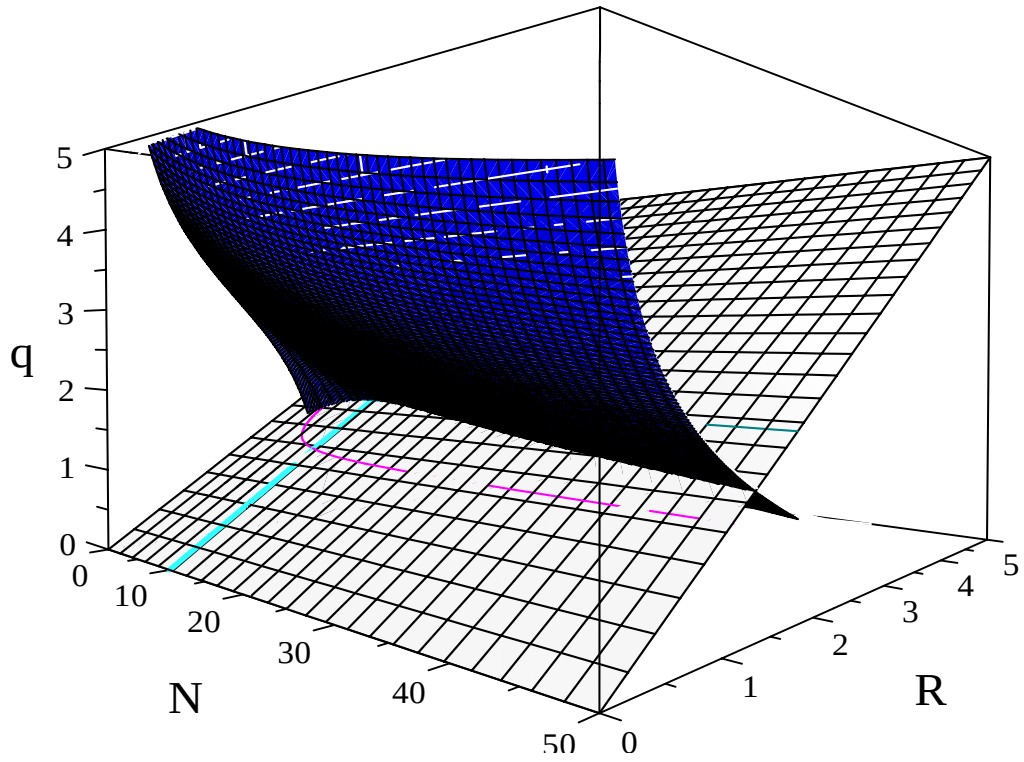


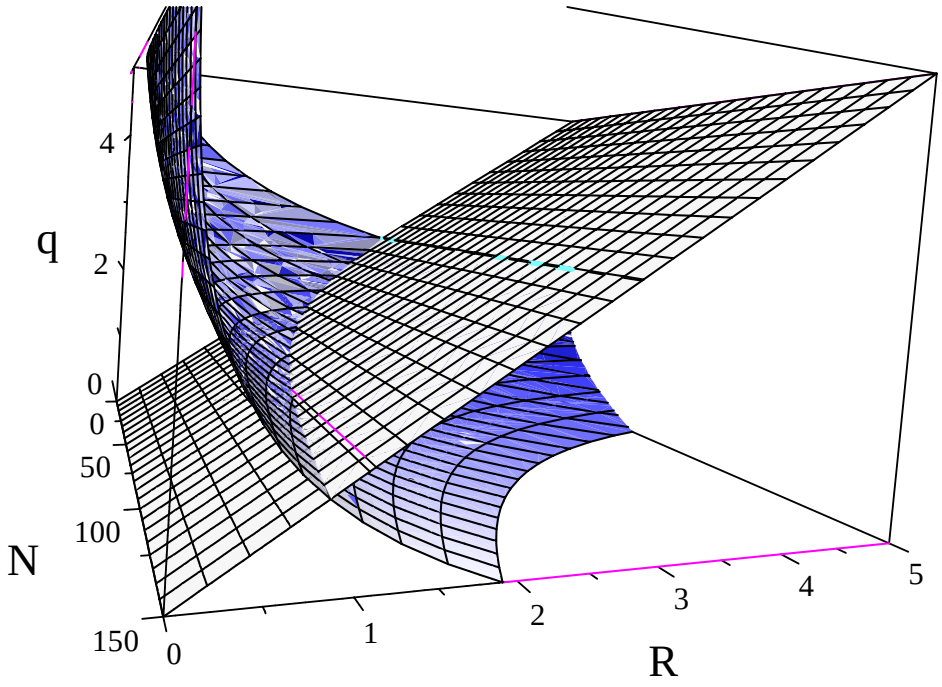
Figure 2.1 shows the equilibrium steady states as a function of the number of firms. The isoclines are in blue/red $(\dot{q}=0)$ and grey $(\dot{R}=0)$. The minimum quality given N (at which profits are zero) is in magenta. The maximum level of quality, which is the optimum, q_{opt} is in blue. The self-fulfilling level of quality, and thereby firm profits, are maximized at a level of membership of 10 firms (light blue).

Proposition 2 *For a membership $N > N_f$, the club presents partial rivalry through reduced profits as membership increases. In this model output per firm is set at 1 for simplicity, but there is no restriction imposed on the amount of output that could be sold. Membership refers exclusively to the number of firms in the market.*

Figure 2.2 shows the same Figure with $G=0$ (which corresponds to Winfree & McCluskey's results, but with reduced membership due to GI level traceability), where the race-to-the-bottom over quality as membership increases is clear. However, if membership is kept low, the self-fulfilling level of quality at the steady-state given N is above q_0.

If the development of GIs in "nature", before any legal protection (Florida Orange, Antigua Coffee, Parma Ham, Basmati Rice, and Feta Cheese) is any indication of this mechanism at play, the message of the model is powerful. It implies that as long as the *use* of the GI name is restricted (based on fair competition, laws against passing-off or

Figure 2.2: Steady states as the number of firms increases with $G=0$



through the legal protection of the GI), and as long as the GI product is a highly valued and differentiated variety (as expressed by the inverse demand function), the market equilibrium will automatically command a higher quality level and a higher profit at the industry level, exploiting some of the potential of the variety under imperfect information.

The model also *justifies* the protection of GIs when GIs are confronted to free-riding by non legitimate users (on consumer and goodwill protection grounds), because of the improvement in quality and profits due to traceability (a signaling effect well known in branding theory), and this in a perfect competition / imperfect information setting.

The policy implication for developing countries is attractive: they do not need to impose cumbersome and expensive structures for the development of GIs, they only need to make sure that the use of the GI label is fair and protected from counterfeits and fakes for *some* of its potential to develop as a market outcome, which is the level of protection granted under the current TRIPS Agreement (conditional on national protection).

2.3 The top-down, State-driven, approach to optimal membership

Although GI protection in traditional countries (France, Italy) often implies setting standards, conformity assessment and administration structures, the only clear requirements under TRIPS for a GI to be protected as such is to be a variety with some *intrinsic* quality or reputation and to set up "a territory, or a region or locality in that territory". The territory is usually set by the State, following a request by some communal entity or group of producers, although the State usually just validates a territory historically set based on tradition.[7]

This issue is of particular relevance regarding a GI club for two reasons. First, there is a **public good dimension** to the GI. In the world, GIs have a strong rural bias and are attached to goods that embody some sort of cultural heritage, typicity, tradition and historicity (Reviron 2009). Those features usually imply a strong hold of State central, communal and civil society institutions in all GI-related matters, with a top-down

[7] This question is related to the literature on (Old and New) Institutional Economics, which focuses on the social and legal norms and rules that underlie economic activity (Commons 1931, Coase 1937, Williamson 1985). In application of this literature, in an interesting non-theoretical paper Barjolle and Chappuis explain why the supply chains of artisanal food products are organized as "hybrid forms" (between the two poles of market and hierarchy -- or the integrated firm), with a case-study for a well-known GI, Gruyère (Barjolle and Chappuis n.a.).

approach to the protection of GIs. That is usually the approach adopted in developing countries. In continental Europe, however, the approach to GIs protection has been more often a process driven by GI good producers through professional or inter-professional associations (cf. Italian Consortia), a bottom-up approach, eventually validated by the State.

Second, different club-house institutional arrangements will lead to different levels of optimal membership. If the club-house is member-driven, the firms will set membership at the level that maximizes profits at the **firm** level, N_f. If however, the GI is controlled by the State, the State might want to set a level of membership that maximizes profits at the **club** level N_c, to fully exploit the potential of the GI and/or to increase its own tax revenues (which in most countries are set at a fixed percentage of profits). At the limit, if the country's legal regime allows for it, the State might even set a State monopoly to fully appropriate the GI profits (cf. the case of Cuban Habanos, and back to Shapiro's model).

To simplify, assume that a "social planner" delimits the territory, thereby indirectly setting N, the club "membership", and total output. What is the optimal membership? Club goods theory, which is a theory of consumption, sheds light to this question. It has been proved that if a club is member-driven, then it is optimal for the club to maximize average net consumer **utility**. If the club, however, has a single profit-maximizing owner, then it is optimal for the owner to maximize its profits, even if it implies a lower average utility per club member (refer to Cornes and Sandler 1996, p. 420 for a discussion and an example).

To explore this issue under the current framework, I will assume that in the neighborhood of $\lfloor N_f, N_c \rfloor$ production technology constraints limit output per firm to a fixed amount independent of membership, set at one unit per firm for simplicity, so that the levels of profits under different levels of membership are comparable. In the scenario in which the social planner maximizes club profits, the game for the social planner is the following:

1. The social planner assumes GI club firms maximize profits based on the state equation for reputation and the exogenous number of firms in the market and solves for the steady state equilibrium, obtaining the result above.
2. The social planner maximizes profits for the GI club based on such a steady state and sets N_c indirectly (N_c is a mnemonic for club).

1. Firms maximize their profits taking N_c as exogenous.

The process might be gradual, starting from a low N, eventually stabilizing at (N_c, q_c, R_c). Step 1 was solved above. In step 2, the social planner assumes a steady state / symmetric equilibrium, so the problem is not dynamic anymore, it is static:

$$\max_{N\geq 0}\Pi = N\left(p - c - \frac{G}{N}\right)$$

$$s.t.: q_0(N) < q^* = R^* < q_{opt} \Rightarrow \begin{cases} \pi = p - c - \frac{G}{N} \geq 0 \\ \frac{\partial \pi}{\partial q^*} = p' - c' - \frac{G'}{N} > 0 \end{cases}$$

$$: p' = \left(1 + \frac{rN}{\gamma}\right)c' + \frac{1}{N}G'$$

$$\frac{dq^*}{dN} = \frac{\frac{r}{\gamma}c' - \frac{1}{N^2}G'}{p'' - \left(1 + \frac{rN}{\gamma}\right)c'' - \frac{1}{N}G''}$$

Profits are maximized at:

$$\frac{\partial \Pi}{\partial N} = 0 \Rightarrow \frac{dq^*}{dN} = -\frac{\left(p - c - \frac{G}{N}\right)}{N\left(p' - c' - \frac{G'}{N}\right)} = -\frac{\pi}{N\frac{\partial \pi}{\partial q^*}} < 0$$

$$\frac{\partial \Pi}{\partial N} \geq 0 \Rightarrow \frac{dq^*}{dN} \geq -\frac{\left(p - c - \frac{G}{N}\right)}{N\left(p' - c' - \frac{G'}{N}\right)} = -\frac{\pi}{N\frac{\partial \pi}{\partial q^*}} \text{ where } RHS < 0$$

q_c and N_c (subscript for club)

First, the club profits-maximizing level of membership, N_c, exists in the range of positive profits $(\pi = p - c - G/N \geq 0)$. Being a monopolist might not be viable anymore. Second, the possible range for quality is above the generics level and below the perfect information optimum, so that $\frac{\partial \pi}{\partial q^*} = p' - c' - G'/N > 0$. The second order condition for a relative maximum is that the second derivative be negative. In the range where quality increases with N, where the LHS is strictly positive, firm profits always increase as N increases, and then so do club profits. At $q_{\max}$, where $\frac{dq^*}{dN} = 0$, firm profits reach their maximum.[8] In the range where quality decreases with N, profits at first keep increasing with N up to $\Pi_{\max}$ and start decreasing afterwards.

[8] The level of membership that maximizes profits at the firm level is always that of $q_{\max}$ unless G is decreasing, so that $G' \leq 0$, a situation that would imply a subsidy, ruled out by assumption.

Figure 2.3: Club (scale 1/20) versus firm profits maximization

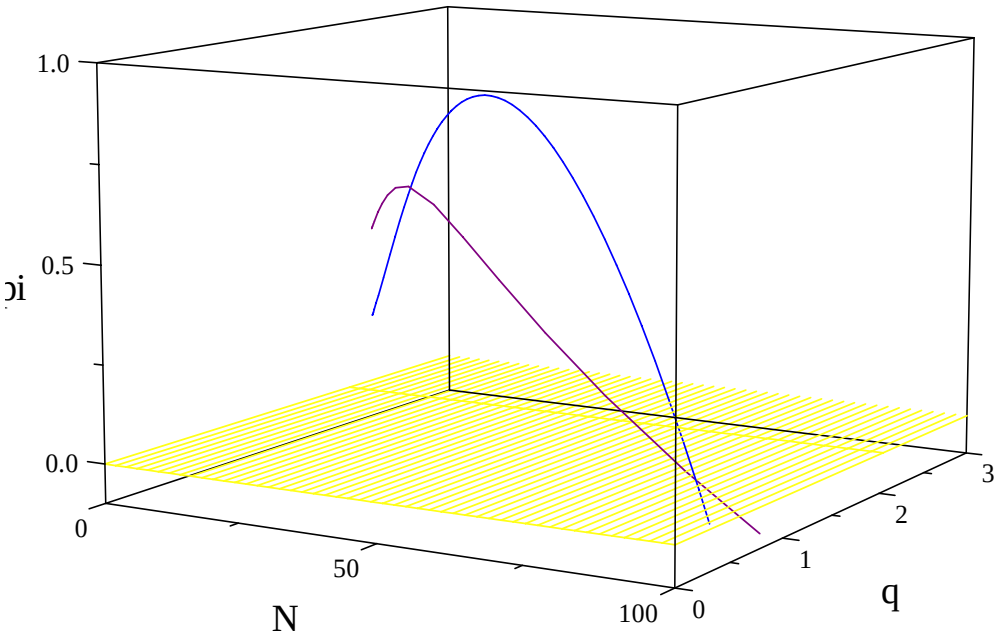


Figure 2.3 shows that the membership that maximizes profits at the firm level is always lower than the membership that maximizes profits at the club level. In addition, the latter implies a lower level of quality in equilibrium. Firm profits given N are plotted in purple plain, while club profits are plotted on a 1/20 scale in blue. The zero-profits plane is plotted in yellow.

$$\begin{cases} 0 > \frac{dq^*}{dN} > RHS \Rightarrow \frac{\partial \Pi}{\partial N} > 0 \\ 0 > \frac{dq^*}{dN} = RHS \Rightarrow \frac{\partial \Pi}{\partial N} = 0 \Rightarrow \Pi_{\max} \\ 0 > RHS > \frac{dq^*}{dN} \Rightarrow \frac{\partial \Pi}{\partial N} < 0 \end{cases}$$

Proposition 3 *The top-down State-driven approach to profit maximization (maximization of club profits) implies a greater optimal level of membership and a lower level of quality than the bottom-up, firm-driven process of profits maximization (maximization of firm profits).*

This result can be interpreted with reference to the membership elasticity of firm profits $\varepsilon_{\pi,N}$. Club profits reach their maximum when the membership elasticity of firm profits equals -1, they increase at higher levels and decrease at lower levels. Notably, if $\varepsilon_{\pi,N} = 0$, then quality is maximum but club profits have still room to increase with increased membership.

$$\varepsilon_{\pi,N} = \frac{\partial \pi}{\partial N}\frac{N}{\pi} = \frac{\partial \pi}{\partial q}\frac{\partial q}{\partial N}\frac{N}{\pi} = \frac{\partial q}{\partial N}\frac{\pi' N}{\pi}$$

$$\frac{\partial \Pi}{\partial N} \geq 0 \Rightarrow \varepsilon_{\pi,N} \geq -1$$

Corollary 1 *In the absence of strict standards of quality, the top-down versus bottom-up approaches to GI protection and territory delimitation, with their impact on optimal club membership, involve a trade-off between club profits/ firm profits/ total sales/ and quality.*

2.4 Minimum quality standards and branding

In the previous analysis, the interest was in understanding within-club dynamics under the hypothesis of endogenous quality and reputation, corresponding to the minimum level of protection and requirement granted under the TRIPS Agreement. But GIs are a hybrid tool of differentiation as they signal origin and more often than not, a production process and a minimum level of quality as well (besides their intrinsic characteristics as varieties that is). The role of GIs is to mitigate market failures deriving from information asymmetries, together with other differentiation and signaling devices available to firms such as brands, safety labels, standards and technical regulations (TRs).

> Regarding standards, the World Trade Organization offers a framework of analysis in its TBT Agreement (Agreement on Technical Barriers to Trade). "Technical regulations" are specifications that products must fulfil mandatorily, out of security or safety concerns. "Standards", on the other hand, are adopted on a voluntary basis, and often include specifications developed for conformity with other products (VCR v. DVD), not necessarily denoting some higher quality. But some standards do denote a minimum quality, these are certification labels, which define high-quality, environmental, or "healthy" standards, such as the French "Label Rouge" for meat, or the French "Bio" or American "Organic" labels. These procedures might be privately or publicly set and performed and are available to all firms after compliance determined through an independent certification process.

In addition, firms might develop an above quality product and signal that level through proper branding and firm-level traceability. One can not set *a priori* a ranking regarding the qualities implied by each instrument, although for sure, a GI firm that has a strong brand will necessarily have a higher quality than that of its club sisters (otherwise the investment in the brand is not justified).

Marette (2005) suggests that the concentration ratio (CR) in the industry determines the preferred device (in average). For example, brands are broadly favored in the sector of mineral water and baby food, which have a CR3 of 80% (for baby food, it reaches 95% in the United States with Gerber, Beech-Nut and Heinz). The cheese and meat sectors, with a CR3 of just 25% are dominated by GIs and so-called "labels". Other

Table 2.1: Industry concentration and preferred differentiation device

	brand	GIs	label	standard	regulation
quality level	q_B	q_G	q_L	$> q_S$	$> q_T$ (all)
# of firms that use it	1	$< N_G$	$< N_L$	$< N_S$	$< N$ (all)
industry concentration	high ---------- low				
variance in market shares	high ---------- low				

sectors with lower levels of concentrations tend to just abide by the technical regulations legally in place, which correspond to the legal minimum.

Considering that under symmetry the industry level of concentration is given by the reciprocal of the number of firms, these facts are coherent with the framework developed above. Notably, since the reduced membership around a GI implies a self-fulfilling above generics level of quality, it seems that imposing a minimum quality standard would inflict only a minor additional cost to firms, against an increase in profits. On the other hand, a monopolist or a big firm has an advantage in investing in its own brand (Shapiro's result).

Case study Champagne: strong brand development

Among wine and spirits GIs, Champagne stands apart for its strong brand development. Intangible Business, a company based in London that specializes in valuing brands and other intangible assets, has issued for the past 4 years a report on the Top 100 brands in the spirits and wine sectors in terms of market share and broad measures of brand awareness and price premia (The Power 100: the world's most powerful spirits & wine brands). The following stylized facts stand out:

Of the 10 most powerful sectors, Champagne ranked 8 in 2006, after Whisky, Vodka, Rum, flavored spirits, still light wine, light aperitif and Cognac and before Gin and Tequila, with 12 brands in the Top 100 with a combined market share of 39.0% (volume based). The 2009 ranking does not single out Champagne from other sparkling wines (ranked 7), although 9 Champagne brands made it to the Top 100, with a combined market share of 45.6%.

Of the Top 10 countries of origin, France came 3rd in 2009 (4th in 2006), after Scotland and the United States and before Russia, Cuba, Italy, Mexico, Sweden, Ireland and England.

Of the 18 and 21 French brands that made it to the global Top 100 in 2009 and 2006, not a single one was for wine (besides Champagne that is). This is a sector in which France has strong wine GIs (Bordeaux, Bourgogne, Beaujolais to name a couple), and yet brand power is dominated by the United States (with 8 brands), Australia (6 brands), Chile, Spain and South

Table 2.2: Champagne market concentration 2009

2009	10 first groups	10 next	60 next
Sales	82%	14%	4%
Bottles	80%	15%	5%
Export volumes	85%	11%	4%
Source: www.maisons-champagne.com			

Africa (one brand each, Concha y Toro, Torres and Kumala respectively).

These facts strongly argue in favor of the thesis of this paper, which is that once a club has achieved market saturation, and under the condition that club market concentration is high, firms have an interest in differentiating themselves from their within-club peers through the development of their brands and of a constant level of quality.

In 2009, the AO Champagne covered 4,776 farmers, 66 cooperatives and 293 businesses operated in a surface of 33,106 hectares, 85% of which belonged to farmers. Total sales in 2009 amounted to 352 million bottles (12,263 kg/hectare), worth €3.7 billion (of which €1.6 billion were exports). There is however a strong market concentration, Table 2.2 shows a C10 of 82% and a C20 of 96% for 2009.

Of total sales, the Maisons de Champagne accounted for 66% of sales in volume, for 3/4 of sales in value and for 90% of exports. As their site puts it, this is equivalent to "the sale of 20 Airbus or of more than one week of purchases of oil for the entire country". This in addition, leads to important price premia; according to the Comité Interprofessionnel du Vin de Champagne, Champagne represents 8% of wine sales in volume and 32.9% of wine sales in value. Market concentration reveals economies of scope as well. LVMH and Pernod Ricard rank first among Champagne brands' owners (with 5 and 2 brands in the Top 100 each in 2006, reduced to 3 and 1 in 2009); but they are also big players in other wine and spirits sectors (in the Top 100, Pernod Ricard ranks 2nd in 2009 with 19 brands -Absolut, Chivas Regal, Ballantines, Ricard, Havana Club, Beefeater, Kahlua- and LVMH 4th with 4 brands -Cognac Hennessy in the 5th place).

Interestingly, few Champagne brands made it to the Top 10 ranking regarding market share and brand awareness (Moët & Chandon ranked 5 in both in 2006 and 4 and 7 respectively in 2009) and growth prospects (Veuve Clicquot 6 in 2006). But Champagne brands stand out in the Top 10 for heritage (Dom Perignon 1 in 2006 and 2009, Veuve Clicquot 5 in 2006, Moët & Chandon 9 in 2006, 5 in 2009) and premium price positioning (Dom Perignon 1 in 2006 and 2009, Krug 2 and Bollinger 7 in 2006). Regarding the Top 10 on soft measures on branding, in 2009 Champagne brands ranked 4, 9 and 10 on brand relevance (capacity to relate to the brand and propensity to purchase) and 2nd and 8th on brand perception (loyalty and how close a strong brand image is to a desire for ownership).

Table 2.3: Case study on Champagne brands

Top Champagne brands among Top 100 wines and spirits brands

						Hard measures				Soft measures			
Rank 2009	Rank in Top 100	Brand	Owner	Total score %	Brand score	Market share (MS)	Future growth	Premium price	Market scope	Awareness	Relevance	Heritage	Brand perception
1	14	Moët & Chandon	LVMH	20.0	7.6	8.6	5.1	6.1	8.1	8.9	7.7	8.3	7.7
2	24	Veuve Clicquot	LVMH	13.7	7.0	6.0	6.1	6.7	7.1	7.6	7.1	7.7	7.4
3	72	Mumm	Pernod Ricard	3.7	5.9	4.9	5.3	5.3	6.3	6.6	6.1	6.4	6.0
4	73	Laurent Perrier	Bernard de Nonancourt	3.5	5.7	4.7	4.6	5.4	6.0	6.0	6.0	6.4	6.4
5	78	Piper Heidsieck	Remy Cointreau	3.1	5.4	4.6	4.6	5.1	6.0	5.9	5.4	6.1	5.6
6	79	Dom Perignon	LVMH	2.9	7.1	3.3	5.4	9.1	6.4	7.9	7.3	8.9	8.7
7	80	Nicolas Feuillatte	CV-CNF	2.8	5.0	4.9	5.3	5.0	5.3	5.0	5.1	4.6	5.0
8	87	Taittinger	Taittinger	2.7	6.0	4.7	4.7	6.0	6.1	6.3	5.9	7.3	7.0
9	100	Lanson	Lanson Int.	2.1	4.7	3.9	4.0	4.0	5.0	5.7	5.1	5.3	4.9
2006		**Market share weighted average scores**				**45.6**	**5.1**	**5.8**	**6.5**	**6.8**	**6.3**	**6.9**	**6.6**
1	18	Moët & Chandon	LVMH	14.8	7.2	8.4	4.4	5.6	8.2	8.4	7.2	7.6	7.6
2	26	Veuve Clicquot	LVMH	10.1	7.1	6.2	6.8	6.4	7.8	7.2	7.0	7.8	7.6
3	66	Laurent Perrier	Bernard de Nonancourt	2.6	5.1	4.0	3.8	5.0	6.0	4.8	5.2	5.8	5.8
4	69	Mumm	Pernod Ricard	2.5	5.2	4.0	5.0	4.4	6.2	5.2	5.4	5.6	5.4
5	77	Taittinger	Starwood	2.1	5.4	3.2	4.4	6.2	5.6	5.2	5.6	6.6	6.6
6	79	Lanson	Lanson Int.	1.9	4.6	3.2	3.6	3.6	5.6	5.8	5.2	4.6	4.8
7	80	Dom Perignon	LVMH	1.9	6.3	1.4	4.2	7.8	6.2	7.2	6.6	8.6	8.6
8	92	Pommery	Phelan Segur	1.2	4.1	2.2	1.8	4.2	4.8	4.6	4.8	5.4	5.2
9	93	Bollinger	LVMH	1.0	5.5	1.6	4.4	7.0	5.4	6.6	5.6	6.4	7.2
10	96	Krug	LVMH	0.9	5.9	1.6	5.0	7.8	5.6	6.0	6.0	7.0	8.0
11	97	Alfred Rothschild	Caisse d'Epargne	0.8	3.0	1.6	3.2	3.6	3.0	3.0	3.2	3.0	3.6
12	98	Perrier Jouet	Pernod Ricard	0.8	4.2	1.6	3.8	5.4	4.2	4.0	4.2	4.6	5.4
Market share weighted average scores						**39.0**	**4.5**	**5.5**	**6.4**	**6.2**	**5.9**	**6.4**	**6.5**

Source: Intangible Business data, www.intangiblebusiness.com

The scoring includes hard measures (market share in volume, growth prospects based on past 10 years and future trends, premium price positioning, market scope in terms of number of export markets) and soft measures (brand prompted and spontaneous awareness, brand relevance for purchase, brand heritage based on longevity and embeddedness in local culture, brand perception based on desire for ownership).

A panel of 5 (2006) and 6 (2009) experts independently ranked each brand in each category out of 10; the scores were aggregated and averaged. Brand score is the average of the eight measures of brand strength. The total score is "achieved by multiplying a brand's weighted volume by its brand score, within a defined range. The weighting is designed to adjust the volumes to a comparable level".

3 Club output and finance decisions (quality exogenous)

> A judgment by the European Court of Justice of 2003 on non-Parma controlled slicing and packaging of Parma ham found that if the product specifications of a GI included slicing and packaging at the place of origin, then supermarkets were prevented from reducing costs by slicing and packaging themselves. ECJ "Judgment in Consorzio del Prosciutto di Parma and Salumificio S. Rita" of 20 May 2003.

This section complements the previous dynamic analysis within a partial equilibrium static framework. The assumption is that a standard of quality is applied exogenously within a GI club. This assumption is reasonable for most GI labels, particularly for European AOs for which product specifications are detailed up to the slicing and packaging procedures; but for well-established GIs from developing countries as well, as minimum quality of standards are often imposed very early in the process of consolidation of a GI as a first best policy to avoid free-riding.

The superiority of minimum quality standards was established in 1982 by Shapiro, and, as it was shown in the literature review, has been a constant finding in recent papers dealing with reputation. Shapiro's first and second theorems (p. 23-24), which apply under broad assumptions, state that "if consumers expect the firm to produce at the perfect information profit maximizing quality level, it will be optimal for the firm to produce a lower quality", and that "any self-fulfilling quality level lies below the perfect information quality level", q_{opt}.[9] He goes on to clarify that under the self-fulfilling quality level "the monopolist earns lower profits than he would under perfect information", so that if he could commit himself to producing q_{opt} and could signal this commitment (for example through a warranty of the type "satisfied or reimbursed"), he could do better; to conclude that "the incentive to provide warranties does not arise from competitive pressures, but rather from a desire by the monopolist to commit himself".

In this section, the reputation of the protected GI is still the club asset, but reputation is assumed to depend on quality and other factors as well which can cause the asset to appreciate or depreciate. The focus is on the optimality conditions for the provision of reputation, output, membership and the club finance mechanism under no rivalry and under partial rivalry due to dilution phenomena. Several extensions are

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[9] In the model of the previous section, if q is exogenously set at $\overline{q}$, the model becomes one of perfect information where $\dot{R} = \dot{q}$ and $\overline{R} = \overline{q}$ and firms earn profits $p(\overline{R}) - c(\overline{q})$. At the optimum, q_{opt} should be set at the (maximum) quality level at which $p' = c'$.

proposed regarding the implications of the geographical confinement of production, State subsidization of GI-related costs, competition concerns and the issue of GI replication.

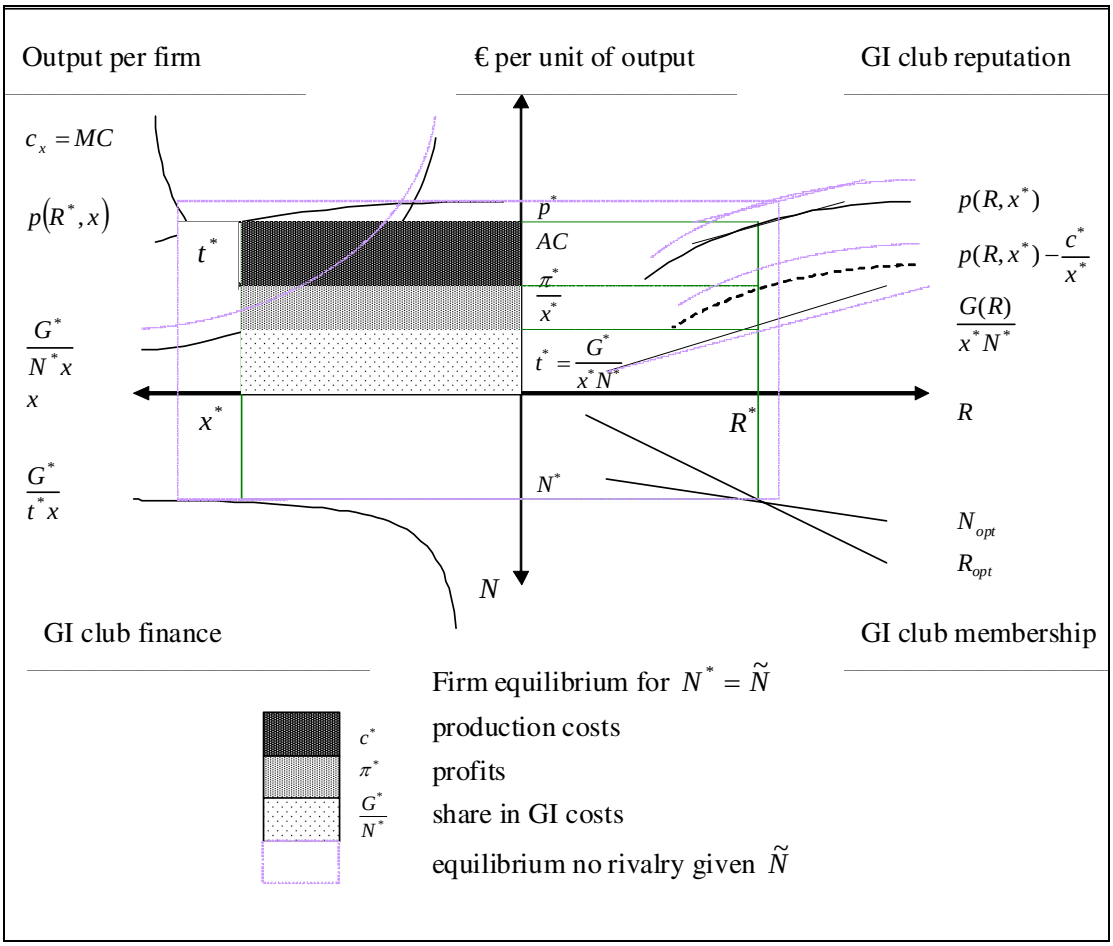
3.1 Model set-up

The inverse demand function $p(R)$ is assumed to increase with reputation R ($p_R > 0$ and $p_{RR} < 0$); and reputation is assumed to be linked to quality q, but **not one-to-one**; in contrast with the previous section. Reputation is assumed to be affected by quality and by other activities financed through the GI club such as advertising, lobbying, marketing, research and development, administration, promotion, standardization process, conformity assessment facilities, legal costs, etc. The choice variable for the GI club is reputation R through a cost-sharing function $G(R)$ which includes setting a minimum standard of quality $\overline{q}$ and other expenses. Regarding supply, the assumption is that club membership N consists of identical profit-maximizing firms, facing complete markets for inputs and using the same technology. The choice variable for the firm is the level of output x. Costs for the firm are production costs with $c(x) = c(\overline{q}, x)$ and its share of GI-related costs $G(R)/N$.

In this context, a potential "congestion" phenomenon will manifest itself through a downward shift in demand, caused by dispersion in quality and dilution of the GI reputation. The congestion function is embedded into the demand function. Three scenarios are explored: congestion caused by increased membership N, by an increase in total output X, and by both. Depending on the congestion function, payments will involve a fixed "membership fee" per firm $G/N = m$, a "toll" per unit of output, $G/N = tx$ (the "visitation fee" in standard club theory) or a combination of the two $G/N = m + tx$.

The questions regarding exclusion costs for non-legitimate GI users are addressed in another paper (Benavente 2010). However, following traditional club theory the membership fee/toll determines the entry of potential legitimate club members and, ultimately, club membership N. In addition, the geographical confinement of production imposes limits on total output, assumed fixed at the level $\overline{X}$.

Figure 3.1: GI club optimality conditions, no rivalry



3.2 No rivalry in benefits

Following standard club theory, maximization is done at the firm level, with values at the aggregate defining club choices. Demand and GI-related costs are assumed to increase with reputation, costs increase with output and quality. Firm subscripts are dropped, low case letters refer to quantities for the firm, and capital letters to aggregates, subscripts refer to partial derivatives.

A representative firm maximizes profits with respect to its choice variable, output x. Reputation R is a choice variable for the club, through $G(R)$:

$$\max_{R,x} \pi = p(R)x - c(x) - \frac{G(R)}{N}$$

$$s.t.: p - c - \frac{G}{N} \geq 0$$

$$: xN \leq \overline{X}$$

The first order conditions with respect to reputation, output and membership are:

$$reputation: \frac{\partial \pi}{\partial R} = 0 \Rightarrow G_R = p_R X \Rightarrow R^*$$

$$output: \frac{\partial \pi}{\partial x} = 0 \Rightarrow p = c_x \Rightarrow x^*$$

$$membership: \frac{\partial \pi}{\partial N} = 0 \Rightarrow \frac{G}{N^2} = 0 \left(\text{non binding, as } \frac{G}{N} > 0 \right)$$

$$(\pi > 0): f = \frac{G}{N} \leq px - c \Rightarrow c_x \geq \frac{c+f}{x}$$

$$membership\ range: px - c - \frac{G}{N} \geq 0 \cap xN \leq \overline{X} \Rightarrow \frac{G}{px-c} \leq N \leq \frac{\overline{X}}{x}$$

The FOCs with respect to reputation R and output x have to be fulfilled simultaneously at the optimum. The membership condition is not binding. There is an optimal level of R that must reflect how much all firms would be willing to pay to get one additional unit of R and that defines its optimal level of provision. The reputation condition equates, at the club level, the marginal return from a one-unit increase in reputation (the increase in demand price times total output, $p_R X$) to its marginal total cost G_R. This is the traditional Samuelson condition for public goods, which holds for club goods as well. The assumption of decreasing returns of the investment in the GI reputation $p_{RR} < 0$ ensures that provision is limited to a positive value. The output condition follows the standard efficiency condition of marginal cost pricing.

Under no rivalry in benefits, GI-related expenses are determined exclusively by the reputation condition; the membership fee $m = G/N$ together with the condition that profits be nonnegative, determine the range for club membership N, but not the optimal membership (the membership condition is not binding) and ensure that the cost of provision is internalized by the firms. The maximum club membership is determined by the capacity limitations implied by the geographical confinement of production of the GI good, imposed by the restriction that $xN \leq \overline{X}$, omitted from now onwards.

Figure 3.1 depicts the situation for a given level of membership set (arbitrarily) at $\tilde{N}$. The two top quadrants give the solutions to the output and reputation conditions respectively, given $\tilde{N}$. The lower left-hand quadrant gives the range for membership. In this example, for simplicity, $G(R)$ is assumed to be linear. The shaded areas correspond to firm production costs, profits and GI-expenses, which account for roughly one third of total sales each.

3.3 Partial rivalry in benefits

3.3.1 Congestion by crowding (dilution due to increased membership N)

An increase in membership N implies dispersion in quality and a possible dilution of the reputation of the GI with the corresponding negative effect in price. Let's assume both the inverse demand function and GI-related costs are a function of membership, with $p_N < 0$:

$$\max_{xR,N} \pi = p(R,N)x - c(x) - \frac{G(R,N)}{N} \geq 0$$

$$reputation: G_R = p_R X$$

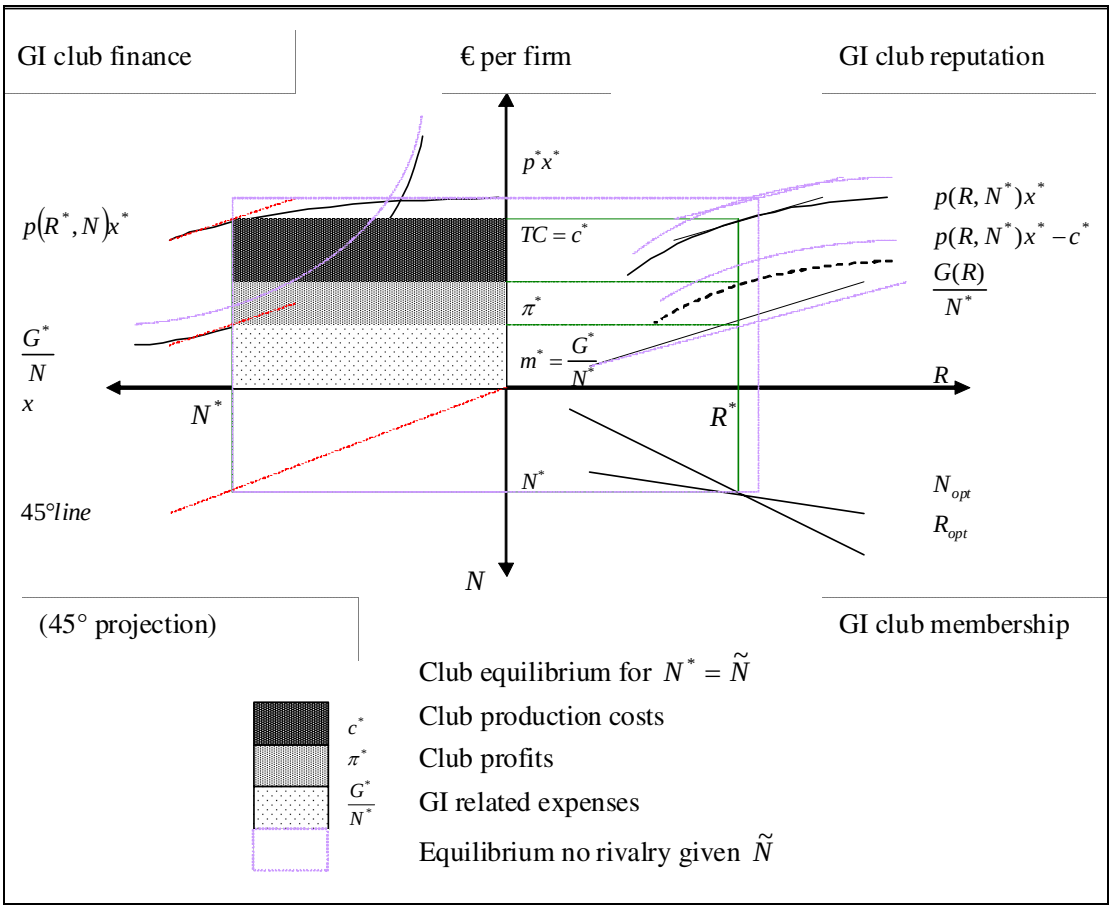
$$output: p = c_x \geq \frac{c+m}{x}$$

$$membership: \frac{\partial \pi}{\partial N} = 0 \Rightarrow f = \frac{G}{N} = G_N - p_N X = m$$

$$(\pi > 0): c_x \geq \frac{c+m}{x}$$

The output and reputation conditions are the same (although the levels are not). A membership condition for within-club optimality is imposed through the FOC with respect to N, which defines membership through the fee m by equating the marginal cost owed to crowding (a decrease in price and thereby in aggregate revenues with $p_N X < 0$), to the saving owed to cost-sharing (a reduction of the fee by $-\frac{G(R)}{N^2} < 0$). If, in addition, GI-related costs increase with membership *ceteris paribus* (a likely assumption), so that $G_N > 0$, the membership fee will have to compensate for this extra expense as well. If both these crowding effects are important ($G_N > 0$ and $-p_N X > 0$), there will be an incentive for the club to impose high membership fees to limit the number of firms operating in the GI *terroir*, leading to a higher market concentration (profits must be non-negative), with the corresponding negative competitive effects. The condition of non-negative profits imposes a restriction on output, but membership is determined by the membership condition.

Figure 3.2: GI club optimality conditions, crowding

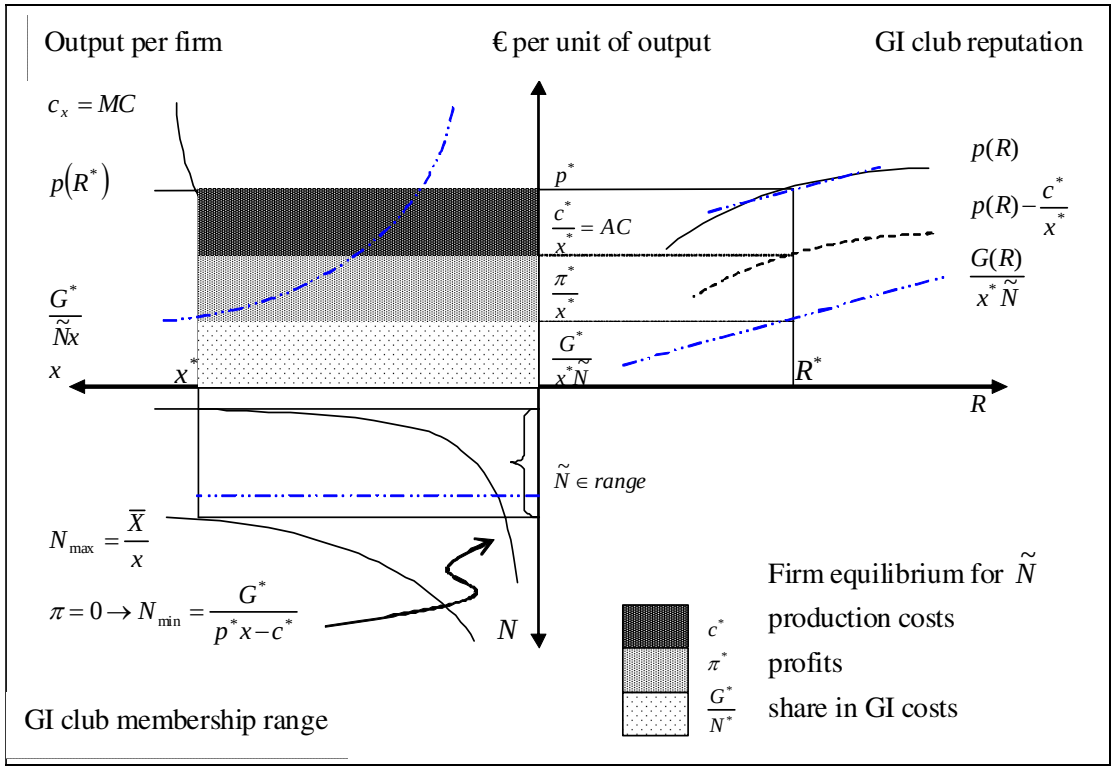


This time, total expenses $G(R)$ are determined jointly by the GI-provision and membership conditions.[10]

Figure 3.2 depicts the situation of dilution due to crowding. The top right hand side panel is the same as before (values are only multiplied by the equilibrium level of output at the optimum x^*). This time, the top left hand side panel has the equilibrium finance condition for the club, not for the firm, and the shaded areas show club production costs, profits and GI expenses. The figure was constructed so that the membership equilibrium level is the same as that retained in Figure 3.1 to show that under dilution the equilibrium levels of reputation and club profits are lower than under no rivalry.

[10] In the previous case of no-rivalry, the marginal cost of a member was zero ($p_N = 0$) and was therefore higher than the saving owed to cost-sharing (negative). For that reason, the membership condition was not binding.

Figure 3.3: GI club optimality conditions, oversupply



3.3.2 Congestion by oversupply (dilution caused by total output X)

To properly deal with the case of reputation dilution by an increase in total output ($X = Nx$), total output is included in the inverse demand function $(p_X < 0)$ and the GI-provision function to allow for a toll per unit of output to supplement the maintenance cost $(G_X \gtrless 0)$. The case of congestion through total output is assimilated to a case of monopolistic competition:

$$\max_{x,R} \pi = p(R, xN)x - c(x) - \frac{G(R, xN)}{N} \geq 0$$

$$reputation: G_R = p_R X$$

$$output: p = c_x + (G_X - p_X X) = c_x + t$$

$$membership: f = \frac{G}{N} = (G_X - p_X X)x = tx$$

$$(\pi > 0): c_x \geq \frac{c}{x}$$

The GI-provision condition remains the same. The membership fee is replaced by a toll per unit of output which redefines the output condition as well. The toll is aimed at limiting total output, not the number of firms operating within the GI-club, but membership N will be defined indirectly by the production technology (through the

output condition) and the condition that profits be non-negative. Dilution through output has thus a competitive effect. The inclusion of the toll per unit in the output condition leads to efficiency in production according to marginal cost pricing again, with full internalization by the firm of the negative externality that its increase in output confers to all members. The three conditions have to be met simultaneously for an optimum.

Figure 3.3 depicts the situation for a simplified scenario in which the congestion function is only included in the inverse demand (not in GI expenses). This dilution phenomenon implies a concave inverse demand function as of some level of output (first top quadrant). To facilitate comparisons, the Figure is drawn such that the optimal membership N^* equals the membership picked arbitrarily in Figure 3.1 $\left(N^* = \tilde{N}\right)$.

The equilibrium under no rivalry given $\tilde{N}$ is given in purple. The toll, internalized in the output condition, implies a lower level of output per firm, and thereby a higher GI-related fee per firm compared to the no-rivalry case because the curve for GI-related expenses per unit of output is steeper. The shaded areas show that under potential GI dilution, profits per firm are lower. The quadrant on GI membership relates two curves, the optimal level of membership given reputation and the optimal level of reputation, given membership. Both curves are positively sloped (not necessarily linear); however, for the whole system to be stable, the latter must be steeper.

3.3.3 Congestion through total output X and membership N

Table 3.1 compares the situation with and without potential dilution phenomena, in the assumption that both total output and membership affect inverse demand and GI-related costs.

The output and GI-provision conditions remain the same. The optimal cost-sharing, which determines membership together with the output condition, includes both a membership fee (fee per member that is) and a toll per unit of output. The three conditions have to be met simultaneously for an optimum. Under this scenario, the optimal club pricing mechanism is designed to affect both total output and membership (the latter directly through the membership fee and indirectly through the output condition).

Table 3.1: Comparison perfect versus rival GI clubs

	no dilution	dilution	results
$\max_{x,R}$	$p(R)x - c(x) - \frac{G(R)}{N}$	$p(R, xN, N)x - c(x) - \frac{G(R,xN,N)}{N}$	
FOC R	$G_R = p_R X$	$G_R = p_R X$	lower reputation
FOC x	$p = c_x$	$p = c_x + t$	lower output
FOC N	not binding	$\frac{G}{N} = m + tx \Rightarrow N^d$	
fee		$m = G_N - p_N X$	binding
toll		$t = G_X - p_X X$	internalized
profits	$\frac{G}{N} \leq px - c \Rightarrow c_x \geq \frac{c}{x} + \frac{G}{X}$	$c_x \geq \frac{c+m}{x}$	lower club profits
membership	$\frac{G}{px-c} \leq N^{nd} \leq \frac{\bar{X}}{x}$	optimum N^d	

3.4 State subsidization

GI-related costs are often partially subsidized by the State. In the hypothetical case of all GI-related costs being subsidized, club firms do not internalize the costs of the GI, but still benefit from the markup allowed by the GI reputation. In that extreme situation, they do not efficiently bank on the value of the GI; rather, they capture a rent allowed by subsidization, to the detriment of taxpayers. Thiedig and Sylvander (2000) point out that "most of GI clubs were already paid by the generations that founded the reputation", but they also mention that erection, maintenance and exclusion costs can be different from country to country.

> In France, before 2006, a parafiscal tax charged to GI producers on output volumes covered less than 20% of the budget of the former Institut National des Appellations d'Origine (INAO), the rest was financed by the State budget (Thiedig and Sylvander 2000). Since December 2006, INAO stands for Institut National de l'Origine et de la Qualité, and in addition of administering the French AOs and GIs, it controls the labels on Spécialité Traditionnelle Garantie, Agriculture Biologique and Label Rouge. INAO's budget in 2009 was of €20.5 million, still 75% of it financed by Ministerial endowment, 20% by fees collected on production and 5% through its own resources.[11]
>
> A few authors argue that GIs fulfil a social role in promoting rural development, protecting consumers, rewarding indigenous peoples and the like (Rangnekar 2003b, OECD 2000), thereby calling for public "provision", i.e. public financing of erection, maintenance and exclusion costs, but the argument is polemical.

[11] Ordonnance n° 2006-1547 of the Ministère de l'Agriculture et de la Pêche, 7 December 2006.

There is however a less sensitive aspect for which there is broader consensus, the subsidization of protection enforcement expenses. As Thiedig and Sylvander point out, the costs of perfect exclusion could be exorbitant for a single club: "a protection level of the French AOC Champagne could not be financed by the club itself, just imagine the number of inspectors needed to monitor all retailers in the world". They conclude that "inspection costs are so enormous compared to the profit that GIs will be provided only if these costs are borne by the public". In fact, similar arguments apply regarding enforcement expenses for other IPRs such as trademarks, patents and copyrights. This is an issue that is not easily solved in terms of its welfare implications. It is all the more controversial the blurrier is the frontier between enforcement and other GI-related costs. For example, in Courts the State is usually involved in the protection of a particular GI, while the enforcement of the protection of a trademark is usually the burden of the owner (Escudero 2001). Once a GI is protected, enforcement structures have a deterrent effect on impostors. This issue is partially addressed in Benavente (2010).

3.4.1 Full subsidization, no rivalry

Efficiency is achieved as long as the provision condition is fulfilled by the State. Let's assume that the State subsidizes the entire amount of G necessary to achieve the required reputation level R and therefore $p(R)$ so that:

$$reputation\ :\ G_R = p_R X$$

Firms will set output according to the following:

$$\max_x \pi = p(R)x - c(x) \geq 0$$

$$output:\ p = c_x \geq \frac{c}{x} = AC$$

$$non-subsidized:\ p = c_x \geq \frac{c+f}{x} = AC \text{ with } f = \frac{G}{N}$$

Under no rivalry, the output condition leads to marginal cost pricing, whether GI firms are charged a membership fee or whether GI-related costs are subsidized. However, the caveat with subsidization is that firms' *average costs* are reduced, which implies that firms capture a pure rent equal to the membership fee, to the detriment of taxpayers, with the consequent welfare implications. The reputation of the GI becomes a pure public good for the GI firms. In addition, when costs are not internalized by the beneficiaries following a pricing in accordance with the Samuelson condition, the likely

outcome is the under-provision of the GI asset, reputation, as the incentive for the State to provide it diminishes with its limited or non-existent return.

3.4.2 Partial rivalry

A more realistic scenario is that of a partial State subsidization, up to a share s of total GI-related costs, in a context of potential congestion. If GI provision is determined by the original function, and total costs are not internalized by the firm, due to lower average costs there will be room for increases in output with the consequent effect in the price. To get the incentives right, the entire function has to be reoptimized, although the result is not an optimum.

This becomes a two-stage game. In the first stage the State assesses what the firms and the club will do given a certain expenditure on GI-related activities, i.e. the state solves for the equilibrium x° and N° given $\overline{G}$, and provides for the optimal level of G based on the reputation condition. In the second stage, firms optimize according to what the State anticipated, although the output levels decided by the firms and the pricing mechanism decided by the club will consider the subsidy. The three conditions have to be met simultaneously for an optimum:

$$\max_x \pi = p(\overline{R}, xN, N)x - c(x) - (1-s)\frac{\overline{G}}{N} \geq 0$$

$$output: p = c_x - p_X X = c_x + t^\circ \Rightarrow x^\circ$$

$$membership: (1-s)\frac{\overline{G}}{N} = (-p_N X) + (-p_X X)x = m^\circ + t^\circ x \Rightarrow N^\circ$$

$$(non-subsidized): f = \frac{G}{N} = (G_N - p_N X) + (G_X - p_X X)x = m + tx$$

$$reputation: G_R = p_R x^\circ N^\circ \Rightarrow \overline{G}$$

$$where: (1-s)\overline{G} = m^\circ N + t^\circ X \text{ is paid by the firms, the rest by the State}$$

$$(\pi > 0): c_x \geq \frac{c + m^\circ}{x^\circ}$$

The optimal cost-sharing decided by the club after discounting the subsidy, includes again a membership fee and a toll per unit of output. However, the marginal costs owed to crowding on the side of the G function are not internalized (they are "equated" to zero by the club, although they are not zero); only the impact of output and membership on the price is internalized. If G_N or G_X are low, the impact of subsidization on the pricing mechanism is lower.

In addition, $|p_N X|$ and $|p_X X|$ are higher than without a subsidy, because average costs at the firm level are lower (due to a lower $m°$ and a lower $t°$), inducing a higher output which retro feeds into a lower p.

The final structure of the cost sharing function depends on the partial derivatives of G and P with respect to N and X. The likely outcome is that both the fee and the toll are lower under subsidization, while output and membership are higher. And that the firms get a rent. State subsidization leads to inefficiencies with allocative, competitive and welfare implications, explained by the incentive for firms to employ additional resources to capture the rent offered by the State, until complete rent dissipation is achieved. The problem is that it is not clear whether an optimum can be reached. With State subsidization, there might be multiple equilibria.

Feehan and Batina (2004) analyzed the impact of a free access public input entering the production function of some private good. In their model, total output is inefficiently increased, which leads them to show that "in the absence of factor taxes, or their equivalent in the form of a direct user charge, it would be difficult to assess whether a congested public infrastructure is a signal of inadequate supply or is simply the result of excessive use due to free access". Their conclusion is valid here too: with State subsidization and partial rivalry, it is difficult to assess whether a low price of the GI good is a signal of inadequate investment in the GI and its reputation or if it reflects the dilution of the GI caused by oversupply due to cheap membership.

3.5 Geographical confinement, GI saturation and factor markets

> Thiedig and Sylvander (2002), citing Johnson (1988) document that the "Champagne wine production stretches 24,500 ha and that an additional 4,800 ha are qualified", and that "the price of land qualified to produce Champagne vineyard is about 25 times the price of normal wine growing land, a high price due to strict scarcity". They also point out that product specifications can create additional scarcity for factors that are otherwise not strictly dependent from land use" to conclude that "this natural restriction might force the output left of optimum and lead to a subsequent suboptimal situation."

With a strong level of protection, the GI is produced exclusively by the firms in the GI locality. Also, most GIs are linked to agricultural products, for which, due to the geographical confinement of GI production, land is a resource in finite (fixed) supply. Assume that land l is a non-mobile factor in finite supply, fixed at $\bar{L}$, with a price r; k and K are other inputs (capital, labor), assumed in infinite supply (a strong assumption as know-how is essential to the success of a GI) at an exogenous price of $\bar{c}$, and $x(l,k)$ is

a linearly homogenous production function. Only the non-rivalry scenario is explored, although the analysis is easily extended to include congestion functions:

$$\max_{l,k,R} \pi = p(R)x(l,k) - rl - \bar{c}k - \frac{G(R)}{N} \geq 0 \text{ with } Nl = L \leq \bar{L}$$

$$reputation: G_R = p_R X$$

$$output: \frac{\partial \pi}{\partial l} = \frac{\partial \pi}{\partial k} = 0 \Rightarrow p = \frac{r}{x_l} = \frac{\bar{c}}{x_k}$$

The output condition is obtained by setting the FOC with respect to l and k to zero, it is still the standard marginal cost pricing. As long as the land available is not entirely used, the optimality conditions remain the same. However, as supply increases following increases in demand, higher levels of output (higher isoquants) are reached by acquiring and hiring additional inputs in amounts that equate their marginal rate of technical substitution to their relative prices. Once land capacity $\bar{L}$ is reached, however, land becomes scarce, and factor relative prices have to adjust to reach higher isoquants with less land and more of the other inputs. The price of land starts rising in an inverse substitution effect. Land being not mobile, its price within and its price outside the GI area differ. If GI firms are not vertically integrated (do not own the land), part of the GI rent is captured by land owners inside the GI area.

Since input income shares are determined exclusively by technical considerations, land's intensity of use and its degree of substitutability with other factors are what ultimately determine the path of its relative price. For example, assuming a Cobb-Douglas of degree 1 production function and marginal product pricing, input income shares are constant, equal to their exponent in the function. If output increases and the amount of land available is fixed, the price of land has to go up to keep constant its share in total revenue. The increase in r with total output is a function of the magnitude of the exponent of land in the production function α, the GI good price p and available land $\bar{L}$.

$$x = l^{\alpha} k^{1-a}, \ \alpha \text{ constant}$$

$$\frac{\bar{c}}{p} = x_k = (1-\alpha)(l/k)^{\alpha} \Rightarrow \frac{\bar{c}k}{px} = \frac{(1-\alpha)(l/k)^{\alpha} k}{l^{\alpha} k^{1-a}} = 1-\alpha$$

$$\frac{r}{p} = x_l = \alpha(l/k)^{\alpha-1} \Rightarrow \frac{rl}{px} = \frac{\alpha(l/k)^{\alpha-1} l}{l^{\alpha} k^{1-a}} = \alpha \Rightarrow \frac{\partial r}{\partial X} = \frac{p\alpha}{\bar{L}}$$

Once land capacity is reached, the producer moves up the inelastic land supply curve, hiring other factors and affecting relative factor prices; this is indeed a source of sub-optimality, since at the market prices prevailing at the border of the GI region, output could be much higher for the same total cost. Eventually, the sub-optimality will

depend on how big is the demand for the GI product, how small is the GI area, land factor-intensity of use and factors substitutability.

3.6 Cartel and oligopolistic behavior

> The OECD has had a permanent interest in competition issues within the agricultural sector and GI clubs in particular. In a report issued in 2000, the OECD notes that in April 1992, Cantal cheese producers' 1987 plan placing limits on total supply was found to limit competition, and that in November 1996 the Competition Council found the Parmigiano Reggiano and the Grana Padano Consortia guilty of restricting market competition through the adoption of a plan limiting total annual output, with production and market allocation agreements among firms and the two consortia. A case against Gorgonzola was also opened in 1998 (OECD 2000). And, in January 1999, the Italian Competition Authority rejected the application by the Parma and San Daniele ham consortia for an extension of the authorization of production agreements that had been granted until 31 December 1998 under Article 4 of Law no. 287/1990, on grounds that after their protection as AOs in June 1996, production quotas were unnecessary and inappropriate with respect to the declared objective of conforming with the prescribed production methods, since special bodies performed these tasks under Italian and Community law (OECD 2005).
>
> Although there have been a few judicial cases involving uncompetitive practices within and among GI clubs, the prevalent situation is most OECD countries is the existence of explicit exemptions for the agricultural sector in the application of antitrust law. The 2005 OECD report includes 15 countries contributions; all contemplate some level of explicit antitrust exemptions for the agricultural sector. For example, EC law exempts agricultural goods from the prohibition of anti-competitive horizontal and vertical agreements, but not from merger control and abuse control provisions (Art.2.1(1) of Regulation 26/62 of 4 April 1962). Mexico has a general antitrust law exemption for cooperatives aimed at export markets, which in 2005 applied to 210 "integrating firms […] in the agricultural sector". Similar provisions apply to agricultural products specifically in Australia and New Zealand (Trade Practices Act and Commerce Act respectively, the latter dormant since its inception however). In Norway, which is not an EU member, the Competition Act of May 2004 continued the agricultural industry's antitrust exemption for joint selling. In the United States, exemptions from antitrust enforcement for agricultural cooperatives exist since 1922 under the Capper-Volstead Act "to collectively process, prepare for market, handle, and market their products", not extended to predatory or coercive conduct, or to mergers or collaborations with non-covered entities. Article 3 of the Swiss Act on Cartels contains antitrust exemptions for joint-activity organizations enumerated in article 8 of Swiss agricultural law, including measures to "adjust the offer to the needs of the market". In Korea, the Monopoly Regulation and Fair Trade Act does not envisage exemptions, however legal exceptions regarding agricultural cooperatives prevail. In Chinese Taipei, the agricultural sector is not exempted from the application of competition law, but both the Constitution and the Co-operative Act "require that the state encourage and facilitate cooperatives".

While a couple of judicial cases involving GIs show that there have been instances in which uncompetitive behavior has been proved and sentenced; the prevalence of antitrust exceptions for the agricultural sector let presume that most cases of anticompetitive behavior never make it to the Courts. In the previous sections, it was assumed that firms were operating under perfect competition, each firm behaving as a price-taker. This section looks at the allocative, competitive and welfare implications of the constitution of a cartel by the firms producing a particular GI. The analysis is pretty standard, and I will therefore look at the simplest case. It is assumed that the firms affiliated to a particular GI

are only a few (small N), that they operate in a highly differentiated niche market or are big players in the market for identical and similar products, and that their total output impacts on the price.

This scenario corresponds to the assumption of congestion of the inverse demand function through over-supply. The difference is that the G function is left unaffected by total output, and that output decisions are not decentralized anymore; a cartel will maximize the profit function for the entire GI club and distribute output quotas accordingly:

$$\max_{X,R} \Pi = p(R, xN)xN - c(x)N - G(R) \geq 0$$

$$reputation: G_R = p_R X$$

$$output: N(p_X Nx + p) - c_x N = 0 \Rightarrow p_X X + p = c_x \Rightarrow MR = MC < p$$

$$membership: p_X X + p = \frac{c}{x} \Rightarrow MR = AC \Rightarrow \pi + \frac{G}{N} = px - c = t^{\circ}x$$

$$(\pi > 0): \frac{G}{N} \leq px - c \Rightarrow f \leq t^{\circ}x$$

$$membership\ range: \frac{G}{px - c} = \frac{G}{t^{\circ}x} \leq N \leq \frac{\overline{X}}{x}$$

The output condition gives the standard result of cartel behavior: marginal revenue equals marginal cost and production quotas are determined accordingly.[12] Firms benefit from a markup over marginal cost and increased profits; firm and aggregate output is lower. Interestingly, the membership condition imposes the additional restriction that marginal revenue equals average cost (a long term efficiency condition since marginal revenue equals marginal cost), but the membership condition is not binding regarding membership N. Similarly to the case of no rivalry, only a *minimum* membership is imposed through the requirement of non-negative profits. The incentive for competitors to enter the market to capture rents is very real; but the membership fee constitutes an additional cost to entry to potential competitors.

Table 3.2 shows the results once crowding is added. What is striking, is that the decentralized decisions at the firm level in a club framework are very close (if not identical) to the centralized decision at the club level in a cartel framework. The only difference is that the membership condition is not binding for the level of membership in the cartel, neither is, consequently, the finance condition (membership fee and toll). This

[12] MR can be written as a function of total output because its value is the same no matter which firms's output level is changed, because $p_x = p_X$ and $G_x = G_X$ in the cartel context (cf. Nicholson 2002, p. 529).

Table 3.2: Comparison rival versus cartelized GI clubs

	firm, dilution	cartel	cartel, congestion
$\max_{x,R}$	π	$\Pi = pxN - c(x)N - G$	Π
given	$p(R, xN, N)$,	$p(R, xN), G(R)$	$p(R, xN, N)$,
	$G(R, xN, N)$		$G(R, xN, N)$
FOC R	$G_R = p_R X$	$G_R = p_R X$	$G_R = p_R X$
FOC x	$p = c_x + t$	$MR = MC$	$p_X X + p = c_x + G_X$
			$\Rightarrow MR = MC$
FOC N	$\frac{G}{N} = m + tx$	$MR = AC$	$px - c = m + tx$
m	$m = G_N - p_N X$		
t	$t = G_X - p_X X$		
$\pi > 0$	$c_x \geq \frac{c+m}{x}$	$\frac{G}{N} \leq t^{\circ}x$	$\frac{G}{N} \leq m + tx$
N		$\frac{G}{px-c} = \frac{G}{t^{\circ}x} \leq N \leq \frac{\bar{X}}{x}$	$\frac{G}{px-c} = \frac{G}{m+tx} \leq N \leq \frac{\bar{X}}{x}$

is implicitly due to the fact that cartels operate for a given level of membership, so that fees and tolls don't have to internalize all the potential externalities to reach the optimum. In any case, cartels are illegal in most of the world, and are unstable, predominantly due to the potential entry of competitors to benefit from the cartel rents, but also due to within-cartel information asymmetries, collective action problems and the incentive to capture rents through the expansion of output.

Even when a competitive behavior is assumed, under certain market conditions, the outcome might still differ from marginal cost pricing. For example, if a club firm has some market power, under oligopolistic competition, the final outcome is somewhere between the perfect competition and the cartel outcomes. The Cournot competition model reflects the best strategy that a firm may adopt if it knows its market power (the effect of its output over price), but not the output decisions of its competitors. This situation is explored in Benavente (2010). A similar result is obtained when GI firms obtain a competitive advantage over their rivals through product differentiation schemes and branding. Once a firm spends in differentiation activities, the firm is not a price-taker anymore; it faces a downward-sloping demand curve. Profit maximization leads to the typical condition that marginal revenue equals marginal cost, in addition to the condition that product differentiation activities should be pursued up to the point where their marginal revenue equals their marginal cost.

Thiedig and Sylvander contend that "with a (perfect competition) behavior the price will not even cover the total average costs and the product would not be supplied anymore". The argument, however, is incomplete, since it is by assuming a substitution process in demand that the new demand curve is drawn, but if the industry is competitive to begin with, as stated above, the shift in demand would be lower, and the new demand curve would pass through the point where average cost equals marginal cost. It is true, however, that a sudden change in the industry towards more competition would imperil the entire GI group and supply could be ensured only through a differentiation campaign that shifted outward the demand curve again up to where marginal cost equals average cost.

3.7 Monopsonistic behavior

Tequila (Mexico) is assimilated to an almost endemic case of supply chain market failure in a recent paper (Bowen 2009). The GI for Tequila was the first to be given legal protection outside Europe, back in 1974; and it is one of the most successful, having achieved recognition by the United States and Canada in 1993 and by the European Union in 1997. Production of Tequila more than doubled from 1995 to 2005, reaching 210 million liters. And yet, these researchers show that the GI for Tequila has largely failed to benefit the local population or environment in its region of origin; while the market has been largely appropriated by transnational liquor companies, agave farmers have been excluded from the supply chain altogether, leading to increased environmental degradation, reductions in quality, and a gradual elimination of traditional practices.

Figure 3.4: GI region for Tequila

Succinctly, these conclusions arise from the following documented facts:

- Tequila is made of at least 51% of blue agave, which is grown within a GI region of 11 million hectares. While the Tequila *mixto* is often sold in bulk and bottled outside of Mexico, the Tequila made from 100% blue agave must by law be bottled within the GI region (Figure 3.4). The land reform of 1917-1949 led small landowners, the *ejidatarios* to supply the agave to the Tequila distilleries, often through intermediaries known as *coyotes*, which traditionally "buy at very low prices". The 1992 amendment to Article 27 of the Mexican Constitution legalized the rental and sale of previous inalienable *ejido*, so that Tequila companies increasingly integrate vertically to ensure their supply of agave. Of the 12,000 *ejidatarios*, those who manage to get contract arrangements, a first best for them in terms of income security, are a minority.

- Even though 124 firms are registered to produce Tequila, four firms (Cuervo, Sauza, Herradura, and Cazadores) control approximately 67% of the market, exacerbating the unbalance. The downside of success, as seen by Bowen and Zapata, is that "Tequila is

evolving into a generic, mass-produced liquor; and the farmer knowledge, artisanal production practices, and environmental resources that are associated with the specificity and heritage of tequila are being degraded".[13]

- In addition, ample fluctuations in climatic, sanitary and market conditions have made the market for agave extremely unstable, as shown in Figure 3.5. The average price of agave went from $1.57 pesos per kilogram in 1998 to $19.08 pesos per kilogram in 2000 (in real terms). Supply chain and State actors have been unable to coordinate the supply and demand or to establish a base price for agave.

Figure 3.5: Market for agave in Mexico

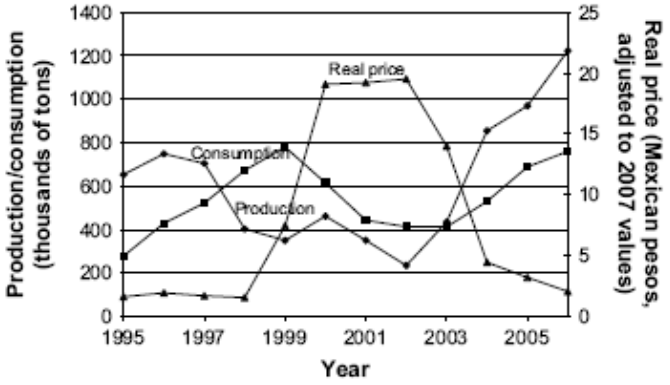


Fig. 2. Cycles of surplus and shortage of agave, and associated changes in price. Source: Macías Macías and Valenzuela Zapata, 2007.

In 2005, the OECD issued a Report on a Policy Roundtable concerning Competition and Regulation in Agriculture: Monopsony Buying and Joint Selling. The report singles out the support of a brand or an appellation (a GI) as one of the four "pro-competitive" reasons for joint-activities, together with economies of scale and scope, advertising and research. But this statement applies to issues regarding reputation and quality building and signaling concerns, as the OECD puts it, this leaves intact the question on "the extent to which competition within a [GI] consortium should be mandated". The OECD starts by noting that "buyer power is a common concern of competition agencies examining the agricultural sector", and then addresses practices prevalent in the sector, such as cost-sharing for unbranded products, price-setting or quantity-setting joint activities, and their cartel-like monitoring mechanisms, bid-rigging, price asymmetries and aberrations between farm gate and retail prices, potential anticompetitive effects of buyer-established quality standards, imbalances in bargaining

[13] Intangible Business The Power 100 included 2 brands of Tequila in 2006 and 4 in 2009: Cuervo (Diageo), ranked 12; Patrón (Patrón Group), 34; Sauza (Beam Global), 36; El Jimador (Brown-Forman), 62. Diageo owns 13 Top 100 brands, including Smirnoff, Johnnie Walker, Baileys, Captain Morgan, J&B, Gordons, Tanqueray. Beam Global owns 6, including Jeam Beam, Teachers, Courvoisier. Brown-Forman owns 5, including Jack Daniels and Finlandia.

power due to market concentration in production and retail, among others. These practices are actually exacerbated by the fact that the agricultural sector is usually exempted from the application of antitrust law in its full extent (as mentioned above).

The study of monopsonistic behavior within the club good framework developed in this section is left for future research; this section will only sketch a couple of themes that might be relevant regarding GIs, in reference to classic economic theory.

1. First, monopsonistic power has been linked to monopolistic power. According to this theory, a dominant position in the procurement market can arise as a result of lacking competition in the sales market. Any firm that has market power upstream (with consumers) will usually have it downstream (with suppliers). According to this theory, any GI club with oligopolistic power will potentially have oligopsonistic power.
2. Second, sectors such as the agricultural sector are prone to unbalances in bargaining positions, as shown by the 2005 OECD Report. In p. 180, the United States mentions that "historically, exemptions from antitrust enforcement have been created for labor unions and for agricultural cooperatives, in part based on the assumption that industrial employers and agricultural processors have monopsony power. […] According to the 'countervailing power' theory, efficiency and consumer welfare may be enhanced by allowing exercise of monopoly power on the selling side to avoid input prices to depress below competitive levels".
3. Third, regulatory factors that limit inputs mobility can indirectly grant monopsonistic power to processors. This implies that the geographical confinement of production might exacerbate eventual concerns over monopsonistic power of GI firms, with a greater effect on the non-mobile factor, land. However, as shown in the Champagne example, factor-owners in a context of market saturation and geographical confinement of output can expect higher rewards for their assets, thus granting factor-owners a natural "countervailing power". Which effect prevails eventually is clearly a function of institutional and market conditions.
4. A fourth source of oligopsonistic power is factors' preferences over firm characteristics. GI firms might have local oligopsonistic power over factors (workers, land owners) that strongly prefer working for them.
5. Fifth, from the point of view of competition law, it has been argued that vertical integration may reduce or eliminate inefficiencies due to monopsonistic power. This mechanism is at play since the 1992 amendment to the Mexican Constitution that

legalized the rental and sale of previous inalienable *ejido*, although at the price of increased mass-production and loss of specificity and heritage (Bowen 2009).

3.8 Total economy view-point: the issue of GI replication

> To date, Italy has 18 AOs and 8 GIs registered under European Law. Of these, 8 are for prosciutto crudo. First came San Daniele in 1961, then Parma in 1963, Veneto Berico-Euganeo in 1971, Toscano in 1990, Carpegna and Modena in 1996, all AOs. Two GIs were added to the list Norcia and Sauris (the latter in April 2010). San Daniele, and Parma (the "Re dei Prosciutti") have been so successful that they have prompted other regions in Italy and abroad to build their own GIs around raw ham. All these raw hams are cured in the same fashion in the same broader region, but, for example, San Daniele promoters claim that "it is the unique climatic conditions of the Friuli region, with its higher altitudes and drier air, that give Prosciutto di San Daniele its unique flavor and texture", and add that another special attribute is that "it is cured with the bottom part of the leg bone, in a feature that makes for a very rustic-looking ham" (unattributed quote reproduced in various internet sites). This phenomenon of club "replication" exists in other sectors such as sparkling wine, wine, liquors (Tequila and Mezcal both are made of agave), to name a few.

A GI club represents a particular variety. Although production processes could be exactly replicated, the GI name can not be used as a signaling device by non-members (besides, proponents of GIs often link quality to the "*terroir*" which is exclusive to the GI club territory). However, close substitutes can exist; a region can invest in a GI variety of its own and compete in the same market segment. A branch of the economic literature has studied club goods from the point of view of the total economy; I refer to Cornes and

Figure 3.6: GI Club Replication: Italian GIs for prosciutto crudo

Sandler (1996) for a review. Suffice to say at this point that issues typically evolve around the optimal number of clubs, optimality and equilibrium for local public goods, heterogeneous consumers, mixed clubs, government provision, etc. This is yet another dimension in which the framework developed in this section could be expanded, which is however left for future research.

In the case of GIs and trademarks, the intellectual property right is linked exclusively to the name, not to the product specifications. Although it is conceivable that some production process related to a GI good might be patented, it is usually not the case (since GIs are based on tradition, potential patents rights are probably forfeited or unclaimed), and if they were, patent protection would eventually expire. GI production processes are in the public domain.

4 Concluding remarks

This paper aims at contributing to the understanding of the economics of geographical indications (GIs) under a general framework of analysis that draws on club goods theory. It provides some elements of answers to those who might wonder how a GI may be characterized in economic terms and how it works at the firm and club levels. The paper is relevant as it relates to current debates at the World Trade Organization and the World Intellectual Property Organization opposing a few countries that advocate for a stronger level of protection of this type of intellectual property right to those that favor the *statu quo*.

In section 2, I argue that firms in a GI club enjoy a reputation which is traceable through the GI label, and develop a model on club reputation in which quality is endogenously determined at the firm level, with reputation as the state variable. Contrary to previous papers, it is shown that the TRIPS legal construct around GIs is potentially compatible with an equilibrium involving a self-fulfilling level of quality (and reputation) that is above the minimum, under the condition that the GI club has a reduced membership of firms and a highly differentiated variety. However, the establishment of a minimum level of quality is still the first best policy to improve firm profits. In the same framework, it is shown that under bottom-up firm-driven processes of club formation, levels of quality and profits are higher and levels of club membership are lower, than under top-down State-driven processes, where the contrary holds true.

In section 3, quality is taken as exogenous, and a static partial equilibrium framework is developed, where the GI is characterized as a localized club asset, with

imperfect exclusion and no rivalry in benefits, which is however subject to potential dilution phenomena (depreciation) due to membership crowding and oversupply. In this framework, GI-related expenses, output, membership, and club finance are all determined simultaneously. It is shown that under partial rivalry in benefits, both output and membership are reduced with the subsequent allocative and competitive effects, in an equilibrium set of variables that dangerously approaches the cartel equilibrium. State subsidization is shown to lead to potential inefficiencies stemming from price and incentive distortions. The impact of the geographical confinement of output on factor prices is also analyzed. Finally, issues concerning potential monopsonistic concerns and the replication of GIs are briefly sketched, although the formal analysis is left for future research.

What the paper does not is to directly address the issue of whether GIs should be protected or not (a normative issue), although a few insights are provided that may prove useful to policymakers. Most papers on the economics of geographical indications focus on price premia, competing regimes (GI versus brands, versus labels, etc.), free rider problems (with models assuming types, high/low quality, etc.). This paper aims at filling a gap in the literature regarding the economic and market structures implied by GIs legal protection at the international level under the TRIPS Agreement.

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Appendix A Club reputation dynamics

The firm's maximization problem

The firm's problem is to maximize the present value of profits subject to the state equation for reputation and to the constraint that profits be non-negative. Following Winfree & McCluskey (2005), firms follow a stationary Markovian strategy (the firm conditions his actions at a certain period only at the state of affairs at that given period), so that $q_j = \phi(R)$:

$$\max_{q_i \geq 0} PV\pi_i = \int_0^{\infty} e^{-rt}\left[p(R) - c(q_i) - \frac{G(R)}{N} \right] dt \;\; i = 1,\ldots, N$$

$$s.t.: \; p - c - \frac{G}{N} \geq 0$$

$$: \dot{R} = \gamma\left(\overline{q} - R\right) \; R(0) = R_0 > 0$$

$$: G(R) > 0, G'(R) > 0$$

$$where: \overline{q} = \sum_{j=1}^{N}\left(\frac{q_j}{N}\right) = \overline{q} = \frac{q_i}{N} + \frac{N-1}{N}\phi(R)$$

The current-value Hamiltonian (λ_i is the current-value shadow price of reputation, a co-state variable) is:

$$\tilde{H}_i = p(R) - c(q_i) - \frac{G(R)}{N} + \lambda_i \gamma\left[\frac{q_i}{N} + \frac{N-1}{N}\phi(R) - R \right]$$

Apply the Pontryagin recipe:

$$(a) \; \frac{\partial \tilde{H}_i}{\partial q_i} = 0 = -c'(q_i) + \lambda_i \frac{\gamma}{N} \Rightarrow \lambda_i = c'(q_i)\frac{N}{\gamma}$$

$$(\dot{a}) \; \dot{\lambda} = \frac{N}{\gamma} c''(q_i)\dot{q}$$

$$(b) \; \frac{\partial \tilde{H}_i}{\partial R} = -\dot{\lambda} + r\lambda_i = p'(R) - \frac{G'(R)}{N} + \lambda_i \gamma\left[\frac{N-1}{N}\phi'(R) - 1 \right]$$

$$\dot{\lambda} = c'(q_i)\frac{N}{\gamma}\left[r + \gamma - \gamma\frac{N-1}{N}\phi'(R) \right] - p'(R) + \frac{G'(R)}{N} = \frac{N}{\gamma} c''(q_i)\dot{q}$$

Solve for the isoclines:

$$\dot{q} = \frac{\gamma}{N} \frac{c'(q_i)\frac{N}{\gamma}\left[r + \gamma - \gamma\frac{N-1}{N}\phi'(R) \right] - p'(R) + \frac{G'(R)}{N}}{c''(q_i)}$$

$$(c) \; \frac{\partial \tilde{H}_i}{\partial \lambda_i} = \dot{R} = \gamma\left[\frac{q_i}{N} + \frac{N-1}{N}\phi(R) - R \right]$$

Equation (a) is the first order conditions with respect to the control variable quality. Equation (b) has a standard interpretation as the adjustment equation for the shadow value of reputation along an efficient path. Equation (c) is the reputation constraint.

Equilibrium

The steady state equilibrium is found at the intersection of the isoclines $\dot{R}=0$ and $\dot{q}=0$, with the symmetry assumption:

$$R^* = q^* = \phi(R^*) \Rightarrow \phi'(R^*) = 1$$

$$\Rightarrow \frac{N}{\gamma}\left[r+\gamma-\gamma\frac{N-1}{N}\phi'(R)\right] = \frac{N}{\gamma}\left(r+\frac{\gamma}{N}\right) = 1+\frac{rN}{\gamma}$$

$$\begin{cases} \dot{R}=0 \Rightarrow \gamma\left(q^*-R^*\right)=0 \\ \dot{q}=0 \Rightarrow \left(1+\frac{rN}{\gamma}\right)c'(q^*)-p'(R^*)-\frac{G'\left(R^*\right)}{N}=0 \end{cases}$$

$$solution: \begin{cases} R^* = q^* \\ p' = \left(1+\frac{rN}{\gamma}\right)c' + \frac{1}{N}G' \end{cases}$$

$p'\left(R^*\right)$ is the marginal revenue of the representative firm (because output is set at unity); $c'(q^*)$ is the output marginal cost and $G'\left(R^*\right)/N$ is the club-house marginal cost. The solution involves a price schedule where marginal revenue covers for marginal costs at a premium $\frac{rN}{\gamma}c'(q^*)$. Under the assumption that $p''(R)<0$ (downward sloped marginal revenue curve) the model implies a lower equilibrium level of quality/reputation than under collective reputation (in the latter case $G=0$).

System stability: saddle-point path equilibrium

The Jacobian matrix is:

$$\dot{q}\,|_{q^*=R^*} = \frac{\gamma}{N}\frac{\left(1+\frac{rN}{\gamma}\right)c'(q^*)-p'(R^*)-\frac{G'\left(R^*\right)}{N}}{c''(q^*)}$$

$$\frac{\partial\dot{q}}{\partial q} = \frac{\gamma}{N}\left(1+\frac{rN}{\gamma}\right)\frac{c''}{c''} = r+\frac{\gamma}{N}$$

$$\frac{\partial\dot{q}}{\partial R} = \frac{\gamma}{Nc''}\left(-p''+\frac{1}{N}G''\right)$$

$$J = \begin{bmatrix} \frac{\partial \dot{R}}{\partial R} & \frac{\partial \dot{R}}{\partial q} \\ \frac{\partial \dot{q}}{\partial R} & \frac{\partial \dot{q}}{\partial q} \end{bmatrix}_{q^*,R^*} = \begin{bmatrix} -\gamma & \gamma \\ \frac{\gamma}{Nc''}\left(-p'' + \frac{1}{N}G''\right) & r + \frac{\gamma}{N} \end{bmatrix}_{q^*,R^*}$$

$$D = \frac{\gamma^2}{Nc''}\left[p'' - \left(1 + \frac{rN}{\gamma}\right)c'' - \frac{1}{N}G''\right] < 0 \text{ for stability}$$

$$\begin{cases} c'' > 0 \\ c'' > p'' \Rightarrow D < 0 \\ G'' > 0 \end{cases}$$

The determinant of the Jacobian matrix at the steady state gives information about the behavior near the steady state. Under the assumptions of the model $c'' > 0$ and $G'' \geq 0$; $c'' > p''$, the determinant is unambiguously negative, implying eigenvalues of opposite signs and a saddle point path equilibrium. The stability condition $D < 0$ is a curvature condition that asserts that the firm's marginal revenue is either declining $(p'' < 0)$, or if it rises, it rises no faster than the "relevant" marginal cost increases (which includes the premium).

Although a concave marginal revenue function is usually assumed, the model does not rule out a convex marginal revenue function ($p'' > 0$), which happens for example for extremely rare wine vintages -say Champagne- for which it is the case that increases in quality are marketed at huge price premia):

$$\begin{cases} c'' > 0 \\ c'' > p'' > 0 \end{cases} \Rightarrow D < 0 \quad \text{iff} \quad 0 < p'' < \left(1 + \frac{rN}{\gamma}\right)c'' + \frac{G''}{N}$$

In addition, under the assumption that the function G is concave $(G'' \leq 0)$, a saddle-point path equilibrium is not completely ruled out either, however it comes at the price of an additional condition.

$$\begin{cases} c'' > 0 \\ c'' > p'' \Rightarrow D < 0 \text{ iff } \quad p'' - \left(1 + \frac{rN}{\gamma}\right)c'' < \frac{1}{N}G'' \leq 0 \\ G'' \leq 0 \end{cases}$$

Wherever the determinant is positive, the system is unstable; i.e. "there is a direction in a 2-dimensional space in which the system will not tend to return back to the equilibrium point." (Wikipedia).

Quality is a function of membership

The implicit derivative of quality with respect to number of firms at the equilibrium point is:

$$p'(q^*) = \left(1+\frac{rN}{\gamma}\right)c'(q^*) + \frac{1}{N}G'\left(q^*\right)$$

$$p''(q^*)\frac{dq^*}{dN} = \frac{r}{\gamma}c'(q^*) + \left(1+\frac{rN}{\gamma}\right)c''(q^*)\frac{dq^*}{dN} - \frac{1}{N^2}G'\left(q^*\right) + \frac{1}{N}G''\left(q^*\right)\frac{dq^*}{dN}$$

$$\frac{dq^*}{dN} = \frac{\frac{r}{\gamma}c'(q^*) - \frac{1}{N^2}G'\left(q^*\right)}{p''(q^*) - \left(1+\frac{rN}{\gamma}\right)c''(q^*) - \frac{1}{N}G''\left(q^*\right)}$$

$$\frac{dq^*}{dN} = \underbrace{\frac{\overbrace{\frac{r}{\gamma}c'}^{>0} - \overbrace{\frac{1}{N^2}G'}^{>0}}{p'' - \left(1+\frac{rN}{\gamma}\right)c'' - \frac{1}{N}G''}}_{<0} = \underbrace{\frac{\overbrace{\frac{rN}{\gamma}c'}^{>0} - \overbrace{\frac{1}{N}G'}^{>0}}{N\left[p'' - \left(1+\frac{rN}{\gamma}\right)c'' - \frac{G''}{N}\right]}}_{<0}$$

$$\frac{dq^*}{dN} = 0 \Rightarrow \frac{1}{N}G' = \frac{rN}{\gamma}c'$$

$$\frac{dq^*}{dN} \geq 0 \Leftrightarrow \gamma G' \geq rN^2c' \Leftrightarrow \frac{1}{N}G' \geq \frac{rN}{\gamma}c' \text{ where } \frac{rN}{\gamma}c' > 0 \text{ and } \frac{1}{N}G' > 0$$

Quality will decrease otherwise, particularly at high levels of membership. Rearranging terms, these conditions reduce to one simple condition: quality will increase with the number of firms as long as the premium over production cost $\frac{rN}{\gamma}c'$ is lower than the per-firm GI-related marginal cost $\frac{1}{N}G'$, quality will decrease otherwise. This determines a potential scenario in which there is an inflexion point as of some level of N, up to which the equilibrium quality increases and after which it decreases.

Appendix B The top-down approach to optimal membership

In step 2, the social planner maximizes profits at the club level assuming a steady state / symmetric equilibrium:

$$\max_{N\geq 0}\Pi = N\left(p-c-\frac{G}{N}\right)$$

$$s.t.: q_0(N) < q^* = R^* < q_{opt} \Rightarrow \begin{cases} \pi = p-c-\frac{G}{N} \geq 0 \\ \frac{\partial \pi}{\partial q^*} = p'-c'-\frac{G'}{N} > 0 \end{cases}$$

$$: p' = \left(1+\frac{rN}{\gamma}\right)c' + \frac{1}{N}G'$$

$$\frac{dq^*}{dN} = \frac{\frac{r}{\gamma}c' - \frac{1}{N^2}G'}{p'' - \left(1+\frac{rN}{\gamma}\right)c'' - \frac{1}{N}G''}$$

Profits are maximized at:

$$\frac{\partial \Pi}{\partial N} = \left(p-c-\frac{G}{N}\right) + N\left(p'-c'\right)\frac{dq^*}{dN} - G'\frac{dq^*}{dN}$$

$$= \left(p-c-\frac{G}{N}\right) + N\left(p'-c'-\frac{G'}{N}\right)\frac{dq^*}{dN} = 0$$

$$\Rightarrow \frac{dq^*}{dN} = -\frac{\left(p-c-\frac{G}{N}\right)}{N\left(p'-c'-\frac{G'}{N}\right)} = \underbrace{-\frac{\pi}{N\frac{\partial \pi}{\partial q^*}}}_{<0}$$

$$\frac{\partial \Pi}{\partial N} \geq 0 \Rightarrow \frac{dq^*}{dN} \geq -\frac{\left(p-c-\frac{G}{N}\right)}{N\left(p'-c'-\frac{G'}{N}\right)} = -\frac{\pi}{N\frac{\partial \pi}{\partial q^*}} \text{ where } RHS < 0$$

q_c and N_c (subscript for club)

Appendix C The international legal regime for GIs

Geographical indications (GIs) constitute a category of intellectual property right (IPR) that acquired quasi universal relevance in the international trade policy debate in 1994 with its protection under the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS Agreement) of the World Trade Organization (WTO).[14] The term GI was coined to encompass a large variety of expressions already in use in other international treaties and national legislations, such as appellations of origin (AOs), although the term itself was given a specific definition in Article 22.1 of the TRIPS Agreement, which is the one retained in this paper:

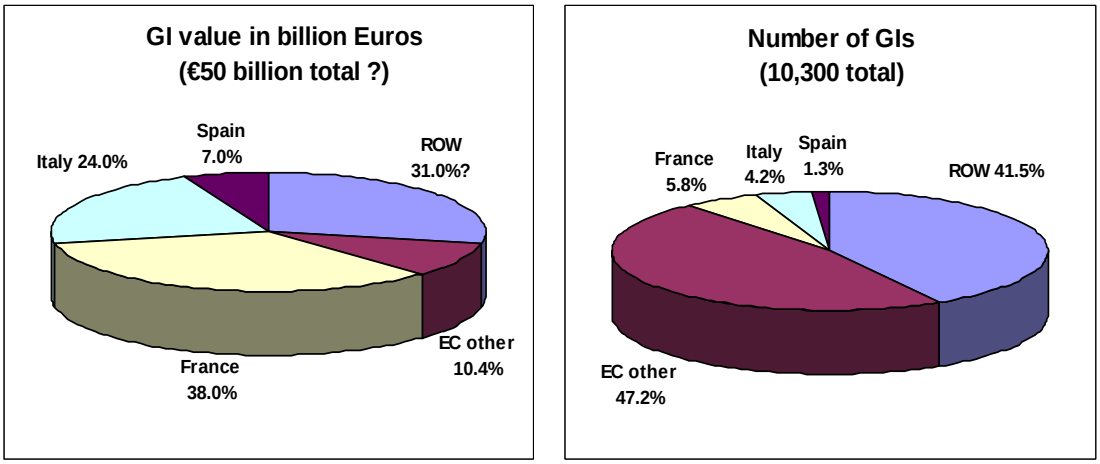
> Geographical indications are indications which identify a good as originating in the territory of a Member, or a region or locality in that territory, where a given quality, reputation or other characteristic of the good is essentially attributable to its geographical origin. Article 22.1 of the TRIPS Agreement.

Feta cheese, Champagne, Pisco, Darjeeling tea, Basmati rice, Parma ham are examples of well-known GIs. The subject of this thesis, however, is not GIs *per se*; it is rather the international legal regime for GIs established under the TRIPS Agreement and its legal predecessors. The models presented fit into the 'economics of law' literature. Since intellectual property protection is territorial, it is interesting to contrast regimes and analyze the impact of specific legal provisions, with no previous judgment as to the soundness of these provisions. The models are kept as tractable, coherent and main-stream as possible and are fully related to well-known bodies of economic theory to ease understanding and referencing. Also, the questions addressed in the interpretation of results were chosen based on their relevance in the policy debate and multilateral negotiations. This paper has no empirical work, although case studies and examples are used to illustrate the points made.

This appendix gives some figures regarding GIs and goes into some length into reviewing the international legal framework for the protection of GIs.

[14] The TRIPS Agreement is part of the single undertaking negotiated during the Uruguay Round of multilateral negotiations which created the WTO in 1994; as such, it has to date 153 signatories.

Figure 0.1: Disparities in value of GIs



Figures

Estimates on GI value added and exports are neither comprehensive nor consistent, however some figures from different sources were recently compiled showing great disparities in value (Giovanucci *et al.* 2009). Roughly, while France, Italy and Spain account for close to 10% of registered GIs, they account for close to 70% of GIs total value worldwide. The number of protected GIs in the world is put at more than 10,300, 90% of which originate in the 30 OECD countries, with a "trade value" of close to US$ 50 billion (€36.7 billion at the current exchange rate, probably meaning exports).

This estimate is definitely conservative since the European Commission has evaluated the combined value generated by its three main GI countries, France, Italy and Spain to be €34.5 billion in 2002 (European Commission 2003),[15] and GIs in seven other EU countries generated and added value of about €5.2 billion (Giovanucci *et al.* 2009). In addition, the European Communities represent more than half the total number of protected GIs, with 6,021 registered GIs (of which 5,200 for wines and spirits). In spirits alone, of the €5.4 billion of EU exports, €3.5 billion pertain to GI-labeled spirits (Giovanucci *et al.* 2009). Figure 0.1 shows the disparities in value with an estimated worldwide value of GI products put (rather arbitrarily) at €50 billion.

[15] The European Commission reports that France's 593 GIs generate €19 billion Euro of value (€16 billion for 466 wines and spirits GIs) and constitute the lifeline of 138,000 agricultural outfits. Similarly, Italy's 420 GIs generate a value of €12 billion euro (€5 billion for 300 wines & spirits GIs) and give employment to more than 300,000 citizens. In Spain, 123 GI products generate some €3.5 billion of income (€2.8 billion for wines and spirits), more than €1 billion going into exports.

Legal protection at the international level

Back in 1883, the Paris Convention on the Protection of Intellectual Property singled out, in its first article, the "indications of source or appellations of origin" as objects of protection. But these concepts were not defined, and the treaty provided for remedies only against the **false** use of indications of source (AOs are not mentioned again). The Madrid Agreement for the Repression of False or Deceptive Indications of Source of Goods of 1891, which consists of only 6 articles, is the first treaty to (1) prevent the **deceptive** use of indications of source, (2) include a **genericity** exception, and (3) set a special regime for wines; the last two embodied in article 4 which reads:

> The courts of each country shall decide what appellations, on account of their generic character, do not fall within the provisions of this Agreement, regional appellations concerning the source of products of the vine being, however, excluded from the reservation specified by this Article.

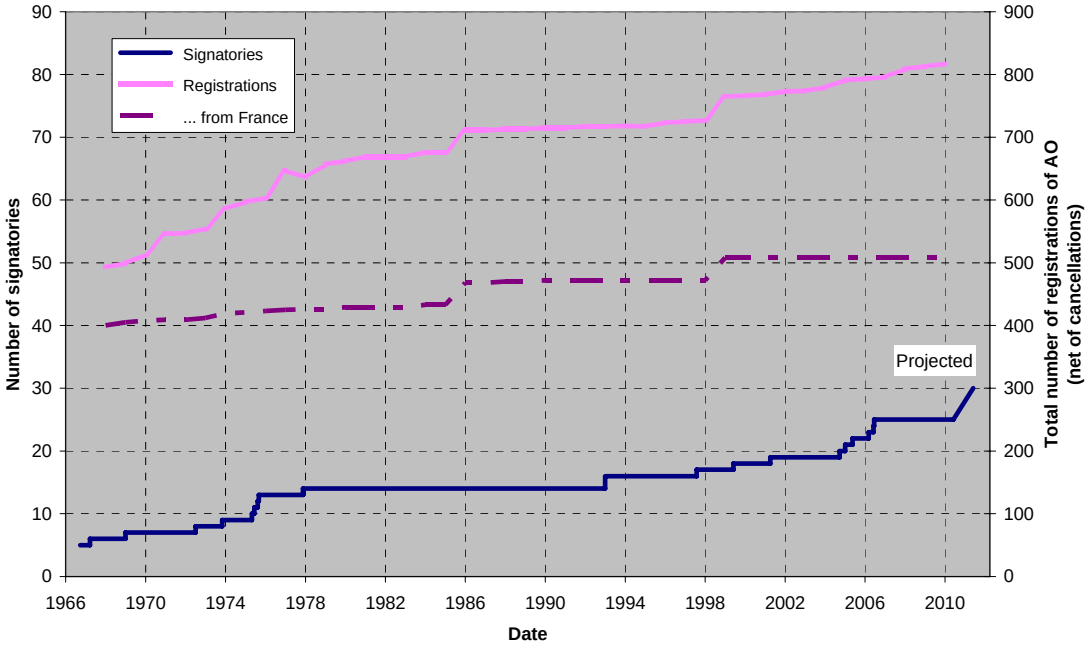
The same year, the Madrid Agreement Concerning the International Registration of Marks was signed, which has been used since by many countries for the protection of GIs as collective, certification or guarantee trademarks. Interestingly, after World War I, France, probably fearing that Germany might want to supply the world of Champagne after the region around Reims had been badly damaged, included an article in the Treaty of Versailles providing for the "respect" of legal, administrative and judicial decisions regarding "appellations for wine or spirits", this was indeed the second time that wines (and spirits) were given special attention.[16]

> Germany undertakes on condition that reciprocity is accorded in these matters to respect any law, or any administrative or judicial decision given in conformity with such law, in force in any Allied or Associated State and duly communicated to her by the proper authorities, defining or regulating the right to any regional appellation in respect of wine or spirits produced in the State to which the region belongs, or the conditions under which the use of any such appellation may be permitted; and the importation, exportation, manufacture, distribution, sale or offering for sale of products or articles bearing regional appellations inconsistent with such law or order shall be prohibited by the German Government. Article 275 of the Treaty of Versailles of 28 June 1919.

Building on these early milestones, the appellation of origin was given a strong level of protection in 1958 under the Lisbon Agreement. However this Agreement only entered into force in 1966 and has had a limited coverage. Geographical indications were given (virtually) universal attention and protection only in 1995 with the signature of the TRIPS Agreement. These agreements are presented in detail next. The section concludes

[16] Hint by Stephen Clarke, 1000 Years of Annoying the French, Bantam Press, March 2010.

Figure 0.2: Lisbon Agreement membership and registrations



with a brief note on the different regimes of protection existing at the national level, which, being closely tied to legal traditions, differ greatly across the globe.

WIPO's Lisbon Agreement: limited coverage and membership

The most well-known type of GI is the appellation of origin (AO), which has been protected since 1958 by the Lisbon Agreement and is defined as follows:

> Appellations of origin are the geographical name of a country, region, 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. Article 2 of the Lisbon Agreement. [17]

The Lisbon Agreement counts 26 Members (5 additional signatories have pending ratifications). Its first signatories, back in 1966, were Cuba, France, Haiti, Israel, Mexico and Portugal. Figure 0.2 shows a moderate increase of membership over time (with a 15-year period of stagnation from 1978 to 1993). The Agreement covers 817 protected AOs,

[17] The Lisbon Agreement for the Protection of Appellations of Origin and their International Registration was signed in 1958 and entered into force in 1966. It is open to signatories to the Paris Convention for the Protection of Industrial Property of 1883; both are treaties ruled by the World Intellectual Property Organization (WIPO).

of which 508 belong to France, representing 62% of the total (down from 81% in 1966).[18] Nine countries haven't registered a single AO.[19]

> Roughly two thirds of registrations correspond to wine, followed by spirits, cheese, tobacco, mineral water and beer and malt. Registrations show a pattern of specialization of certain countries in particular sectors (Escudero 2001); AOs in wine, spirits and cheese are led by France, all registrations for tobacco are from Cuba, and the Czech Republic specializes in mineral water and beer and malt. Examples of AOs covered by the Lisbon Agreement are: Porto, Cognac, Pilsen, Champagne, Bordeaux, Tequila, Habano cigar, Jerez, and in general all the French Appellations d'Origine Contrôlée. Non-food products have also been registered, such as the Talavera handcraft (Mexico), the Cholet cloth (France) and Bohemia glass (Czech Republic) (WIPO 2009).

Although the Lisbon Agreement has a rather limited coverage, it grants in many respects a stronger level of protection than that accorded under TRIPS. Its most relevant feature is the creation of a registry of AOs with protection in the territories of all signatory members, a feature that proponents of an increased level of protection for GIs would like to import to the WTO.

WTO's TRIPS two-tier standard of protection for GIs

Broadly, GIs are protected under the TRIPS Agreement on grounds of consumer and goodwill protection. There are however two standards of protection, a minimum level applies to all goods and evolves around the so-called "no-misleading requirement", while wines and spirits benefit of an additional level of protection. The Doha Round divides those countries that favor the extension of the additional protection to all products to those who favor the *statu quo*.

The minimum level of protection

The stated aim of the TRIPS Agreement is to reduce distortions to international trade, to promote an effective protection and enforcement of all categories of IPRs, and to promote technological innovation and transfer. In substance, the Agreement applies to all IPR categories, and GIs in particular, the traditional GATT/WTO clauses of non-discrimination (national treatment and most-favored-nation treatment) and includes detailed obligations regarding enforcement within WTO Members' territories (in aspects

[18] Correlative registration numbers go up to 891 due to 74 cancellations over time, of which 56 by France in 2001.

[19] Burkina Faso, Congo, Costa Rica, Gabon, Haiti, Iran, Nicaragua, Serbia, Togo. In addition, Israel and Moldova have one registered AO each.

such as judicial review, indemnification, provisional measures and criminal procedures). However, it is left to members to apply border measures regarding GIs.[20]

In addition, a series of provisions apply specifically to GIs under Section 3 of Part II of the TRIPS Agreement, aimed at preventing the use of a GI "in a manner which misleads the public as to the geographical origin of the good" (the "no-misleading requirement") or "which constitutes an act of unfair competition". The protection extends to the invalidation of the registration of a trademark which contains or consists of a GI if (and only if) it is misleading. These provisions apply against deceptive indications (i.e. indications that being literally true, falsely represent that the goods originate in another territory). Importantly, a GI must be protected in its country of origin and not have fallen into disuse to have the right to be protected abroad.

> The requirement that the GI be protected at the national level does not apply to trademarks. And it is not a minor issue, particularly for firms in developing countries that witness with some frustration the use of their main traditional names by foreign producers in foreign and national markets and that nonetheless can do little about it for lack of protection within their own territories. One example, in Chile, are the producers of the Azapa olive ("aceituna de Azapa", from the Azapa Valley), who have unsuccessfully tried to prevent producers in Bolivia and Peru to use the Azapa indication, one reason being the lack of legal domestic protection for the said indication in Chile in the first place.

There is also an exception for those GIs that are reputed to have become generic terms, such as Moutarde de Dijon or Cheddar cheese, or Camembert, for which only Camembert de Normandie is protected as an AO in France (Giovanucci *et al.* 2009).[21] In addition a 'grand-fathering clause' prevents the invalidation of trademarks identical or similar to a GI when the trademark has been acquired in good faith before 1994, or before the GI is protected in its country of origin.

> One example is Parma, which has been trademarked in both Mexico and Canada, preventing Parma ham Italian producers to market their products with the Parma GI, and an estimated loss of €3 million per year in Canada alone (European Commission 2003).

Additional protection for wines and spirits

There is an additional level of protection for GIs for wines and spirits. First, there is no "misleading requirement". Second, the use of a GI is prevented even when the true origin is indicated or the GI is used in translation or accompanied by expressions such as "kind", "type", "style", "imitation" or the like (Article 23).

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[20] The adoption of measures at the border is mandatory regarding infringements to trademarks and copyrights (against counterfeits and pirated goods respectively).

[21] On the genericity issue, the protection of the Lisbon Agreement is broader: once an AO is protected, it cannot be deemed to have become generic as long as it maintains its protection in its country of origin.

Some exceptions (for homonymous GIs for example) and additional obligations apply (Article 24). In particular, the genericity exception applies to those GIs that are identical to the customary name of a grape variety (such as Montepulciano). And there are is a second 'grand-fathering clause' which allows the continuous use of a protected GI for wines or spirits by those who can prove a prior use (before 1984, or in good faith before 1994).

Finally, WTO Members may not refuse, if requested, to conduct negotiations of international agreements aimed at increasing the protection of individual GIs for wines and spirits.

Policy debate at the WTO: 'usurpation' versus 'confiscation'

At the World Trade Organization, a few countries expressed their willingness to renegotiate the Section relative to GIs of the TRIPS Agreement under the Doha Round; eventually the subject was not retained.[22] There is however a so-called 'built-in agenda' of negotiations aimed at establishing a multilateral system of notification and registration of GIs for wines, 'built-in' in the sense that negotiations of this register were mandated in Article 23.4 of the TRIPS Agreement. Since no deadlines were set and since negotiations have systematically failed to conclude, they are now part of the Doha Round of multilateral negotiations. The Doha mandate on GIs includes two issues: the creation of the multilateral register for wines *and spirits*; and the extension of the higher level of protection granted under Article 23 beyond wines and spirits.[23]

Succinctly, current discussions at the WTO oppose two groups of countries. On one side, the friends of GIs favor a strong level of protection (no misleading requirement and no generic exemption), the establishment of a global registry of GIs and the extension of the special protection for wines and spirits to all products. Their main point

[22] The current situation regarding negotiations is detailed in the WTO website, TRIPS: Geographical Indications, Background and the current situation, version of February 2010:
http://www.wto.org/english/tratop_e/trips_e/gi_background_e.htm#wines_spirits
Refer also to WTO documents TN/IP/W/7, TN/IP/W/8, TN/IP/W/12, WT/GC/W/546, TN/C/W/25, TN/C/W/50 and revisions thereby.

[23] The built-in agenda of Article 23.4 refers only to wines. The extension of the mandate to include spirits was highly resented at the beginning as it affected the balance of benefits struck during the Uruguay Round; it is less controversial these days since the Doha Round presents opportunities for trade-offs in other areas under negotiation. I am grateful to Sergio Escudero for pointing out this aspect.

is to argue against the 'usurpation' of their geographical indications by New World producers.[24]

> The EU has the strongest position, defined in a proposal dated June 2005 (TN/IP/W/11). The EU calls for the TRIPS Agreement to be amended by adding an annex to Article 23.4 requesting that the registration of a GI would establish a 'rebuttable presumption' that the term is to be protected by all Members, except in a country that makes a reservation 'on permitted grounds' (such as genericity) within a specified period (for example, 18 months). It also favors the extension of the higher protection of GIs for wines and spirits to all products.

Their opponents favor the *statu quo*. These countries are satisfied with the current level of protection and would favor a decision by the TRIPS Council to set up a voluntary system where notified GIs would be registered in a database. The governments participating in the system would have to consult the database when taking decisions on protection in their own countries. Non-participating members would be 'encouraged' but 'not obliged' to consult the database. They also counter the 'usurpation' argument by recalling that European colonial rule and immigration led GIs to be adopted and popularized as generic terms outside Europe. They argue that current users of European GIs outside Europe would be 'confiscated' of the value of their investments if a monopoly over the GI label were to be imposed.[25]

> David Spencer (2003), former Ambassador of Australia to the WTO, has argued that "enhancing GI protection in the way some WTO Members have proposed would: erode, rather than strengthen, competition; lead to rent-seeking at the expense of the consumer; add costs to producers and governments; do nothing to open up markets; not guarantee more sales or higher returns for developing countries; undermine the cultural heritage of those countries in the Americas, Oceania and Africa which were based on immigration; not guarantee that developing countries could protect the terms they would like to protect". WIPO/GEO/SFO/03/25 of 15 July 2003.

Bilateral Agreements: main tools for an effective protection

Several bilateral agreements on GIs have been negotiated based on the TRIPS clause that mandates negotiations on GIs for wines and spirits when requested by a WTO Member; although most prevalently under the umbrella of Free Trade Agreements (FTAs), which facilitate trade-offs in other sectors in the course of the negotiations.

> Regarding wines and spirits alone, the European Commission has concluded agreements with Albania, Australia, Bosnia-Herzegovina, Canada, Chile, Croatia, Macedonia, Mexico,

[24] The Friends of GIs include: Bulgaria, the European Union, Guinea, India, Jamaica, Kenya, Madagascar, Mauritius, Morocco, Pakistan, Romania, Sri Lanka, Switzerland, Thailand, Tunisia and Turkey.

[25] At Doha, this position is represented in a "joint proposal" submitted in 2005 and revised in 2008 (TN/IP/W/10/Rev.2), which was sponsored by Argentina, Australia, Canada, Chile, Costa Rica, Dominican Republic, Ecuador, El Salvador, Guatemala, Honduras, Japan, Korea, Mexico, New Zealand, Nicaragua, Paraguay, Chinese Taipei, South Africa and the United States.

Montenegro, South Africa, Switzerland and the United States.[26] It is essentially through these bilateral agreements that the EU has been able to ensure the protection of its GIs where these were exploited as generic terms, notwithstanding the grand-fathering clauses and the genericity exemptions. In the trade jargon, this practice has been labelled the "claw-back" of GIs.

Since most GIs are agricultural products, agriculture-based economies could be inclined to advocate for a strong international protection of GIs, although it does not seem to be the case, mainly due to the use of GIs as generic terms. It is worth noticing, however, that some developed countries have become demandeurs in this area, especially those few countries that have GIs with some international recognition (Escudero 2001). These demands are often channeled through bilateral negotiations, a fact that could signal a perception of potential imbalance in the eventual outcome of multilateral negotiations.

Protection at the national level

I refer to (Blakeney n.a.) and (OECD 2000) for a detailed description of national systems of protection of geographical indications. What is relevant for the purposes of this paper is that the TRIPS Agreement does not specify the legal means to protect GIs; it is left to each member to decide what those means are. Members usually provide protection to GIs by means of (i) laws focusing on business practices; (ii) trademark law; (iii) special or *sui generis* protection. In particular, a few countries protect GIs under collective, certification or guarantee mark regimes (such as the United States), or under common law action of 'passing off' (Escudero 2001).

A determinant feature common to most national regimes, however, is that the registration of a GI as a trademark is usually not allowed, either explicitly by law or through jurisprudence. This does not necessarily imply that the GI is recognized a protection as such, as in most cases, the registration of a GI as a trademark is refused on grounds that the GI has become a generic term. In any case, the impact of national GI regimes is not guaranteed; the markets often require some maturity for a GI to create value.

Chile established a national system of appellations of origin for wines by means of Decree Nº 464 of 1995 of the Ministry of Agriculture.[27] Until recently, however, the impact of this Decree

[26] The list of Bilateral agreements in wine and spirits negotiated by the European Commission appears in the following website: http: //ec.europa.eu/agriculture/markets/wine/third/index_en.htm.

[27] The only other product that has been granted a similar level of protection in Chile is Pisco, the national eau-de-vie made of grape, protected by D.F.L. N ° 181 of 16 May 1931.

was rather limited, since trademarks and grape varieties (not GIs) tended to prevail at the consumer level. This has been steadily changing as a few GIs have acquired an increasingly good reputation. For example, the success of the Casablanca Valley wineries in marketing their wines, particularly their Chardonnay and Sauvignon Blanc, led the wine producers and grape farmers to organize themselves into an Association in 2001.[28]

Last but not least, there is a developmental issue which is linked to legal traditions. While the current international framework of protection is in harmony with the European tradition of protection of geographical names (such as the French 'Appellations d'Origine Contrôlée'), it has proved less suited to protect indications that originated in a particular locality but that are not geographical names properly, although nothing in the TRIPS Agreement states that a GI has to be a geographical 'name' (contrary to the Lisbon Agreement). For instance, Greece and India have found it difficult to counter arguments of genericity regarding terms such as Feta cheese, Basmati rice and Darjeeling tea. The European Commission had to go all the way to the European Court of Justice against its own Member countries to establish the exclusivity of Greece over the use of the name Feta.

On the socioeconomic and developmental aspects of GIs, I refer to Rangnekar (2003a), the OECD (2000), Marette (2005) and Giovanucci et al. (2009). All these papers include their own extensive literature reviews. These papers take stock of the major theories that have been or may be applied to the topic, and review the major models developed in related issues, particularly trademarks. The main topics involve information asymmetries and market failure; product differentiation and competitive advantage; market access and market segmentation; competition policy (oligopolies) and state aid; and rents and social welfare.

[28] The Asociación de Empresarios Vitivinícolas del Valle de Casablanca was created in June 2001 and regroups the Casablanca producers of grapes and of wine (http: //www.casablancavalley.cl/).