Firm Organizational and Payoff Imbalances: 
An Aggrievement Model with Cooperatives and Private Firms

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Abstract

Hart and Holmstrom (2010) claim that organizational form conditions a sense of entitlement. In turn this may create feelings of being aggrieved by contractual outcomes resulting in shading activities and deadweight losses. If shading depends positively on existing payoff imbalances between bosses and managers, our model predicts that (non)integration with coordination is more plausible when profits of bosses and benefits of managers are (dis)similar. Given plausible parameter constraints, we illustrate how both organizational forms, an integrated cooperative and a nonintegrated private firm may coexist in a coordinated equilibrium and how cooperatives may obtain a higher social surplus. Empirically, we study cooperatives in Northern Italy and how they compete with private wineries regarding product quality and collective reputation. We show that cooperatives may obtain higher levels of social welfare through a collective reputation and/or a price premium for quality relative to private wineries.

Keywords: Firm Organization, Behavior, Cooperatives, Wine.  
JEL Codes: D1, L66, Q13.

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1. Introduction

Privately or investor owned firms (IOFs) and cooperatives coexist in many market sectors, with particular emphasis in the agricultural one, of modern economies where they compete actively for market share (Hansmann, 1996; Hendrikse, 1998; Sexton and Lavoie, 2001). Pennerstorfer and Weiss (2013) provide data from the European Commission illustrating how cooperatives account for considerable market shares in most European Member States, particularly in the agri-food chain. In this regard, Hendrikse has analyzed formally through several papers the coexistence of both governance structures, i.e. types of firms, within a given market sector. He has done so mainly through principal-agent models (Hendrikse, 2007), while highlighting the relative efficiency of cooperatives as equilibrium organisational forms when dealing with a different decision-making process (Hendrikse, 1998). Similar conclusions are reached when considering cooperatives from an incomplete contracting perspective (Hendrikse and Veerman, 2001). When comparing cooperatives with privately owned firms, Pennerstorfer and Weiss (2013) suggest that members of the cooperative have an incentive to free-ride on quality. Bontems and Fulton (2010, p. 322) present a theoretical model where the efficiency advantage of a cooperative “is directly linked to the goal alignment between the cooperative and its members and is influenced by the extent of income redistribution between members and the degree of rent seeking that takes place in the organization”. They concentrate on information costs and redistribution policies faced by cooperatives.

In this paper, we introduce a formal model and empirical evidence illustrating how cooperatives and private firms can coexist within a market while obtaining different quality rewards. The reputation of a cooperative for product quality depends on the contributions of its individual growers and its managerial ability to produce high quality wine. The choice between a cooperative and a private firm organizational form depends on the difference between the objectives and payoffs obtained by the parties composing the organization and the resulting shading parameters. Our empirical model shows that when cooperative wineries manage to organize their production process accordingly, they are able to compete with private wineries in terms of quality and reputation. In turn, it supports the conclusion of our theory, i.e. that an integrated cooperative and a nonintegrated private firm, may coexist in a coordinated equilibrium and that cooperatives may obtain a higher social surplus
due to larger reputation and quality premiums that they are able to obtain in the market. In our model, we built a similar intuition in terms of the alignment of objectives between the members of a cooperative but follow an approach based on contract as reference points framework of Hart and Holmstrom (2010). In doing so, we provide a link between the traditional research on the coexistence of different governance structures, which is generally based on agency-related problems, and the main characteristics related to the emergence of new generation cooperatives. New generation cooperatives are defined as organizational hybrids that combine aspects of IOFs and traditional cooperative. Katz and Boland (2002) present a summary of the five main property rights problems exhibited by traditional cooperatives and solutions that the new generation provide. We describe these problems and interpret the main trend implicit in the shift from traditional to new generation cooperatives in Table 1 below.

Principal-agent models address these agency problems by designing contracts to mitigate the frictions arising due to conflicting interests and asymmetric information. However, as emphasized by Hart and Holmstrom (2010), the property rights approach assumes that any conflict arising after the contract is agreed upon is resolved through bargaining with side payments. They argue that “many decisions made in a firm will be carried out without consultation or negotiation with other firms even when these decisions impact the other firms in a major way. It is rare, for instance, for a firm to go to a competitor with the intention of extracting side payments for avoiding aggressive moves (p. 484).”

Thus, the shading taking place whenever a party feels aggrieved after signing the contract remains outside the scope of the original contract initially agreed upon by the parties. The aggrievement model of Hart and Holmstrom (2010) addresses conflicting interests by adopting an organizational form to mitigate the effect of shading. In this regard, the findings on social comparison obtained by the psychology literature have been incorporated by the economics and strategic management ones to analyze incentive differentials and shading problems.

The literature on social comparison follows from the fact that individuals acquire information on other people who are similar to them, while being affected by the resulting comparisons (Festinger, 1954). Applied to the current setting, it implies that “when deciding how much effort to exude, workers respond not only to their own compensation but also to pay relative to their peers as they socially compare (Larkin et al. (2012), p. 1200-1201).” Economists and (strategic) managers have
argued that these comparisons may lead to envy and provide incentives to sabotage other workers within the same organization (Nickerson and Zenger, 2008; Bartling and von Siemens, 2010). The importance of social comparisons has been empirically illustrated by (Blinder and Choi, 1990), as well its effect on the reduction of effort among workers (Cohn et al., 2012) and the emergence of unethical behaviour (Gino and Pierce, 2010). Moreover, this phenomenon has also been shown to lead to escalations in the salaries of executives and among employees within a given firm (Faulkender and Yang, 2010).

Though we will not formalize the shift between both types of cooperatives within our model, the shift in their characteristics when dealing with the property rights problems described in Table 1 provides important intuition regarding the results obtained in this paper. The differences in objectives and, therefore, potential payoffs described by these five points indicate that low coordination incentives do not necessarily prevent the existence of a cooperative structure but damage its performance severely. Consider, for example, the free riding problem and note how new generation cooperatives align the individual benefits of their members before they start operating. This is also the case when choosing the portfolio of the cooperative. Similarly, an increment in coordination incentives between the members can be observed when dealing with the control and influence problems, with the horizon one being solved by allowing members to enter or exit the cooperative based on the alignment of their liquidity interests with those of the cooperative. Thus, the success of (new generation) cooperatives in dealing with standard property right problems is based on the alignment of objectives and payoffs among its members, that is, an increment in their coordination incentives. This alignment will be used in our model to determine the incentives of the members to shade on a given agreement and disrupt potential coordination incentives among them.

From a literature standpoint, following Cook (1995) and Hendrikse (1998), it can be argued that new generation cooperatives arise so as to account for the property rights problems described in Table 1, with a similar conclusion being reached by Borgen (2004) from a socio-economic perspective. As already described, the shift between both types of cooperative may be interpreted as an increment in the coordination incentives among the members of the cooperative. In this regard, as stated by Holmstrom and Roberts (1998, p. 92): “… high degrees of frequency and mutual dependency seem to support, rather than hinder, on-going co-operation across firm boundaries”. We build on these existing interdependencies to design our model while, at the same time, moving beyond the property rights-based interpretation presented by Katz and Boland (2002).
The current paper presents a formal model illustrating how cooperatives [integrated organizations] and private firms [nonintegrated organizations] can coexist within a market while obtaining different surpluses. We build on the model developed by Hart and Holmstrom (2010) to analyze the strategic choice of organizational form among producers. For example, one can consider wineries as being composed by growers and winemakers. Growers could delegate the winemaking process to an external winemaker or contribute to the winemaking process themselves. When growers delegate to an external manager [integration], their individual contributions to the process are not explicitly acknowledged, with the winemaker losing complete control over the quality of the production chain. However, if growers interact in the winemaking process themselves [nonintegration], they are able to highlight the quality of their individual contributions within the production chain. In this regard, a higher degree of quality control is exerted over the production chain. This quality coordination problem has been studied by Pennerstorfer and Weiss (2013), who show its dependence on the quality aggregation process and the number of members composing a cooperative.

We will particularly concentrate on the similarity of the payoffs received by the parties composing the units within an organization as the main determinant of the boundary choices of firms. Payoff similarities will also be used to show how cooperatives may be uniquely efficient within the current

<table>
<thead>
<tr>
<th>Problems</th>
<th>Traditional Coop Behavior</th>
<th>“New Generation” Behavior</th>
</tr>
</thead>
<tbody>
<tr>
<td>Free Riding</td>
<td>Individual benefits and property rights are not well aligned.</td>
<td>Investment and optimal levels of product flows are determined before the firm becomes operative.</td>
</tr>
<tr>
<td>Control</td>
<td>Absence of information and external pressure by public trading.</td>
<td>Greater property rights alignment through patronage-based voting.</td>
</tr>
<tr>
<td>Influence</td>
<td>Influence depends on centralization of authority and homogeneity of members.</td>
<td>Centralized and limited to a specific purpose.</td>
</tr>
<tr>
<td>Horizon</td>
<td>Lack of liquidity.</td>
<td>Tradable stock to allow for entry and exit from the cooperative.</td>
</tr>
<tr>
<td>Portfolio</td>
<td>Investment decision is tied to patronage decision.</td>
<td>Level of investment in assets is decided before the cooperative starts operating.</td>
</tr>
</tbody>
</table>

Table 1. Property rights problems and behaviour of traditional versus new generation cooperatives. Source: Based on Figure 1 in Katz and Boland (2002).
strategic setting due to the lower shading intensity applied by its members. The basic intuition follows from the literature on firm boundaries determined via incomplete contracts where organizational forms, when agreed upon competitively, condition the sense of entitlement of the parties (Hart and Moore, 2008).\(^1\) If feeling aggrieved by the outcome of the contract, parties may shade by underperforming, which creates deadweight losses. If ever at all, shading takes place after the organizational form has been chosen.

The basic environment on which our model is built is that of Hart and Holmstrom (2010), who build on the contracts as reference points approach of Hart and Moore (2008) when determining firm boundaries “to deal with strategic decisions that are taken in the absence of ex post bargaining (p. 484)”. We will therefore restate their initial assumptions and maintain their notation. These authors assume that the organizational forms composing the market, i.e. private firms and cooperatives, are given ad hoc and do not consider the choice between them as a result of the effect that payoff differentials have on the coordination game played by the units interacting within the market. We incorporate this feature in the current paper leading to a two-stage game that expands the formal setting introduced by Hart and Holmstrom (2010).

Few studies have analyzed the relationship between ownership structure and product quality or reputation in general. Hoffmann (2005) argues that despite an extensive literature on endogenous quality choice, the effects of different ownership structures have been largely overlooked in the literature. Since we have motivated the paper arguing that cooperatives face free rider problems in assuring high quality production, we limit our review of the existing literature to the case of cooperatives vs. private firms. Hoffmann (2005) develops a game theoretical model to analyze cooperatives vs. investor owned firms (IOF) in a duopoly with simultaneous quality choice and price competition. With fixed cost of quality, IOFs charge higher prices and generate larger consumer surpluses than cooperatives by marketing higher qualities. With variable cost of quality, cooperatives have a structural cost advantage which is used to market larger quantities of higher quality product generating larger profits, larger consumer surplus and larger social welfare. Thus, firms can have a cost advantage due to ownership structure in addition to a quality advantage.

\(^{1}\) Empirical evidence supporting the role of contracts as reference points and analyzing the resulting strategic consequences is presented by Fehr et al. (2011). Fehr et al. (2014) provide additional empirical evidence verifying the robustness of this approach to informal trading agreements and ex post renegotiation or revision of the original contract. Moreover, Bocquého et al. (2014) verify the validity of cumulative prospect theory, where reference dependence and subjective probability weighting determine the relative valuations and behaviour of decision makers, when eliciting the risk preferences of a sample of French farmers.
Product quality and reputation crucially affect product prices and social surplus. Cooperatives may have a lower reputation for wine quality with consumers. Assuming similar winemaking and management abilities between different ownership forms, a cooperative’s reputation for quality depends crucially on its individual growers supplying high quality grapes which in turn determine wine quality further downstream. Individual growers may have an incentive to free ride on quality as suggested by Pennerstorfer and Weiss (2013). In contrast, private wineries may face less uncertainty about grape qualities and in turn may gain a higher reputation for wine quality with final consumers further upstream.

The paper proceeds as follows. The next section presents the basic model and results following from Hart and Holmstrom (2010) that constitute the basis on which we build our model. The main results obtained are developed both intuitively and formally in Section 3. In Section 4, we present the empirical analysis. The final section summarizes the main findings and concludes by suggesting potential extensions.

2. Model

The model described in this section summarizes Hart and Holmstrom (2010) and sets the basis for the development of our formal model, where units are able to choose the type of organizational structure they want to form before playing the coordination game. The organizational form will be chosen so as to maximize social surplus net of shading costs, which may be incurred after a given organizational form has been agreed upon. In this regard, as already stated, units may either operate independently or delegate in an independent boss who maximizes her joint private profit.

The basic strategic environment is composed by two units, A and B, that have a lateral relationship, i.e. they interact within the same output or input market, such that each unit is operated by a manager who triggers external effects on the other unit. Units are presented with a binary decision; they must choose either ‘Yes’ or ‘No’. Coordination occurs if and only if both units choose ‘Yes’. Otherwise, units face noncoordination. In this sense, coordination may be interpreted as the decision of both units to remain as active producers within a joint project while any of them leaving the project results in noncoordination. Two main organizational forms are considered: nonintegration, where units are separate firms whose managers are also the bosses, and integration, where units are part of a single firm with an outside manager acting as the boss and the managers of each unit as
subordinates. We will identify nonintegrated organizational forms with private independent firms, while the integrated scenario will be assumed to correspond to a cooperative structure.

Two types of benefits are assumed to be generated by each unit: monetary transferable profits, \( v_i, i = A, B \), and private nontransferable benefits, \( w_i, i = A, B \), in the form of job satisfaction for the manager working in the corresponding unit. The boss of a unit can divert all profits from the unit to herself, leading to a nonintegrated payoff of \( v_i + w_i \) if she is also the manager of unit \( i = A, B \). Private benefits always reside with the managers. Thus, if both units are integrated, the professional outsider acting as boss receives \( v_A + v_B \). Note that, under nonintegration both bosses receive the private benefits generated by each unit, which are ignored under integration in favor of total profits. Social surplus is given in both cases by \( v_A + v_B + w_A + w_B \).

Independently of the organizational form considered, coordination constitutes an agreement by both units to proceed with a given project and implies a change in the benefits received by managers of units and their corresponding bosses. In this regard, following Hart and Holmstrom (2010) and without loss of generality, profits and private benefits will be normalized to zero in both units under noncoordination. Table 2 presents the coordination game between bosses and unit managers. Accordingly, the entries of the table define the change in monetary transferable profits and private nontransferable benefits that results from the coordination decision taken by the bosses and managers of each unit.

<table>
<thead>
<tr>
<th>Unit A</th>
<th>Unit B</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>((\Delta v_A, \Delta w_A); (\Delta v_B, \Delta w_B))</td>
<td>((0, 0); (0, 0))</td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>((0, 0); (0, 0))</td>
<td>((0, 0); (0, 0))</td>
<td></td>
</tr>
</tbody>
</table>

Table 2. Coordination-based payoffs received by bosses and managers

The following notation has been introduced to simplify the presentation

\[
\Delta z_i = \Delta v_i + \Delta w_i, \quad z = \Delta z_A + \Delta z_B
\]

where \( \Delta z_i, i = A, B \), represents the change in total surplus in unit \( i \) derived from coordination, and \( z = \Delta z_A + \Delta z_B \) accounts for the change in aggregate social surplus absent shading costs. Following Hart and Holmstrom (2010), coordination is assumed to lead to a reduction in private benefits due to the independence lost by the managers and its effect on job satisfaction, i.e.

\[
\Delta w_A \leq 0, \quad \Delta w_B \leq 0.
\]
Shading will be used to force bosses to internalize the externalities generated on other parties. This may occur under integration and nonintegration, since the relationship between both units is assumed to persist in both settings after the strategic coordination decision is made. It will also be assumed that a party receiving $k_i$ less than his maximum payoff will be aggrieved by $k_i$ and shade to the point where the payoff received by the other party falls by $\theta k_i$. Hart and Holmstrom assume that $\theta \in (0,1)$ is an exogenous value identical for all parties. We will parameterize this variable as a function of the spread existing between coordination profits and private benefits within a given unit.

The decision stages leading to the coordination game played by both organizational structures are summarized in Figure 1 and defined as follows

1. **Nature.** The bosses and managers of both organizational structures observe the values of the benefit variables, $v_i$ and $w_i$, the surplus changes derived from coordination, $\Delta v_i$ and $\Delta w_i$, together with $\Delta z_i$, with $i = A, B$, as well as the value of the shading parameter $\theta$.

2. **Coordination choice.** Given the above values, bosses and managers decide whether or not to coordinate after accounting for the resulting shading costs.

![Figure 1](image.png)

**Figure 1.** Hart and Holmstrom (2010) coordination and *ad hoc* organizational form choice environment.
The exogenously determined environment introduced by Hart and Holmstrom (2010) assumes that the resulting coordination and organizational form choices are determined de facto by nature. That is, the intensity of shading, a parameter that determines the equilibrium conditions illustrated in Figure 1, does not result from the interactions taking place within the units composing an organization but is exogenously given ex ante. As described in the introduction, the literature on social comparison provides the required incentives at the psychological, managerial and empirical levels to justify the fact that the value of the shading parameter must be defined endogenously as a result of the payoff differences between the agents composing the different units within the potential resulting organizational structures.

After some basic algebra, the model defined by Hart and Holmstrom (2010) gives place to the following coordination conditions:

- The non-integration coordination condition (NIC) defined for any $\Delta z_i$, $i = A, B$, is given by

$$\Delta z_i + \theta \Delta z_j \geq 0,$$  \hspace{1cm} (1)

where $i \neq j$. If $\Delta z_i \geq 0$, $i = A, B$, then (1) is trivially satisfied. However, if $\Delta z_i < 0$, and $\Delta z_j > 0$, then this condition states that coordination will take place under non-integration only if the costs of shading imposed by manager $j$ on manager $i$ are larger than the losses derived by the latter from coordination.

Social surplus in the (NIC) setting [with $\Delta z_i < 0$, and $\Delta z_j > 0$] is therefore given by

$$S_{NIC} = \Delta z_A + \Delta z_B + \theta \Delta z_i \text{ under coordination}$$

$$- \theta \Delta z_j \text{ under noncoordination.}$$

Note that with coordination unit $i$ will shade by $\theta \Delta z_i$, because it receives a payoff of $\Delta z_i < 0$.

- The integration coordination condition (INT) defined for any $\Delta v_i$ value, $i = A, B$, is given by

$$\Delta v_i + \Delta v_j + \theta (\Delta w_i + \Delta w_j) \geq 0.$$ \hspace{1cm} (2)

Trivially, if $\Delta v_i \leq 0$, $i = A, B$, then (2) is violated. Thus, for this condition to hold we need at least one of the $\Delta v_i$ changes in private profits to be positive.

Social surplus in the (INT) setting [with $\Delta z_i < 0$, $\Delta z_j > 0$, and $\Delta v_i + \Delta v_j > 0$] is given by

$$S_{INT} = \Delta z_A + \Delta z_B + \theta (\Delta w_A + \Delta w_B) \text{ under coordination}$$

$$- \theta (\Delta v_A + \Delta v_B) \text{ under noncoordination.}$$
If coordination takes place, then managers will shade by $\theta(\Delta w_A + \Delta w_B)$, as both $\Delta w_A$ and $\Delta w_B$ are negative. If, on the other hand, condition (2) does not hold and units do not coordinate, then the boss will shade by $\theta(\Delta v_A + \Delta v_B)$.

In order to provide additional intuition for the analysis performed through the rest of the paper, we rewrite the respective (NIC) and (INT) coordination conditions as follows

\[
\begin{align*}
\Delta v_A + \Delta w_A + \theta (\Delta v_B + \Delta w_B) & \geq 0 \quad (1') \\
\Delta v_A + \theta \Delta w_A + \Delta v_B + \theta \Delta w_B & \geq 0. \quad (2')
\end{align*}
\]

Note that the lower degree of quality control exerted over the production chain within the cooperative [integrated] environment implies that the contributions of the individual growers to the winemaking process cannot be explicitly acknowledged. As a result, when shading, they can only do so through their respective $\Delta w_A$ and $\Delta w_B$ values, as illustrated in equation (2'). On the other hand, private [nonintegrated] wineries are able to recognize the contributions of the individual growers, which allows the latter ones to shade through their entire $\Delta z_B$ values, as described by equation (1').

3. Choice of organizational form when shading is a function of misaligned interests

We extend now the model of Hart and Holmstrom (2010) in order to allow both units to choose the organizational form under which to decide whether or not to coordinate. We start by illustrating how, given our definition of shading intensity, managers will be more willing to delegate if their $\Delta w$ values are close to the respective $\Delta v$ of the boss.

Consider the coordination payoffs received by the managers and the boss within each unit. We parameterize the intensity of the shading parameter $\theta$ as a function of the difference in coordination incentives existing between the boss and the unit managers. The definition of the [finite] $\theta_i (v, w)$ variable, $i = A, B$, is therefore given by

\[
\theta_i (\Delta v_i, \Delta w_i) = |\Delta v_i| + |\Delta w_i|.
\]

Note that we have to account for the possibility that $\Delta v_i < 0$, while knowing that $\Delta w_i < 0$ under coordination. We must therefore consider the absolute value of $\Delta w_i$ within the absolute value expression dealing with the distance separating both payoffs. As a result, a substantial difference between both payoffs leads to an increase in the value of the shading parameter. That is, the strength or effort dedicated by a party to shade depends on the existing differences in objectives (and
payoffs) with respect to the other one. This assumption follows directly from the guilt-envy (Fehr-Schmidt) inequality aversion literature based on comparisons of absolute differences in payoffs between the parties. Camerer (2003) provides a review of the literature on this topic. The importance that the shading parameter has in determining the coordination incentives of bosses and managers within both units can be easily illustrated numerically.

**Proposition 1.** If \( \theta = 0 \), then \( \text{INT} > \text{NIC} \) for any \( \Delta z_i < 0 \), and \( \Delta z_j > 0 \).

**Proof.** If \( \theta = 0 \), the functions (1') and (2') become respectively \( \Delta v_A + \Delta w_A \geq 0 \) and \( \Delta v_A + \Delta v_B \geq 0 \). The result follows from the fact that \( \Delta v_B > 0 \) while \( \Delta w_A < 0 \). ■

The dominance of the integration coordination condition over the non-integration one prevails for all \( \theta < 1 \), \( \Delta v_i \), and \( \Delta w_i \), \( i = A, B \), with \( \text{INT} = \text{NIC} \) trivially when \( \theta = 1 \). The behavior of the integration and non-integration coordination conditions follows from the relative strength that shading by a given party has under non-integration. In this case, both parties are able to recognize their respective contributions, which allows them shade through their entire \( \Delta z_i \) values. It therefore follows that

**Proposition 2.** Coordination is more likely to take place under integration (nonintegration) when the \( \theta \) variable is relatively low (high).

**Proof.** Changes in the value of the shading parameter have the following effect on the NIC and INT conditions described in equations (1') and (2'), respectively,

\[
\left( \frac{\partial (1')}{\partial \theta} \right) = \Delta v_B + \Delta w_B \\
\left( \frac{\partial (2')}{\partial \theta} \right) = \Delta w_A + \Delta w_B.
\]

We have assumed that \( \Delta z_B > 0 \), which implies that \( \Delta v_B > 0 > \Delta w_A \). As a result

\[
\left( \frac{\partial (2')}{\partial \theta} \right) < \left( \frac{\partial (1')}{\partial \theta} \right).
\]

That is, decrements in the value of \( \theta \) will increase the integration coordination incentives over the non-integration ones. Given the fact that \( \text{INT} = \text{NIC} \) when \( \theta = 1 \), we will get

\[
\text{INT} > \text{NIC} \quad \text{when } \theta < 1 \quad \text{and} \quad \text{INT} < \text{NIC} \quad \text{when } \theta > 1. \quad \blacksquare
\]

Thus, similar (dissimilar) interests between both parties in the form of coordination payoffs would lead to a lower (higher) shading intensity, which encourages coordination within an integrated (nonintegrated) organizational environment.² It immediately follows that

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² It should be noted that \( \theta \) \( (\Delta v_i, \Delta w_i) \) could be normalized within the [0, 1] interval after defining (exogenously) some bounds for \( \Delta v \) and \( \Delta w \). This constraint would keep the analysis within the parameter value limits considered by Hart and Holmstrom, where (1) \( \rightarrow \) (2). That is, the more restrictive character of the NIC condition for \( \theta < 1 \) illustrated in
Lemma 1. If the intensity of shading depends positively on the existing payoff imbalances between bosses and managers, then

- Integration (Nonintegration) with coordination is more plausible when the profits of bosses and benefits of managers are similar (dissimilar).

Corollary 1. Given $\Delta z_i < 0$, $\Delta z_j > 0$, and $\Delta v_i < 0$, social surplus tends to be higher under integration whenever coordination takes place, partly due to lower $\theta$ values generated by the respective units.

The direct dependence of social surplus on the value of $\theta$ when comparing the NIC and INT settings implies that a lower shading parameter will tend to increase the social surplus generated within the INT setting relative to the NIC one. This result follows intuitively from Corollary 1, though a detailed formal analysis is presented below. At the same time, we will be illustrating how

Proposition 3. Both organizational forms, an integrated cooperative and a nonintegrated private firm, may coexist in a coordinated equilibrium and the former may even obtain a higher social surplus than the latter one.

4. Choice of organizational form in duopoly

We turn now to a more formal analysis where the current model will be used to explain how both these organizational forms may coexist optimally within unequal coordinated equilibria. Cooperatives are more willing to coordinate when the $\theta (\Delta v, \Delta w)$ values are small and similar for all units involved. At the same time, if heterogeneity is allowed for in the values of $\theta (\Delta v, \Delta w)$, then any unit with a sufficiently divergent payoff structure [leading to a high $\theta (\Delta v, \Delta w)$ value] has an incentive to avoid the integrated setting and imposes a nonintegrated though coordinated organizational form. Thus, highly unequal $\theta (\Delta v, \Delta w)$ values between units favor the emergence of

Proposition 2 implies that whenever this condition is satisfied so must be the less restrictive INT one. However, if $\theta$ is allowed to be defined above one, as is the case here, then we have that $(2) \rightarrow (1)$ for $\theta > 1$. In this regard, when comparing absolute differences in payoffs between both parties, we could also define ex-ante bounds for $\Delta v$ and $\Delta w$ determining a pair of $\theta_i (\Delta v_i, \Delta w_i)$, $i = A, B$, values that delimit the dominance of the integration coordination condition over the non-integration one. The analysis performed in the following section provides additional intuition on this option.
nonintegrated but coordinated structures. In order to illustrate these points, we must allow for heterogeneous $\theta (\Delta v, \Delta w)$ values to be defined between both units.

Consider two different $\theta_i (\Delta v_i, \Delta w_i)$ values, $\theta_A$ and $\theta_B$, one for each unit, though the analysis can easily account for a larger number of units. We concentrate on the nontrivial $\Delta z_i < 0$, and $\Delta z_j > 0$ case, and assume that $i=A$ and $j=B$. Thus, in order for a nonintegrated equilibrium with coordination to be more plausible than an integrated equilibrium with coordination we need $(1') > (2')$, which, after some basic algebra, implies that

$$(1 - \theta_A) \Delta w_A > (1 - \theta_B) \Delta v_B.$$  \hspace{1cm} (4)

Note that $\Delta w_A < 0$ and $\Delta v_B > 0$. As a result, it is sufficient (though not necessary) for this inequality to hold that either $\theta_A$ or $\theta_B$ are higher than one with the other being at least as high. This implies that large payoff differentials between both parties within a unit may shift coordination to a nonintegrated environment. However, it is also possible for this inequality to hold when $\theta_B > 1$ and $\theta_A < 1$. In this case, the unit shifting faces larger payoff inequalities between its parties. Moreover, $\Delta v_B$ should be large enough to achieve coordination under nonintegration, an equilibrium which would not necessarily be plausible under integration.

Clearly, for the sake of completeness, an integrated equilibrium with coordination would be more plausible than a nonintegrated equilibrium with coordination if $(2') > (1')$, which implies that

$$(1 - \theta_B) \Delta v_B > (1 - \theta_A) \Delta w_A.$$  \hspace{1cm} (4')

In this case, it is sufficient (though not necessary) for this inequality to hold that either $\theta_B < 1$ and $\theta_A \leq 1$ or $\theta_B \leq 1$ and $\theta_A < 1$.

Social surplus could be higher under either one of these organizational structures. Note, however, that highly aligned and similar payoffs work in favor of an integrated organization [cooperative] due to the smaller value of $\theta$ generated by its units. We will show how, in the $\Delta z_i < 0$, and $\Delta z_j > 0$ case, there exist reasonable payoff and shading values that allow for an integrated organizational form to lead to a higher social surplus under coordination than the nonintegrated one. For this to be the case, we require that $S_{INT} > S_{NIC}$ under coordination, i.e.

---

3 It clearly follows that a larger number of heterogeneous units would favor the nonintegrated [coordinated] setting over integration.
\[ \Delta z_A + \Delta z_B + \theta_A \Delta w_A + \theta_B \Delta w_B > \Delta z_A + \Delta z_B + \theta_A \Delta z_A \]

which simplifies to

\[ \theta_B \Delta w_B > \theta_A \Delta v_A. \]  \hspace{1cm} (5)

We know from equation (4) that \( \theta_B > \theta_A. \) \hspace{1cm} (4)

Thus, in order for (5) to hold we need

\[ 0 > \Delta w_B >> \Delta v_A. \]

The main implications derived from equations (4) and (5) for the coexistence of both organizational forms within socially unequal coordinated equilibria are summarized as follows

**Proposition 4.** In order for coordination under nonintegration to be more plausible but lead to a lower social surplus than coordination under integration it suffices to have

\[ \Delta v_B >> 0 \approx \Delta w_B >> \Delta v_A \approx \Delta w_A \]  \hspace{1cm} (6)

These requirements state that the unit avoiding integration must exhibit considerably unequal payoffs between the boss and the manager. In this case, the unit avoids integration but keeps on coordinating under nonintegration. At the same time, the other unit must exhibit similar negative payoffs that prevent its shading from affecting coordination under integration. \hspace{1cm} (5)

**Proposition 5.** In order for coordination under integration to be more plausible and lead to a higher social surplus than coordination under nonintegration it suffices to have

\[ \Delta v_B > 0 \approx \Delta w_B > \Delta v_A \approx \Delta w_A, \]  \hspace{1cm} (7)

Note that equation (7) is implied by (6).

Figure 2 illustrates the process determining the choice of organizational form by both units based on the corresponding value of the shading parameter. It also describes the potential coexistence of both organizational forms, i.e. cooperatives and private firms, within a given economic system while

---

4 Note that it is also possible for both \( \theta \) values to be higher than one with \( \theta_B \leq \theta_A \), which would weaken the strength of the requirements derived from equation (5).

5 Note that \( \Delta z_A < 0 \) is an essential requirement for social surplus to be higher under integration. If this were not the case and \( \Delta v_A > 0 \), then social surplus would always be lower under integration since \( \Delta w_B < 0 < \Delta v_A \), which violates (5). Unit \( A \) managers shade in both cases due to the benefits lost under coordination, but when \( \Delta v_A > 0 \) the boss of the unit obtains positive profits that relatively increase the nonintegrated social surplus despite the intensity of his shading.
either coordinating or not. Note that each unit has complete information about the other one, so both units know the values of $v_i$ and $w_i$, $i = A, B$, and each unit can calculate the resulting changes in the payoffs derived from coordination, that is, $\Delta v_i$ and $\Delta w_i$, together with $\Delta z_i$. An immediate extension of the current model to which we refer to in the conclusion considers a stochastic environment where the payoffs and resulting shading values of each unit are unknown.

**Figure 2.** Extension of Hart and Holmstrom (2010) with the coordination and organizational form choice environment being based on social comparison.

Thus, as Figure 2 illustrates, given perfect information on the set of payoffs, both units will calculate the resulting coordination incentives beforehand and, as a result, choose the best organizational form consisting of either an integrated or non-integrated one. If information was not perfect, particularly so when determining the calculation of the $\theta_i$ variables, then a standard two-stage game will be played by both units, with expectations determining the potential equilibria of the second coordination stage being carried over to the initial organizational form choice and together determining the equilibrium of the game.
The decision stages leading to the organizational coordination game played by both units are therefore defined as follows:

1. **Nature.** Both unit managers observe the values of the benefit variables $v_i$ and $w_i$ and resulting surplus changes derived from coordination, $\Delta v_i$ and $\Delta w_i$, together with $\Delta z_i$ with $i = A, B$.

2. **Shading.** Given the values of $\Delta v_i$ and $\Delta w_i$, unit managers calculate the value of the resulting shading parameters $\theta_i$ as well as the coordination payoffs under both governance structures.

3. **Coordination and organizational form choice.** Unit managers choose both whether or not to coordinate and the corresponding governance structure leading to the highest payoff after accounting for the resulting shading costs.

In this regard, the current paper provides a link to our empirical counterpart in the current volume, where both organizational forms coexist while resulting in different equilibrium payoffs in terms of quality signal rewards.

Finally, we consider the scenario where the parameter values allowing for coordination under nonintegration (integration) do not allow for a coordinated integrated (nonintegrated) structure to coexist. This constraint requires considering two different types of organizational structures defined by different parameter values. The parameter values defining the integrated structure will be identified through the superscript $I$ while we will use a $N$ for those of the nonintegrated one. In order for the INT structure to provide a higher social surplus than the NIC one we require

$$\Delta^I z_A + \Delta^I z_B + \theta^I_A \Delta^I w_A + \theta^I_B \Delta^I w_B > \Delta^N z_A + \Delta^N z_B + \theta^N_A \Delta^N z_A$$

The following parameter values follow from the existence and equilibrium conditions defined through the paper and can be easily shown to guarantee the coexistence of both types of structures, with the social surplus obtained from integration under coordination being higher than the one derived from nonintegration under coordination

$$\theta^N_A, \theta^N_B > 1: \text{follow from equation (4)}$$

$$\theta^I_A, \theta^I_B < 1: \text{follow from equation (4')}$$

$$|\Delta^N z_A| > |\Delta^N z_B|: \text{given equation (1) and since } \theta^N_B > 1$$
\[ \Delta^I z_B < \Delta^N z_B : \text{follows from equation (6)} \]
\[ \Delta^I z_A > \Delta^N z_A : \text{follows from equation (7)} \]
\[ \Delta^I w_A, \Delta^I w_B > \Delta^N z_A : \text{follow from equations (6) and (7)} \]

4. **Empirical Application**

Product quality and reputation crucially affect product prices and in turn social welfare. Economists often use hedonic models based on Rosen (1974) to empirically study price-quality and reputation effects. Rosen’s seminal paper posits that goods are valued for their utility-generating attributes and consumers value them when making purchase decisions. Competitive markets define implicit prices for the utility-generating attributes and the product price is the sum of implicit prices. Many studies have applied hedonic models defining implicit prices for wine quality and reputation attributes. We examine the price-quality relationship in order to determine whether wines from private wineries receive a reputation and/or quality premium relative to cooperatives. In a previous study, Schamel (2009) examines cooperatives in Germany and estimates that their wines suffer a reputation discount of about 10% relative to private wineries.

According to our expectation formulated in the introduction, consumers face more uncertainty regarding product quality and reputation for cooperatively produced wine. Thus, we formulate the following hypothesis:

A. **Relative to cooperatives, wines produced by private (non-cooperative) wineries receive**

   1. a reputation premium and
   2. a higher wine quality premium.

In addition, we are interested if there is any strategic orientation towards specific quality denomination rules (IGT/DOC). Our expected result formulated above was that cooperatives are deeply rooted in the local economy and thus specialize in local DOC denominated wines for which they receive a price premium. On the other hand, private wineries may specialize in IGT denominated wines, i.e. produce and market distinct wines outside the stricter DOC rules. Thus, we formulate the following hypothesis:

B.1 **Cooperatives receive a relative price premium for their DOC denominated wines.**
B.2 **Private wineries receive a relative price premium for their IGT denominated wines.**
4.1. Data and Research Design

We analyze a data set of wines evaluated in the annual Le Guide de l’Espresso (I vini d’Italia) for Alto Adige and Trentino in Northern Italy. We obtained three years of data published in the guide (2012-14 Editions). The data used in the estimation consists of 1265 wines from Alto Adige (377 from coops, 888 from private wineries) and 724 wines from Trentino (164 from coops, 560 from private wineries). We employ a hedonic model to test whether cooperatives or private wineries can obtain higher implicit prices for reputation and product quality (Model 1) and to test for any strategic orientation towards specific quality denomination rules (Model 2).

The data guide lists a range of applicable retail prices per bottle from which we use the lower bound for estimation purposes. The price information used in the estimation is submitted prior to the quality evaluation (i.e. the point rating by the expert tasters). Thus, it does not reflect any direct effects due to a favorable quality rating. The experts rate the wines according to a 20-point scale in half-point steps. The guide also provides a star-rating (between 0 and 3) for a winery’s distinctiveness which can be regarded as a proxy for its reputation for wine quality.

Wine age at the time of evaluation ranged from 1-13 years. The wine guide differentiates wine color, sweet or desert wines, DOC and IGT designated wines, biologically or bio-dynamically produced wine, wine variety and special recommendations such as value for money and best regional buys. In addition, the guide allows to categorize whether a wine was produced by a local cooperative or not and includes production quantities (number of bottles produced).

Cooperatively produced wines, red vs. white wines, sweet wines, IGT vs. DOC designated wines, bio-labeled wines and special recommendations are regular dummy variables. Wine variety is a categorical dummy differentiating seven varieties/wine types. Five varieties are in common for both regions (Gewürztraminer, Pinot Noir, Sauvignon Blanc, Riesling and Spumante). Lagrein and Schavina are specific for Alto Adige while Teroldego, Nosiola are specific for Trentino. As dependent variable, we use the logarithm of the lower price bound \( \log(\text{price}) \). We employ a log-linear function in our regression and estimate the following equation (Model 1):

\[
\log(\text{price}) = \alpha + \beta_1 \log(\text{points}) + \beta_2 \log(\text{Bottles}) + \beta_3 \text{Age} + \beta_4 \text{Stars} + \beta_5 \text{Red} + \beta_6 \text{Sweet} + \beta_7 \text{Bio} + \beta_8 \text{Variety} + \beta_9 \text{Coop} + \beta_{10} \text{IGT} + \beta_{11} \text{ValueRec} + \beta_{12} \text{BuyRec} + \varepsilon
\]

where \( \log(\text{price}) \) is the logarithm of the wine price, \( \log(\text{points}) \) is the logarithm of the Gault Millau points (individual wine quality) and \( \log(\text{Bottles}) \) is the logarithm of the production quantity, Coop is
dummy variable as an indicator for the collective reputation of cooperatives while $\varepsilon$ is the error term with a zero mean and uniform variance. The regression equation stated above includes a number of variables to control for willingness to pay (price) effects due to:

- production quantity (scarcity effect implied by the number of bottles produced) $\beta_2$
- wine age (storage premium due to age in years at the time of evaluation) $\beta_3$
- star ranking (winery reputation for wine quality effect) $\beta_4$
- red vs. white wines (red wine premium) $\beta_5$
- sweet or dessert wines (sweet wine premium) $\beta_6$
- bio-labeled wines (organic-premium) $\beta_7$
- wine variety (varietal premium) $\beta_8$
- cooperative reputation effect $\beta_9$
- IGT denomination effect $\beta_{10}$
- value recommendation (ValueRec) $\beta_{11}$
- best buy recommendation (BuyRec) $\beta_{12}$.

Given its log-linear functional form, estimating the equation above yields price premiums and discounts relative to the contribution of the base category (non-sweet white DOC wine that is not bio-labeled and not a specific variety in the region).

In a second model, we include interaction terms between DOC or IGT denominations and ownership structure, i.e. cooperative (Coop) vs. private (NonCoop) wineries. This is done to see if there is any strategic orientation towards specific quality denomination rules with respect to ownership structures. The second regression equation estimated looks as follows (Model 2):

$$
\log(\text{price}) = \alpha + \gamma_1 \log(\text{points}) + \gamma_2 \log(\text{Bottles}) + \gamma_3 \text{Age} + \gamma_4 \text{Stars} + \gamma_5 \text{Red} + \gamma_6 \text{Sweet} + \gamma_7 \text{Bio}
\quad + \gamma_8 \text{Variety} + \gamma_9 \text{IGT*Coop} + \gamma_{10} \text{IGT*NonCoop} + \gamma_{11} \text{DOC*NonCoop}
\quad + \gamma_{12} \text{ValueRec} + \gamma_{13} \text{BuyRec} + \varepsilon
$$

Notice that in Model 2, the base category is a DOC wine produced by a cooperative (a non-sweet white wine that is not bio-labeled and not a differentiated variety within the region). The three remaining interaction terms between denomination rules and ownership structure are:

- IGT * Coop or IGT classified wine produced by cooperatives ($\gamma_9$)
- IGT * NonCoop or IGT classified wine produced by privately owned wineries ($\gamma_{10}$)
- DOC * NonCoop or DOC classified wine produced by privately owned wineries ($\gamma_{11}$)
We test both models for normality (Jarque-Bera-Test) and heteroskedasticity (White-Test) and do not find any significant problems in the data. We also employed RESET tests which rejected other functional forms.

4.2. Results

To test hypothesis A.1, we expect a significant but negative coefficient for the cooperative dummy variable (indicating a negative collective reputation for cooperatives). Thus, we would look for a negative coefficient $\beta_0$ for wine produced by cooperatives. To test the hypothesis A.2, we expect a lower quality premium for cooperatively produced wines. Thus, we split the sample into cooperative and private wineries and would look for a significantly positive coefficient for the wine quality indicator log(points) that is higher in the cooperative subsample.

Our a priori expectation was that cooperatives in Alto Adige achieve a lower level of uncertainty about grape quality through vertical quality coordination and thus are in a better position to compete with private wineries in terms of wine quality and reputation. Thus, comparing the results for Alto Adige and Trentino, we would expect that cooperatives in Alto Adige outperform the cooperative in Trentino in terms of reputation and quality premiums.

Our estimation results for Model 1 are listed in Table 3 (for Alto Adige/AA) and in Table 4 (for Trentino/TN). For Alto Adige, our estimation reveals a significantly positive coefficient for cooperative reputation. The estimate (0.108) indicates that Alto Adige cooperatives receive a collective reputation premium (about 11%) relative to their local privately owned competitors. This is even more remarkable given the fact that the model corrects for a wineries’ quality reputation via the Stars variable. On the contrary, our estimation for Trentino (Table 4) reveals a significant but negative reputation coefficient for the Trentino cooperatives (with a collective reputation discount of about 6%). Thus, we cannot fully confirm hypothesis A.1. Wines coming from private (non-cooperative) producers do not receive a reputation premium relative to cooperative wines at least for the Alto Adige region. This mixed result confirms our observation stated above: cooperatives in Alto Adige (and in contrast to Trentino) are able to lower the uncertainty about grape quality relative to private wineries through vineyard yield management systems such that the hypothesized price difference due to reputation disappears.
### Table 3. Model 1 Results for Alto Adige/AA: Dependent Variable: log(price)

<table>
<thead>
<tr>
<th>Variable</th>
<th>AA Wines</th>
<th></th>
<th>AA Coops</th>
<th></th>
<th>AA Non-Coops</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>-4.458‡</td>
<td>-9.915</td>
<td>0</td>
<td>-4.530‡</td>
<td>-5.639</td>
<td>0</td>
</tr>
<tr>
<td>Log(Points)</td>
<td>2.682‡</td>
<td>17.02</td>
<td>0</td>
<td>2.748‡</td>
<td>9.874</td>
<td>0</td>
</tr>
<tr>
<td>Log(Bottles)</td>
<td>-0.071‡</td>
<td>-8.616</td>
<td>0</td>
<td>-0.058‡</td>
<td>-4.007</td>
<td>0</td>
</tr>
<tr>
<td>Age</td>
<td>0.108‡</td>
<td>12.45</td>
<td>0</td>
<td>0.124‡</td>
<td>11.47</td>
<td>0</td>
</tr>
<tr>
<td>Stars</td>
<td>0.069‡</td>
<td>7.047</td>
<td>0</td>
<td>0.010</td>
<td>0.605</td>
<td>0.546</td>
</tr>
<tr>
<td>Red Wine</td>
<td>0.172‡</td>
<td>5.787</td>
<td>0</td>
<td>0.258‡</td>
<td>5.249</td>
<td>0</td>
</tr>
<tr>
<td>Sweet Wine</td>
<td>0.253‡</td>
<td>6.358</td>
<td>0</td>
<td>0.255‡</td>
<td>6.091</td>
<td>0</td>
</tr>
<tr>
<td>Bio-Wine</td>
<td>0.062*</td>
<td>1.648</td>
<td>0.099</td>
<td>-0.168</td>
<td>-1.387</td>
<td>0.166</td>
</tr>
<tr>
<td>Cooperatives</td>
<td>0.108‡</td>
<td>6.517</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IGT Wine</td>
<td>0.105‡</td>
<td>3.121</td>
<td>0.002</td>
<td>-0.068</td>
<td>-0.574</td>
<td>0.567</td>
</tr>
<tr>
<td>Lagrein</td>
<td>-0.048</td>
<td>-1.432</td>
<td>0.152</td>
<td>-0.096</td>
<td>-1.381</td>
<td>0.168</td>
</tr>
<tr>
<td>Schiava</td>
<td>-0.283‡</td>
<td>-7.291</td>
<td>0</td>
<td>-0.399‡</td>
<td>-7.137</td>
<td>0</td>
</tr>
<tr>
<td>Gewürztraminer</td>
<td>0.236‡</td>
<td>9.959</td>
<td>0</td>
<td>0.246‡</td>
<td>7.036</td>
<td>0</td>
</tr>
<tr>
<td>Pinot Nero</td>
<td>0.051</td>
<td>1.247</td>
<td>0.213</td>
<td>-0.178†</td>
<td>-2.506</td>
<td>0.013</td>
</tr>
<tr>
<td>Sauvignon Blanc</td>
<td>0.096‡</td>
<td>4.522</td>
<td>0</td>
<td>0.132‡</td>
<td>3.794</td>
<td>0</td>
</tr>
<tr>
<td>Riesling</td>
<td>0.109‡</td>
<td>4.266</td>
<td>0</td>
<td>0.032</td>
<td>1.250</td>
<td>0.212</td>
</tr>
<tr>
<td>Spumante</td>
<td>0.139*</td>
<td>1.941</td>
<td>0.053</td>
<td>1.474</td>
<td>1.798</td>
<td>0.073</td>
</tr>
<tr>
<td>Value for Money</td>
<td>-0.362‡</td>
<td>-19.73</td>
<td>0</td>
<td>-0.361‡</td>
<td>-12.28</td>
<td>0</td>
</tr>
<tr>
<td>Best Buy Region</td>
<td>-0.219‡</td>
<td>-7.604</td>
<td>0</td>
<td>-0.183‡</td>
<td>-3.519</td>
<td>0.001</td>
</tr>
<tr>
<td>F-statistic</td>
<td>134.97‡</td>
<td>0</td>
<td></td>
<td>67.05‡</td>
<td>0</td>
<td>86.54‡</td>
</tr>
<tr>
<td>Wald F-statistic</td>
<td>165.30‡</td>
<td>0</td>
<td></td>
<td>134.64‡</td>
<td>0</td>
<td>97.97‡</td>
</tr>
<tr>
<td>Adjusted R²</td>
<td>0.656</td>
<td>1.424</td>
<td>6.382</td>
<td>0.738</td>
<td>0.245</td>
<td>0.621</td>
</tr>
<tr>
<td>Std. err. estimate</td>
<td>0.244</td>
<td>0.022</td>
<td>0.025</td>
<td>0.225</td>
<td></td>
<td>0.248</td>
</tr>
<tr>
<td>Sum sq. residuals</td>
<td>74.48</td>
<td>18.30</td>
<td>53.36</td>
<td>377</td>
<td></td>
<td>888</td>
</tr>
<tr>
<td>Observations</td>
<td>1265</td>
<td>377</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notes: Estimation Method: LS / White heteroskedasticity-consistent standard errors & covariance. The symbols ‡, †, and * denote significance at the 1%, 5%, and 10% level, respectively.

Comparing the quality premium, i.e. the coefficients for log(points) in the cooperative and private (non-cooperative) subsamples which can be interpreted as elasticities, we find that hypothesis A.2 is not confirmed for both Alto Adige and Trentino. This means that cooperatively produced wines are able to command a significant quality premium relative to private (non-cooperatively produced) wines (i.e. 2.748 vs. 2.515 comparing the elasticities for AA in Table 3 and 3.582 vs. 2.489 for TN in Table 4). Thus, we cannot confirm hypothesis A.2 for both Alto Adige and Trentino. Cooperatives in both regions are able to obtain a quality premium for their wines relative to private (non-cooperative) wineries. The regional difference between TN and AA with respect to hypothesis A.1 and A.2 could mean that while the cooperatives in Trentino may also have lowered the uncertainty about their grape quality supply relative to private wineries such that the wine quality premium for private wineries disappears, but this apparent success has not yet translated into a
corresponding reputation effect with consumers which of course is a more long run effect. Thus, the competitive position for Trentino cooperatives is weaker relative to private wineries in Trentino.

Table 4. Model 1 Results for Trentino/TN: Dependent Variable: log(price)

<table>
<thead>
<tr>
<th>Variable</th>
<th>TN Wines</th>
<th></th>
<th>TN Coops</th>
<th></th>
<th>TN Non-Coops</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>-5.200‡  -7.711</td>
<td>0</td>
<td>-7.049‡  -4.344</td>
<td>0</td>
<td>-4.203‡  -5.514</td>
<td>0</td>
</tr>
<tr>
<td>Log(Points)</td>
<td>2.874‡  11.638</td>
<td>0</td>
<td>3.582‡  6.091</td>
<td>0</td>
<td>2.489‡  8.954</td>
<td>0</td>
</tr>
<tr>
<td>Log(Bottles)</td>
<td>-0.050‡  -5.603</td>
<td>0</td>
<td>-0.052‡  -3.638</td>
<td>0</td>
<td>-0.053‡  -4.700</td>
<td>0</td>
</tr>
<tr>
<td>Age</td>
<td>0.090‡  9.411</td>
<td>0</td>
<td>0.099‡  5.300</td>
<td>0</td>
<td>0.100‡  7.997</td>
<td>0</td>
</tr>
<tr>
<td>Stars</td>
<td>0.144‡  7.610</td>
<td>0</td>
<td>0.109†  2.602</td>
<td>0.010</td>
<td>0.157‡  7.371</td>
<td>0</td>
</tr>
<tr>
<td>Red Wine</td>
<td>-0.002 0.079</td>
<td>0.937</td>
<td>-0.155‡  -3.359</td>
<td>0.001</td>
<td>0.031 1.142</td>
<td>0.254</td>
</tr>
<tr>
<td>Sweet Wine</td>
<td>0.217‡  3.909</td>
<td>0</td>
<td>-0.176  -2.025</td>
<td>0.045</td>
<td>0.320‡  5.765</td>
<td>0</td>
</tr>
<tr>
<td>Bio-Wine</td>
<td>-0.014 0.379</td>
<td>0.705</td>
<td>0.371‡  8.588</td>
<td>0</td>
<td>-0.038  -1.042 0.298</td>
<td></td>
</tr>
<tr>
<td>Cooperatives</td>
<td>-0.061‡  -2.790</td>
<td>0.005</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IGT Wine</td>
<td>0.076‡  3.566</td>
<td>0</td>
<td>0.013 0.264 0.792</td>
<td>0.098‡  4.077</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Teroldego</td>
<td>0.130‡  3.005</td>
<td>0.003</td>
<td>0.069 0.796 0.428</td>
<td>0.184‡  3.645</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Schiava</td>
<td>-0.086‡  -3.060</td>
<td>0.002</td>
<td>-0.104‡  -2.302</td>
<td>0.023</td>
<td>-0.071* -1.948 0.052</td>
<td></td>
</tr>
<tr>
<td>Gewürztraminer</td>
<td>0.113‡  3.116</td>
<td>0.002</td>
<td>0.001 0.020 0.984</td>
<td>0.162‡  4.707</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Pinot Nero</td>
<td>0.164‡  4.179</td>
<td>0</td>
<td>0.178‡  2.927 0.004</td>
<td>0.151‡  3.314</td>
<td>0.001</td>
<td></td>
</tr>
<tr>
<td>Sauvignon Blanc</td>
<td>-0.081  -1.548</td>
<td>0.122</td>
<td>-0.206  -1.685 0.094</td>
<td>-0.046  -0.808</td>
<td>0.420</td>
<td></td>
</tr>
<tr>
<td>Riesling</td>
<td>0.053 0.761 0.447</td>
<td>0.223†  2.458 0.015</td>
<td>0.025 0.394 0.693</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spumante</td>
<td>0.167‡  3.548</td>
<td>0</td>
<td>-0.079  -0.879 0.381</td>
<td>0.207‡  3.610</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Value for Money</td>
<td>-0.363  -16.536</td>
<td>0</td>
<td>-0.411‡  -10.815</td>
<td>0</td>
<td>-0.331‡  -12.960</td>
<td>0</td>
</tr>
<tr>
<td>Best Buy Region</td>
<td>-0.172‡  -5.300</td>
<td>0</td>
<td>-0.219‡  -3.310 0.001</td>
<td>-0.161‡  -4.468</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>F-statistic</td>
<td>109.41‡</td>
<td>0</td>
<td>26.29‡</td>
<td>0</td>
<td>90.89‡</td>
<td>0</td>
</tr>
<tr>
<td>Wald F-statistic</td>
<td>117.78‡</td>
<td>0</td>
<td>84.37‡</td>
<td>0</td>
<td>93.19‡</td>
<td>0</td>
</tr>
<tr>
<td>Adjusted R²</td>
<td>0.730 0.725 0.732</td>
<td>0.233 0.207 0.233</td>
<td>0.383 6.24 29.47</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Std. err. estimate</td>
<td>0.725 0.725 0.732</td>
<td>0.207 0.207 0.233</td>
<td>6.24 29.47</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sum sq. residuals</td>
<td>38.38 6.24 29.47</td>
<td>0.164 560</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Observations</td>
<td>724 164</td>
<td>560</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notes: Estimation Method: LS / White heteroskedasticity-consistent standard errors & covariance.
The symbols ‡, †,  and * denote significance at the 1%, 5%, and 10% level, respectively.

The remaining results on the control variables listed in Tables 3 and 4 are mostly in line with other studies. For example, the storage effect (wine age) is relatively consistent across the sub-samples and ranges between 9% and 12%. There is a red wine premium for Alto Adige but not for Trentino. Note that bio-labeled wine has a positive coefficient at least for Alto Adige which is in contrast to other studies (e.g. Delmas and Grant, 2010). This effect may be due to the particular producers engaged in biological wine production in Alto Adige. Moreover, we note that the premium on IGT wine is positive for both Alto Adige (10.5%) and Trentino (7.6%). This result suggests that wines produced outside the local DOC rules command a price premium. Hence, the question is raised why DOC regulations, established to guarantee local quality wine production are not necessarily working...
in favor of receiving higher market prices. However, we notice that the coefficients for IGT wines are positive and significant in the non-cooperative sub-samples only for both regions. This would indicate that private (non-cooperative) wineries may produce according to IGT classifications to sell off higher quality grapes and to market own-branded wines while avoiding DOC rules. We argue that this strategic orientation is confirmed by our results for model 2. Cooperatives get a collective reputation premium for focusing on DOC rules while their non-cooperative competitors use an IGT strategy emphasizing branding.

In order to confirm hypothesis B.1 with model 2, we expect a significant, but negative coefficient estimate for the IGT*Coop interaction term ($\gamma_5$). To confirm hypothesis B.2, we look for a significant, but positive coefficient estimate for the IGT*NonCoop interaction term ($\gamma_6$).

Table 5. Model 2 Results for Alto Adige and Trentino: Dependent Variable: log(price)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Alto Adige Wines</th>
<th>Trentino Wines</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>-4.170‡</td>
<td>-9.255</td>
</tr>
<tr>
<td>Log(Points)</td>
<td>2.656‡</td>
<td>16.94</td>
</tr>
<tr>
<td>Log(Bottles)</td>
<td>-0.071‡</td>
<td>-8.613</td>
</tr>
<tr>
<td>Age</td>
<td>0.109‡</td>
<td>12.44</td>
</tr>
<tr>
<td>Stars</td>
<td>0.068‡</td>
<td>7.016</td>
</tr>
<tr>
<td>Red Wine</td>
<td>0.167‡</td>
<td>5.567</td>
</tr>
<tr>
<td>Sweet Wine</td>
<td>0.263‡</td>
<td>6.549</td>
</tr>
<tr>
<td>Bio-Wine</td>
<td>0.064*</td>
<td>1.706</td>
</tr>
<tr>
<td>IGT*NonCoop</td>
<td>0.011</td>
<td>0.318</td>
</tr>
<tr>
<td>IGT*Coop</td>
<td>-0.108</td>
<td>-0.948</td>
</tr>
<tr>
<td>DOC*NonCoop</td>
<td>-0.113‡</td>
<td>-6.863</td>
</tr>
<tr>
<td>Lagrein</td>
<td>-0.043</td>
<td>-1.283</td>
</tr>
<tr>
<td>Schavina</td>
<td>-0.279‡</td>
<td>-7.175</td>
</tr>
<tr>
<td>Gewürztraminer</td>
<td>0.233‡</td>
<td>9.853</td>
</tr>
<tr>
<td>Pinot Nero</td>
<td>0.056</td>
<td>1.373</td>
</tr>
<tr>
<td>Sauvignon Blanc</td>
<td>0.095‡</td>
<td>4.468</td>
</tr>
<tr>
<td>Riesling</td>
<td>0.109‡</td>
<td>4.291</td>
</tr>
<tr>
<td>Spumante</td>
<td>0.136*</td>
<td>1.934</td>
</tr>
<tr>
<td>Value for Money</td>
<td>-0.360‡</td>
<td>-19.70</td>
</tr>
<tr>
<td>Best Buy Region</td>
<td>-0.213‡</td>
<td>-7.689</td>
</tr>
<tr>
<td>F-statistic</td>
<td>128.50‡</td>
<td></td>
</tr>
<tr>
<td>Wald F-statistic</td>
<td>157.30‡</td>
<td></td>
</tr>
<tr>
<td>Adjusted R$^2$</td>
<td>0.657</td>
<td></td>
</tr>
<tr>
<td>Std. err. estimate</td>
<td>0.244</td>
<td></td>
</tr>
<tr>
<td>Sum sq. residuals</td>
<td>74.20</td>
<td></td>
</tr>
<tr>
<td>Observations</td>
<td>1265</td>
<td></td>
</tr>
</tbody>
</table>

Notes: Estimation Method: LS / White heteroskedasticity-consistent standard errors & covariance. The symbols ‡ and * denote significance at the 1% and 10% level, respectively.
In Table 5, we list the results for model 2 including the interaction terms between IGT/DOC denominations and ownership structure (Coop/Non-Coop) for both Alto Adige and Trentino. Comparing IGT and DOC denominations, the estimated coefficients indicate that relative to a cooperative DOC wine, private (non-cooperative) wines receive a significant premium for their DOC wine in Trentino (the coefficient for DOC*NonCoop equals +4.5%) but not so in Alto Adige (-11.3%). Moreover, in Trentino, private (non-cooperative) wineries receive a significant premium for their IGT wine (the coefficient for IGT*NonCoop equals +13.3% relative to cooperative DOC wines) while the coefficient is not significant for Alto Adige. The interaction term for IGT*Coop is not significant for both regions.

This means that we can only confirm hypothesis B.1 for Alto Adige and not Trentino. On the other hand, hypothesis B.2 is confirmed only for the Trentino but not for Alto Adige. This mixed result may be interpreted as follows. Cooperatives in both regions clearly specialize in DOC denominated wine which is expressed through a price premium that they are able to receive for these wines in the market. On the other hand, private wineries are relatively weak competitors for cooperatives in Alto Adige (due to hypothesis A.1) and thus are not able to gain a price premium for their IGT denominated wine (hypothesis B.2). In Alto Adige, it seems that cooperatives compete successfully focusing on DOC wines while private wineries at least to some degree avoid DOC rules to market and brand distinctly different IGT wines but according to our sample do not receive a price premium for these wines. On the other hand, in Trentino, private wineries receive a price premium both for DOC and IGT wines relative to their cooperative competitors. Table 6 summarizes our main results.

Table 6. Summary of results

<table>
<thead>
<tr>
<th>Estimation</th>
<th>Hypothesis</th>
<th>Alto Adige/AA</th>
<th>Trentino/TN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model 1</td>
<td>A.1.</td>
<td>−</td>
<td>+</td>
</tr>
<tr>
<td></td>
<td>A.2.</td>
<td>−</td>
<td>−</td>
</tr>
<tr>
<td>Model 2</td>
<td>B.1.</td>
<td>+</td>
<td>−</td>
</tr>
<tr>
<td></td>
<td>B.2.</td>
<td>−</td>
<td>+</td>
</tr>
</tbody>
</table>

5. Summary and Conclusion

The paper has illustrated how both organizational forms, an integrated cooperative and a nonintegrated private firm, may coexist in a coordinated equilibrium and how the former may even obtain a higher social surplus than the latter one. These results are based on the intensity of shading depending positively on the existing payoff imbalances between bosses and managers. These
imbalances determine the incentives of bosses and managers regarding the coordination decision of both units together with their choice of organizational form, leading to the potential coexistence of both organizational forms in equilibrium. In this case, private firms are more plausible to coordinate when the parties receive considerably unequal payoffs, while a decrease in the imbalances between bosses and managers makes coordination more plausible within a cooperative.

The results obtained lead us to conclude that similar interests between both parties, the boss and the unit managers, strengthened either internally by a common quality objective or externally through a third institutional party, will reduce shading and encourage coordination within a cooperative (integrated) environment. On the other hand, private dissimilar interests between the parties results in a nonintegrated though coordinated equilibrium scenario.

We provide empirical evidence illustrating how cooperative and private wineries compete regarding product quality and reputation. A cooperative’s reputation for quality wine production depends crucially on the quality variation of its grape supply from individual growers and wine quality from the downstream winery may be more uncertain relative to a private winery with more control over the production chain and thus less uncertainty about wine quality. The data shows that cooperatives are able to compete with private wineries regarding product quality and reputation which holds for Alto Adige and to a lesser degree in Trentino. Cooperatives in Trentino seem to also have lowered the uncertainty about their grape quality supply relative to private wineries such that the wine quality premium for private wineries disappears, but this apparent success has not yet translated into a corresponding long-run reputation effect with consumers. The relative competitive strength of Alto Adige cooperatives in terms of DOC wine production implies that private wineries are unable to command a price premium for their branded IGT wines. This is in contrast to neighboring Trentino where cooperatives are not able to command a long-run reputation premium for their DOC wines because of the relative competitive strength of private wineries, both in terms of DOC and IGT wine production.

While this paper develops an interesting case of regional differences in terms of how successful cooperative enterprises may operate, it remains to be seen which case is more generally observed in other regions. While the Alto Adige case is very interesting from a cooperative organizational point of view, it may rather be the exception than the rule as suggested by the results from other regions reported in the literature (Frick, 2004; Schamel, 2009; Pennerstorfer and Weiss, 2013).
The current theoretical model is purely deterministic. We intend to extend this to a stochastic environment, where payoff imbalances and the resulting shading variable become stochastic events shaping the strategic interactions taking place between the parties. This extension would lead to a two-stage game played by both units, whose expectations would determine their coordination decision as well as their choice of organizational form. In this regard, this extension would bring the model closer to that of Hendrikse (1998) where both organizational forms coexist within a stochastic environment based on the strategic choice of potential projects by each organization. This extension would also allow us to consider additional stochastic scenarios not only within the current cooperative versus private firm environment but also when selecting different group structures within a strategic management setting (Larkin et al. 2012). That is, different group (and compensation) structures would become optimal as a result of the expected differences in the project payoffs obtained by the members of the group.

References


