On the Incentive Effects of Collective Reputation Structures

—Work in Progress—

Pierre Fleckinger†  Wanda Mimra◊  Angelo Zago*

†MINES ParisTech & Paris School of Economics

◊ETH Zurich

*University of Verona

AAWE, Bordeaux, June 2016
The Importance of Collective Reputation

- Collective reputations (CRs) are quite common, especially in agricultural markets [but not only: education, professions...]

In the EU, they are referred to as Geographical Indications, which are indeed the distinctive feature of the EU wine and food industry. They are collective labels, such as EU’s PDO (protected designation of origin) and PGI (protected geographical indication). In the EU they are so important that they may constitute a major impediment in the ongoing TTIP trade agreements with the US.
The Importance of Collective Reputation

- Collective reputations (CRs) are quite common, especially in agricultural markets [but not only: education, professions...]

- In the EU, they are referred to as Geographical Indications, which are indeed the distinctive feature of the EU wine and food industry.
The Importance of Collective Reputation

- Collective reputations (CRs) are quite common, especially in agricultural markets [but not only: education, professions...]
- In the EU, they are referred to as Geographical Indications, which are indeed the distinctive feature of the EU wine and food industry.
- They are collective labels, such as EU’s PDO (protected designation of origin) and PGI (protected geographical indication).
Collective reputations (CRs) are quite common, especially in agricultural markets [but not only: education, professions...]

In the EU, they are referred to as Geographical Indications, which are indeed the distinctive feature of the EU wine and food industry.

They are collective labels, such as EU’s PDO (protected designation of origin) and PGI (protected geographical indication).

GIs have a long tradition in the EU: they started in the early 20th century in the wine industry (formerly known as AOCs in France).
The Importance of Collective Reputation

- Collective reputations (CRs) are quite common, especially in agricultural markets [but not only: education, professions...]

- In the EU, they are referred to as Geographical Indications, which are indeed the distinctive feature of the EU wine and food industry.

- They are collective labels, such as EU’s PDO (protected designation of origin) and PGI (protected geographical indication).

- GIs have a long tradition in the EU: they started in the early 20th century in the wine industry (formerly known as AOCs in France).

- In the EU they are so important that they may constitute a major impediment in the ongoing TTIP trade agreements with the US.
In the news: France, Greece, Italy...

Tafta : pourquoi les Etats-Unis peuvent produire mozzarella, chablis ou champagne

LE MONDE | 19.02.2016 à 15h56 • Mis à jour le 02.05.2016 à 16h51 | Par Pierre Breteau (journaliste/pierre-breteau) et William Audureau (journaliste/william-audureau)

Greece to block TTIP unless geographical indications are protected

Corriere della Sera – Economia | 30 maggio 2016

Ttip, cosa rischia il Made in Italy e cosa pensano gli imprenditori

Prevede nuove regole per il commercio tra Nord America ed Europa, a luglio nuovo round di negoziati

di Andrea Ducci
Some like it **smaller**

Rioja's splitting
Dernier acte : la conciliation

Les IGP du Languedoc signent pour un projet commun de hiérarchisation

Jeudi 28 avril 2016 par Marion Sepeau Ivaldi

Le vignoble du Languedoc structure son offre de vin IGP. - crédit photo : DR

Le projet de Terre du Midi, et les débats enflammés qu’il aura suscité, fait naître un plan de structuration de l’offre IGP du Languedoc sur lequel il aurait été difficile de parier il y a encore peu de temps.
Some like it different
Montagny (Burgundy)'s reshuffling

Burgundy climats: the spirit of Montagny

So it might be surprising to learn that in 1943, seven years after Montagny was named one of the very first appellations in the Burgundy region, it was given the rarified status of being 100% Premier Cru. It meant that every single producer of the commune was able to bottle his wine as Premier Cru, providing that the alcohol levels reached a minimum of 11.5%abv, but without the usual link to exposition and terroir that governs the typical Premier and Grand Cru system in Burgundy.

The reason for this anomaly was linked to German Occupation during the Second World War, but what makes Montagny even more interesting is that between 1989 and 1991, when the winemakers were looking to extend the appellation, they voluntarily decided to reduce the number of Premiers Crus. Ceding to the spirit of the usual Burgundy quality system, they split their production into Premier Cru and Montagny Village wines, with the best sites set on the mid to high slopes. This means that today the 326 hectares of AOC Montagny have 201 hectares in Premier Cru set over 49 individual climats.

‘There were plenty of private and public spats over which vineyards kept their status,’ Dominique Lamby of the Burgundy Wine Bureau (BIVB) told me over a fascinating tasting of the Burgundy climats this week, ‘but the fact remains that the winemakers had seen over the proceeding decades that certain plots in Montagny made unquestionably better wines than others, and they couldn’t justify the whole commune being labeled as Premier Cru. So they did something about it’. It seems to me that this kind of story is why Burgundy, even with its spiraling prices, manages to keep the hearts and minds of the wine buying public. There are plenty of appellations that are currently lobbying for their best plots to be labeled as Premier Crus.
Some like to imitate it
Bordeaux goes to China

Ningxia announces wine classification system

By Sylvia Wu / 吴嘉溦
16 February 2016

China's Ningxia wine region has announced plans for its first winery classification system, in an effort to standardise wine production in the up-and-coming quality wine region in China.
Propose a new model of collective reputation:
- that contrasts with Tirole (1996)
- captures several insights in a unified model
- underlines the incentive costs and benefits of collective reputation

Which allows an analysis of:
- Private vs Social benefits to form groups
- Collective Reputation design

Today: three selected central results
A model of collective reputation
Collective Reputation in a Friendly Environment

We consider a market situation with:

- heterogeneous producers grouped according to a collective reputation structure
- producers exert effort to produce high quality
- the demand side a priori does not observe the true quality
- a high quality product is detected as such with some probability (via e.g. expert inspection)
- products not detected as of high quality are pooled together according to the collective reputation structure
Each producer is characterized by a cost parameter $\theta$ of providing quality.

- $\theta$ distributed on $[0,1]$ with cumulative $F$ and positive density $f$.
- Quality is binary, high or low.
  - $q$ denotes the probability of obtaining high quality.
- Producer of type $\theta$ choosing $q \in [0,1]$ incurs cost $c(q, \theta) = \theta q$. 

![Diagram showing a producer's decision process with high and low quality outcomes.]
Model Set-up and Notations: Demand Side

- willingness to pay normalized to 1 for high quality and 0 for low quality
- a high quality product is recognized as such with probability $e$
- We assume that a product is traded at its expected quality
  - identified high quality thus traded at high price of $p = 1$,
  - unidentified product traded on the basis of its reputation $\mu$, the belief that the product is of high quality when unidentified
Incentives for Quality

For a given reputation $\mu$, the expected payoff of a producer given by:

$$\Pi(q, \theta) = q(e + (1 - e)\mu) + (1 - q)\mu - c(q, \theta).$$

(1)
Incentives for Quality

For a given reputation $\mu$, the expected payoff of a producer given by:

$$\Pi(q, \theta) = q(e + (1 - e)\mu) + (1 - q)\mu - c(q, \theta).$$

(1)

Profit linear in $q$ (an individual producer alone does not influence $\mu$). A producer hence chooses $q = 1$ whenever

$$\Pi(1, \theta) \geq \Pi(0, \theta)$$

$$\iff$$

$$\theta \leq e(1 - \mu)$$
Bayesian Equilibria

From the incentive constraint, we have cutoff equilibria: sellers with cost below some cutoff $\theta^*$ choose high quality, the types higher than $\theta^*$ choose low quality.
From the incentive constraint, we have cutoff equilibria: sellers with cost below some cutoff $\theta^*$ choose high quality, the types higher than $\theta^*$ choose low quality.

Conditions for a Bayesian equilibrium are then:

(i) A seller with cost $\theta^*$ is indifferent between high and low quality:

$$\theta^* = e(1 - \mu^*). \quad (2)$$

(ii) The equilibrium reputation of unidentified quality has to obey Bayes’ rule:

$$\mu^* = \frac{(1 - e)F(\theta^*)}{(1 - e)F(\theta^*) + (1 - F(\theta^*))}. \quad (3)$$
Equilibrium
Full Collective Reputation

Proposition: Equilibrium with Collective Reputation

There exists a unique equilibrium, such that a producer with $\theta \leq \theta^*$ chooses $q = 1$, and $q = 0$ otherwise. Average quality is

$$F(\theta^*) = \frac{e - \theta^*}{e(1 - \theta^*)},$$

(4)

and the reputation for unidentified quality is

$$\mu^* = (1 - \theta^*)F(\theta^*).$$

(5)
Figure: Equilibrium in the $(\theta, F(\theta))$ space.
Implications for Incentives

- High cost producers (above $\theta^*$) free-ride on the quality of low cost producers

- If low cost producers (below $\theta^*$) would separate, incentives of the others would increase

- Everybody would like to kick out the (other) high cost/bad quality producers (above $\theta^*$) from the group, since everybody wants a higher reputation

- But: This in turn reduces incentives in the group.
Implications for Incentives

- High cost producers (above $\theta^*$) free-ride on the quality of low cost producers
- If low cost producers (below $\theta^*$) would separate, incentives of the others would increase
Implications for Incentives

- High cost producers (above $\theta^*$) free-ride on the quality of low cost producers.

- If low cost producers (below $\theta^*$) would separate, incentives of the others would increase.

- **Everybody** would like to kick out the (other) high cost/bad quality producers (above $\theta^*$) from the group, since everybody wants a higher reputation.
  
  - But: This in turn reduces incentives in the group.
Collective Reputation Structures

- A collective reputation structure is a partition of the set of producers.
- An element of a collective reputation structure is a group $i$ of producers, characterized by the group cumulative $F_i$.
  - Consumers observe that structure and what group a producer belongs to.
- (For finite groups) it has to hold that

$$\sum_i \lambda_i F_i(\theta) = F(\theta) \quad \forall \theta, \text{ with } \sum_i \lambda_i = 1$$
Collective Reputation Structures

- A collective reputation structure is a **partition of the set of producers**
- An element of a collective reputation structure is a group $i$ of producers, characterized by the group cumulative $F_i$
  - Consumers observe that structure and what group a producer belongs to
- (For finite groups) it has to hold that
  \[ \sum_i \lambda_i F_i(\theta) = F(\theta) \quad \forall \theta, \text{ with } \sum_i \lambda_i = 1 \]
- Polar cases (today):
  - **full collective reputation**: case already studied
Collective Reputation Structures

- A collective reputation structure is a \textit{partition of the set of producers}.
- An element of a collective reputation structure is a group $i$ of producers, characterized by the group cumulative $F_i$
  - Consumers observe that structure and what group a producer belongs to.
- (For finite groups) it has to hold that
  $$\sum_{i} \lambda_i F_i(\theta) = F(\theta) \quad \forall \theta, \text{ with } \sum_{i} \lambda_i = 1$$
- Polar cases (today):
  - \textit{full collective reputation}: case already studied
  - \textit{vertical collective reputation}: cutoff $\sigma$ separating two groups
Collective Reputation Structures

- A collective reputation structure is a partition of the set of producers.
- An element of a collective reputation structure is a group $i$ of producers, characterized by the group cumulative $F_i$.
  - Consumers observe that structure and what group a producer belongs to.
- (For finite groups) it has to hold that
  \[ \sum_i \lambda_i F_i(\theta) = F(\theta) \quad \forall \theta, \text{ with } \sum_i \lambda_i = 1 \]
- Polar cases (today):
  - full collective reputation: case already studied
  - vertical collective reputation: cutoff $\sigma$ separating two groups
  - individual reputation: continuum of groups (one for each $\theta$)
Vertical CR: The single cutoff case
Full CR versus Vertical CR
Illustration with the Uniform Distribution

Figure: Two groups (uniform distribution and single cutoff).
Splitting the producers in two groups:

- increases incentives for those with high costs
- decreases incentives for those with low costs

Also, note that the allocation of effort across producers is inefficient: between $\theta_1^*$ and $\sigma$, there is no effort, while producers between $\sigma$ and $\theta_2^*$ exert effort.
Full CR versus Vertical CR

Welfare Comparison

- Splitting the producers in two groups:
  - increases incentives for those with high costs
  - decreases incentives for those with low costs

- Also, note that the allocation of effort across producers is inefficient: between $\theta_1^*$ and $\sigma$, there is no effort, while producers between $\sigma$ and $\theta_2^*$ exert effort.

Proposition: Full CR versus single cutoff

There exists a cutoff $\sigma > 0$ such that welfare with two groups separated at $\sigma$ is higher than welfare with full collective reputation.
Full CR versus Vertical CR

Welfare Comparison

▷ Splitting the producers in two groups:
  ▷ increases incentives for those with high costs
  ▷ decreases incentives for those with low costs

▷ Also, note that the allocation of effort across producers is inefficient: between $\theta_1^*$ and $\sigma$, there is no effort, while producers between $\sigma$ and $\theta_2^*$ exert effort.

Proposition: Full CR versus single cutoff

There exists a cutoff $\sigma > 0$ such that welfare with two groups separated at $\sigma$ is higher than welfare with full collective reputation.

▷ The proof depends on the lowest cost being 0.
▷ The argument can be applied (ad infinitum) to the lowest group.
Individual vs Collective Reputation
Collective versus Individual Reputation

- Individual Reputation equilibrium involves mixing (intuition)

- Intra-producer free-riding under IR versus inter-producer free-riding under CR

- Under IR compared to CR, effort is shifted from relatively more efficient to relatively less efficient producers
  - For a given level of quality, welfare under full CR is always higher than under IR from the above
Collective versus Individual Reputation

- Individual Reputation equilibrium involves mixing (intuition)
- Intra-producer free-riding under IR versus inter-producer free-riding under CR
- Under IR compared to CR, effort is shifted from relatively more efficient to relatively less efficient producers
  - For a given level of quality, welfare under full CR is always higher than under IR from the above

Proposition: Full CR versus IR

Suppose that $F$ is the uniform distribution. Then full Collective Reputation yields higher welfare than Individual Reputation.
Collective versus Individual Reputation

- Individual Reputation equilibrium involves mixing (intuition)

- Intra-producer free-riding under IR versus inter-producer free-riding under CR

- Under IR compared to CR, effort is shifted from relatively more efficient to relatively less efficient producers
  - For a given level of quality, welfare under full CR is always higher than under IR from the above

Proposition: Full CR versus IR

Suppose that \( F \) is the uniform distribution. Then full Collective Reputation yields higher welfare than Individual Reputation.

- Does not generalize to arbitrary distributions.
Yes, we can (address):

- Collective Reputation unraveling
- Design and stability of collective reputation structures
- Merging reputations
- Endogenous attention of experts and self-fulfilling prophecies
Yes, we can (address):

- Collective Reputation unraveling
- Design and stability of collective reputation structures
- Merging reputations
- Endogenous attention of experts and self-fulfilling prophecies

Thank you.