

July 1998

Organization Change and Vinification Cooperatives in France's Midi

Trevor C. Knox
University of Connecticut

Follow this and additional works at: https://opencommons.uconn.edu/econ_wpapers

Recommended Citation

Knox, Trevor C., "Organization Change and Vinification Cooperatives in France's Midi" (1998). *Economics Working Papers*. 199804.
https://opencommons.uconn.edu/econ_wpapers/199804



University of
Connecticut

Department of Economics Working Paper Series

**Organization Change and Vinification Cooperatives in France's
Midi**

Trevor M. Knox
University of Connecticut

Working Paper 1998-04

July 1998

341 Mansfield Road, Unit 1063
Storrs, CT 06269-1063
Phone: (860) 486-3022
Fax: (860) 486-4463
<http://www.econ.uconn.edu/>

Introduction

Standard accounts of French industrialization blame the predominance of the traditional family firm for France's failure to adopt or to pioneer modern production methods. Economic historians could easily interpret the *cave coopérative vinicole* as evidence that corroborates this explanation for inefficiency in French agriculture and industry. The *cave coopérative* preserved the idiosyncrasies that attend fragmented land tenure at the expense of governance costs and incentive problems associated with cooperative ownership and control. These apparent barriers to rationalized production notwithstanding, this paper claims that the cooperative was a progressive organizational structure that adapted winegrowers in southern France to the emerging institutions of a growing market.¹ That cooperatives were, in some sense, defensive measures, designed to prolong the profitability of existing institutions and capabilities, does not preclude their also being efficient.

Collective enterprises inspired by capitalism, they won, on the level of production and marketing, the membership of most winegrowers; they brought archaic structures to bear on a capitalist market, and succeeded in giving an artisanal craft modern production and competitive marketing. The ties tightened between the viticulturist and the cooperative that absorbed him, forming a screen against the market (Gavingnaud, 1983, p. 424, translation mine).

¹ My argument echoes the finding of John Vincent Nye (1987), who confirms the "revisionist" view that entrepreneurial failure and small firm size were not responsible for retarded economic growth in the 19th-century French cotton, wool, and flour industries.

Small French winegrowers formed these wine-making cooperatives beginning in the early twentieth century, with the most dramatic growth occurring between the World Wars. The importance of caves cooperatives continues; in 1987 1160 cooperatives made 42% of the wine produced in France (Niederbacher, 1988, p. 32). And the Midi, where most French cooperatives are located, “alone produces 35-40 million hectolitres, 12-13% of the world total” (Niederbacher, 1988, p. 25). In this paper, I analyze the appearance and persistence of vinification cooperatives in the Midi, the four chief wine-producing departments of which are Gard, Aude, Hérault, and Pyrénées Orientales.

From the phylloxera blight of the 1870's to the overproduction and fraud of early in this century, a confluence of exogenous and endogenous pressures forced a dis-integration of vinification and viticulture. My thesis is that, given the existing institutional arrangements and configuration of capabilities, small growers rationally adopted cooperative vinification to market wine to a rapidly integrating national and international market, and to utilize the resources and technology dominant in wine production. This organizational evolution preserved the independent, small-scale viticulture practiced by the farmer-owners of the cooperative. Mine is an argument about change in organizational structures when the minimum efficient scale of part of an integrated multi-stage production process changes dramatically.

I do not argue that the vinification cooperative was an optimally efficient organizational adaptation in a static, technological sense; I argue, rather, that this adaptation was dynamically efficient, given the institutional environment. I argue, that is, that vinification cooperatives allowed existing institutions and capabilities to remain profitable when market conditions turned against the constellation of small, independent winemakers that covered the Midi. This conception of dynamic efficiency might be thought of in terms of “fitness.” What makes organizational structure fit “is only the ability to induce successful actions on a particular market given a particular institutional regime” (Koppl and Langlois, 1994, p. 87). Vinification cooperatives were fit because they proved adequate to sustain small-scale viticulture despite technological change that favored large vintners. I make the additional claim, defended below, that vinification cooperatives were *more fit* than alternative forms of organization. My conception of dynamic efficiency, then, is about comparative fitness within a particular institutional environment.

As I explain below, one cannot construe the formation of these cooperatives as a response to marginal incentives. Rather, to borrow from an account of market expansion in late 19th century US history, “Inadequate information and economic coercion, produced by complexity, anonymity, dependency, and concentrations of power, invited, if not demanded, public policy responses” (Carstensen, 1995, p. 588). The French government provided legislative support and start-up capital for most of these cooperatives. Although

cooperatives' genesis was largely a matter of public policy, their persistence reflects profitability in an increasingly competitive market. I use a transactions-cost approach to argue that cooperative vinification was the least-cost path of reorganization that would allow small proprietors to coexist in a market dominated by large estates and *Grands Crus* appellations.

The story I tell here differs with traditional accounts of industrial development. Though in many industries mass production required vertical integration to assure the continuous flow of production from raw material to retail distribution, mass production of wine required dis-integration. Small scale wine production, previously an integrated, cottage-type industry, dis-integrated, separating the processes of viticulture and vinification. And instead of expediting the flow of product to market, one key function of the cooperative was to withhold wine when prices were low. Increased specialization accompanied this evolution, but no integrated "factory system" emerged despite the need to monitor inputs for the sake of quality control.²

Most economic models of cooperative formation portray the process as an integration upstream into supplies, or downstream into marketing. (See, for example, Sexton, 1986.) Caves coopératives, however, institutionalized a dis-integration. Compared to small, independent winegrower-winemakers, cooperative members participated in an operationally *less* integrated production

² I have come across one exception: "In the sandy wastes of the upper Camargue, next to the department of the Gard, a whole new vinyard sprang up after 1919. There small railways ran

process. My labeling of cooperative formation as “dis-integration” is admittedly a relative judgment, however. Dis-integration occurred as growers relinquished effective control of the vinification and marketing functions. But on the level of the wine industry, the cooperative movement signified a consolidation; and as a matter of law, cooperative members collectively retained ownership of the entire process. Not surprisingly, then, some of the same forces that caused managerial capitalism to succeed personal capitalism in Chandler’s (1977) account also gave rise to the *cave coopérative vinicole*. Social, economic, and geographic mobility increased, lower transportation costs favored high-volume distribution, and branding became essential to differentiating a product in impersonal markets.

Although Chandler’s managerial capitalism served a coordination function that arguably *replaced* the market coordination of the price mechanism, vinification cooperatives provided a different sort of coordination. Their role was to effect government-sanctioned cartel-like coordination of production, thereby *using* the price mechanism to reduce the extent of supply-side disequilibrium. Cooperative marketing accomplished this coordination. Cooperative vinification collectivized more than it coordinated the actual production of wine. As I discuss below, this larger scale of vinification both increased the economic value of the product and increased the market power, or at least the bargaining power, of its producers.

between the vines, bringing the grapes harvest to huge mechanized ‘wine factories,’ some of which could store 100,000 hectolitres a year” (Warner, p. 77).

I organize this treatment of organizational change and vinification cooperatives in France's Midi as follows. First, I outline a history of winemaking in southern France, culminating with the emergence of the cooperative form of production. Second, I present a theory that interprets cooperative vinification as a response to changes in the competitive environment, production technology, and demand characteristics. Third, I compare the vinification cooperative to alternative organizational forms in an effort to assess its relative efficiency. I conclude with some observations on the present and future of cooperative winemaking.

History

Early Development

Historical accident shaped the institutional environment that would eventually favor cooperative winemaking. Arab and Roman engineering created a system of dams and canals that enhanced the fertility of the plains of Languedoc-Roussillon, the region that would typify wine production in the Midi, allowing productive cereal cultivation in this region characterized by a long growing season and mild winters. The imperative of dependable irrigation caused local civil codes to focus on water rights, establishing a juridical tradition in the promotion of agriculture (Gavingnaud, 1983, p. 56). Furthermore, long before the French Revolution, the institution of private property had enfranchised small farmers. Feudalism was never as ubiquitous in the Midi as it was in the North,

and assertions of royal sovereignty over the local nobility consistently undermined feudal obligations, though France did not formally annex much of Roussillon until 1659 (Gavingnaud, 1983, p. 99). By the 13th century, a large number of small farmers were either free landowners or paid modest seigniorial taxes, and farmers without legal title to their land were still considered in a position to sell their limited interest (Gavingnaud, 1983, p. 103).

As population decreases of the 14th and 15th centuries left many small farms abandoned, lords resorted to granting free title to farmers who would farm their lands for the payment of a modest tax. Furthermore, this tax was construed as an obligation between two people, not as a return from the land (Gavingnaud, 1983, p. 104). As the number of small landholders grew in this way, the traditional relationship between lord and vassal lost all but its symbolic meaning.

Lured by the higher prices obtained in viticulture, small farmers abandoned the more traditional cereal cultivation. As a result, poor harvests threatened famine while bumper crops caused wine price collapses because of over-production. During much of the 18th century, civil authority attempted to redirect agriculture by prohibiting new planting of grape vines, but a marked increase in wine production compared to a mere 2% official increase in cultivated land suggests widespread noncompliance (Gavingnaud, 1983, pp. 134, 141). Despite the relative increase in grain prices that accompanied this dynamic, small farmers persisted in viticulture. One explanation for their

persistence is that the technology of cereal production as early as the 19th century required a larger minimum efficient scale and so was not a practical alternative, given the fragmented state of land ownership. Equally possible is that plots were so small that cereal cultivation could not meet subsistence; so farmers gambled on the more lucrative (and more variable) returns to winemaking.³

Markets for the sale of wine date to the ninth century, but significant exportation emerged in the late Middle Ages during English occupation and the Hundred Years' War (Ulin, 1986, p. 26). This market development and expansion allowed monocropping in wine where previously it had been only a supplement to subsistence-oriented farming. Expansion of the export market allowed for the beginnings of labor specialization. This commercial activity centered in Bordeaux, and the contemporaneous repercussions on the wine industry in the Midi are unclear. Still, culturally, this market development created the institutions that would characterize wine production in the Midi once inland transportation expanded the domestic market. Broadly speaking, the critical institutional developments consisted of landless labor force, usually share-croppers or tenants with use rights, and a merchant class in the sale of wine.⁴

³ A similar dynamic caused small US farmers to plant cotton after the civil war, contributing to depressed cotton prices in the ensuing decades. (See Wright and Kunreuther, especially p. 528.)

⁴Sivéry (1969) reconstructs the dynamics of a lively wine trade in the 14th century from the accounting records of the barony of Hainaut, in what is now the northeastern part of France.

Institutional Change and Industrial Restructuring

Two 18th-century events were seminal to the growth of wine cooperatives 150 years later. One event was the Revolution of 1789 and the resulting institutional transformations. Reforms curtailed both use rights and vestigial feudal obligations in favor of fee simple land tenure achieved through enclosure, though the high concentration of land in the possession of a relative few, compared to the large number of small landowners, did not change (Gavingnaud, 1983, p. 197). Perhaps more significantly, an entrepreneurial merchant class with ready cash bought the estates previously held by landed aristocrats. These merchant-entrepreneurs expected a return from land ownership that their aristocratic predecessors had not. Proprietors regarded post-Revolution vineyards as an investment, not a heritage. The sale of church lands, including substantial vineyard acreage, hastened this transition to capitalist viticulture. These institutional transformations generated inertia, as winegrowers lobbied for, and received, tax and regulatory reforms that further increased the viticulturists' ability to expand vineyard acreage (Gavingnaud, 1983, p. 205).

The other 18th-century event was the introduction of the *Grands Crus* appellations, elaborated over the course of the 19th century, which conferred prestige upon vineyards capable of meeting prescribed guidelines. Responding to international competition, the government intended this classification to maintain prices by creating at least the perception of higher quality. Since

guidelines required specialized labor to rationalize each step of the process, *Grands Crus* legislation formally separated the unified process of wine cultivation and production (Ulin, 1988, p. 254). Specialized knowledge separated vine trimmers from grape harvesters, and neither shared the expertise of the wine maker. Approved vines were 50-100 years old and produced a smaller yield, directly improving the quality of the wine. *Grands Crus* guidelines typically required that the wine be aged for several years, thus imposing carrying costs and the additional capital requirements of storage facilities. Large estates operated at a scale of production large enough to support this increased division of labor and level of capital investment, while small growers did not. As a result, estates enjoyed the rents accruing to the *Grands Crus* appellations, while small growers minimized their comparative disadvantage by producing lower quality table wines, which had higher yields and required less storage since they were drunk young. This production-side market segmentation persisted through much of the nineteenth century; large-scale estates produced quality wines, and small-scale winemakers, table wine. Nonetheless, periodic crises of overproduction contributed to a consolidation of the industry. Well-capitalized estates bought the assets of small proprietors who were less able to withstand financial losses. In this way, large estates augmented and consolidated their holdings, while small growers clung to dispersed plots, an artifact of France's tradition of partible inheritance (Landes, 1969, p. 189).

The Phylloxera Epidemic and Economic Dislocation

A remarkable increase in wine production occurred in the fifteen years leading up to the vine devastation that was first reflected in the 1876 harvest (Warner, 1960, p. 2). Railroad transport spurred both domestic consumption and international wine trade, and facilitated the concentration of production in the Midi, where climate and high-yielding varieties made high-volume production of wine feasible (Gavingnaud, 1983, p. 279). This increase in the extent of the market created arbitrage possibilities that *négociants* quickly exploited. They bought in large volume and then resold to wholesalers in urban centers, creating a marketing network that would ultimately monopolize the sale of wine to distant markets (Gavingnaud, 1983, pp. 300-1).

Besides transforming production and marketing arrangements, increased commerce also created mechanisms for spreading various plant diseases and infestations. The Phylloxera blight of the 1870's and 80's seems to have been imported from the US, where vines were immune to its effects. The French vines were not, and winegrowers' dramatic response to this epidemic transformed viticulture in a way that threatened the coexistence of the two scales of wine production. Phylloxera wiped out large vineyards with alarming speed, while curative measures such as flooding the root stocks and treating them with chemicals only slowed the disease's progression. Public and private organizations pursued scientific research on a scale unprecedented in French agriculture and established a policy role for research. Charles K. Warner writes, "A marked policy of governmental intervention was born during the phylloxera;

meanwhile the phylloxera was creating conditions that would make the policy less and less timid” (1960, p. 8). The blight and the effort to combat it demonstrated that the industry’s viability was inextricably tied to increased scientization. Ultimately, growers ended the epidemic by grafting their vines onto resistant American root stocks or by replanting altogether with the heartier American varieties. Growers hit particularly hard had further incentive to replant with the lower quality American grapes because they would yield a bigger harvest in fewer years than the more refined varieties, thus allowing faster repayment of the loans required for replanting. This turn of events thrust large estates into direct competition with small growers as production of *vin ordinaire* became the key to survival for large estates and small growers alike.

This high-yield reorientation of the wine industry contributed to a price slump lasting from 1900 through 1907. This slump reached crisis proportions in the Midi, which suffered disproportionately because of the negotiating weakness of its many independent producers. The 1907 revolt of the Midi, in which hundreds of thousands participated, ended with “demonstrators gunned down by occupying troops” (Johnson, 1995, p. 241). On average, prices dropped by as much as 50% of what they had been in the previous decade (Warner, 1960, p.19). Wine fraud, the production of second and third wines by adding sugar and water to the lees, was a second aggravating factor endogenous to the domestic industry (Warner, 1960, p. 13). Faced with weak prices, many producers tried to compensate for falling or negative margins with increased volume of false

wines. The exacerbating effect of increased supply as a response to falling prices, although inevitable in the aggregate, did not deter individual producers from gambling that they could improve their returns in this way.

Dynamics exogenous to the domestic market also depressed prices. First, unusually good weather at the turn of the century produced good harvests, the traditional source of overproduction. Additionally, the advent of wine importation from Algeria introduced further price competition. The Algerian wines were cheaper and of a higher alcohol content than the French table wines. The appeal of these wine imports was not limited to French consumers, however. As Algerian exports to third countries rose, French exports to those same countries predictably fell. Other nations, too, and notably Italy, increased exports to France. The genesis of this international competition seems to have been the Phylloxera, devastating enough to raise world prices and spur new planting in unaffected countries. Weakened demand increased the downward price pressure caused by wine imports. The distillers of other alcoholic beverages, traditionally wine-buyers of last resort, had converted their operations to the use of beet and grain alcohol because of the high wine prices prevailing during the Phylloxera. Previously, their high elasticity of demand for wine had caused them to increase purchases dramatically when large harvests and low wine prices prevailed; but technological and agricultural advances

made during the phylloxera epidemic ensured that grape wine, even during price slumps, would remain more expensive than other sources of alcohol.⁵

Collective Response

Private and governmental crackdown on fraud, and government restrictions on imports, combined with a return to less spectacular growing conditions ended the price slump by 1907. But among winegrowers, the seeds of cooperation had already been planted—not yet in the actual production of wine, but already as an institutional means of combating unwelcome market forces. In the Midi, various committees sprang up to organize revolts against a perceived lack of government action in response to the crisis. Just before the 1907 harvest, these committees succeeded in forming the Confédération Générale des Vignerons du Midi (CGV), whose primary aim was to combat wine fraud. A secondary aim was to lobby the French government for favorable legislation (Warner, 1960, p. 45). Thanks to aggressive, effective, and public anti-fraud enforcement, the CGV label came to represent quality, if not prestige, and membership exploded as a result. By 1912 its membership had grown to 20,000, representing 425 winegrowing communities (Warner, 1960, 47).

Mobilization for World War I disrupted but did not end the relative prosperity that had evolved among winegrowers. Wartime requisitions maintained demand, and wine gained cultural status as a morale-builder. At

⁵ Distillation of grape alcohol would later resume thanks to government-subsidized mandatory distillation.

war's end, neglected vineyards and pent-up demand for wine caused spot prices to rise. Higher prices prompted farmers to increase their planting, however, creating the potential for renewed overproduction. If crises of overproduction were a tolerable risk to small growers after the Revolution, they were clearly unbearable by the advent of the 20th century when large estates could and did flood the market with *vin ordinaire*, taking advantage of marketing ties and high-volume contracts to sell their output. Small growers, already at a production cost disadvantage, could not combat the market power of the estates and "were often cheated by local commission agents who procured wines for large wholesalers" (Loubère et al, 1985, p. 142). Unable to withstand recurring losses, many small growers responded by abandoning the vineyard to pursue wage labor in the growing cities.

Although economic forces shaped the environment in which cooperatives would later thrive, public policy initiatives were not without influence on the cooperative movement. Government officials were eager to stem the migration of farmers to urban centers because they feared urban unemployment would mean social unrest. Elected officials, therefore, had an interest in stabilizing wine prices and production in order to prevent a rural exodus. The national French government and municipal authorities backed an organizational innovation that had met with some success in its initial articulations, namely, the *cave coopérative vinicole*, which combined independent viticulture with cooperative vinification and marketing. Between 1920 and 1939 the number of

such cooperatives increased from 82 to 827 (Loubère et al, 1985, 137). Although these cooperatives required some initial investment from their founding members, national grants and loans from Crédit Agricole provided most of the start-up financing. The government provided this financing to cooperatives that adopted modern production methods and agreed to participate in reforms designed to stabilize wine prices. Perhaps most significant from a public policy perspective was that “wine cooperatives would provide . . . the very institutional medium through which limitations could be levied on the quantity of production through the cooperatives centralized administration” (Ulin, 1996, p. 87).

The Ministry of Agriculture promulgated a standardized charter for vinification cooperatives that local organizers could modify as necessary. (For an example, see Ulin, 1996, p. 151.) Typical cooperatives required capital contributions from new members to finance some portion of the plant, property, and equipment used in vinification. They frequently required that members deliver their entire harvest to the cooperative. In return, members received a predetermined per-liter price, which varied according to sugar content. The cooperative’s employees supervised the remaining production and marketing. Usually, a university trained œnologist controlled the technical aspects of fermentation, and marketing staff negotiated sales, either of casks or bottles. Members would then receive a prorated share of any residual profits remaining after payment of administrative and overhead expenses. The sole means of

obtaining a return from cooperative membership is, therefore, the sale of grapes to the cooperative. This arrangement improves the organizational stability of the cooperative since farmers will not sell out simply to realize capital gains⁶.

The Theory

In this section, I show that the restructuring represented by cooperative winemaking was a progressive response to market conditions, not evidence of the entrepreneurial failure that Landes (1969) alleges. First I address changes in the competitive environment. I argue that market and nonmarket forces combined to determine which producers would survive the dislocation that followed the phylloxera. Second, I discuss the impact of changes in production technology. Third, I illustrate the influence of demand characteristics on the economic organization of winemaking, and portray the vinification cooperative as a response to this influence. Last, I analyze the fitness of the cooperative form of organization as compared to alternative governance structures. The cooperative form was better suited, I hold, than any of these to the institutional context of winemaking.

Changes in the Competitive Environment

Government intervention to protect small growers and facilitate the formation of cooperatives weakened the competitive pressures that otherwise would have shaped the industry early in this century. Nelson and Winter

⁶ Ellerman (1984, p. 885) and Estrin and Jones (1992) discuss the tendency of producer

observe, “[M]arkets can be judged as working well or poorly depending on the extent to which the profitability of a firm hinges on its ability to meet customer demands as well as or better than its rivals” (1982, p. 268). The critical role of government intervention in behalf of small winemakers weakened linkages between economic performance and survival. But the market discipline of profit and loss would not have been efficient in any case. Given that crop insurance was not available, and because of the volatility of total wine production and therefore of prices, survival would depend more on the ability to self-insure against periodic losses than on low-cost production of a desired product. Efforts by the government to stabilize prices were largely ineffective until after World War II, so governmental support of cooperatives merely reduced the comparative disadvantage lesser-capitalized producers faced as a result of this price volatility.

Not even the considerable favor conferred on small farmers by civil authorities immunized them from domestic competition, however. Big players in the industry defined the competitive environment. Large estates began to sell *vin de table* after the phylloxera epidemic since they had replanted with the more resilient, higher yielding, but lower quality American grapes. The resulting collapse of the price umbrella their higher quality wines had provided increased price competition. Accordingly, margin pressures permitted less variation in production methods. Winemakers who continued to produce and market

cooperatives to “degenerate” into capitalist firms.

favorably differentiated wines were not subject to this discipline. For example, because of name recognition, small Bordeaux region farmers received a higher price, a premium that allowed more flexibility in their choice of production methods. As a result, the rationale for cooperative vinification and marketing was not as strong in Bordeaux, and, indeed, cooperatives are not nearly as common in that region as they were in the Midi (Loubère et al, 1985, p. 149).

Although government intervention and successful product differentiation relieved some competitive pressures, market outcomes were not irrelevant to the viability of vinification cooperatives, since profitability was ultimately the key to survival. Agricultural techniques varied little from *château* to small farmer, and vintners only sold a small portion of their output directly to retailers or consumers, so middlemen, or *négociants*, played the decisive role in picking winners and losers. Therefore, it was at this level of wholesale marketing that the market imposed discipline on winemakers. Institutional inertia in the critical areas of land tenure, viticulture, and vinification could proceed unchecked, except as they impacted on the critical stage of marketing.

Changes in Production Technology

Technological innovation causes organizational change by shifting the basis for competition. Margins on which competitive pressures are weak may become critical to a firm's survival if technological advances along those margins confer cost advantage or otherwise increase the profitability of firms that adopt the new

technology. As the basis for competition changes, dynamic efficiency may not only require a change in product or process technology but, more significantly, a change in organizational form. For centuries, scale of production in winemaking had not been a margin on which competitive pressures operated. Beginning with the phylloxera, the principal cause of increased competition in *vin ordinaire*, technological advances brought competitive pressures to bear the scale of vinification activities. Economic forces threatened to drive the small independent winemaker out of business. The impetus for *caves coopératives* was in governmental promotion of modern production methods, but the source of their longevity lies in the differing MES of the production stages, and in the rewards of effective wholesale marketing.

The minimum efficient scale of viticulture had not changed for centuries and may have been smaller than that of other cash crops. The firm-specific threshold model states that small farms will not invest in mechanized equipment because higher fixed costs per unit of output would outweigh the labor savings. At some higher threshold acreage, saved labor costs would just offset the average fixed costs of mechanization (David, 1966). Proponents of small-scale inefficiency arguments might accept this as a reason why tractors were not common in French viticulture until the 1950's (Ulin, 1996, p. 136). Regarding scale of production in grape farming, one researcher notes, "That a typical wine estate would have up to twenty times more land than a peasant farm was less significant than that the parcels were located in the same area," thus reducing

wear and tear on machinery and allowing for more systematic planting (Yoon, 1975, p. 82). Yoon also contends that some American grape-picking machines could only be used on large plots. But recent scholarship suggests that the firm-specific threshold model may not apply to mechanization in agriculture because of joint ownership arrangements and the availability of independent contractors for harvesting (Olmstead and Rhode, 1995). Indeed, Ulin notes “a group of growers from Lustrac have pooled their resources to buy equipment that they could not afford alone. This works well as long as the members are careful to plan when the equipment will be used by whom” (1996, p. 134). Thus, even small farmers could share the benefits of innovation in agricultural equipment as it became available. By contrast, the minimum efficient scale of vinification increased dramatically because of technological factors and marketing considerations.

A divergence in minimum efficient scales within a unified production process has implications for economies of scope and may produce disintegration. When the larger MES is downstream, smaller-scaled upstream products will tend to modularize, while the downstream process will act as an interface that combines the modular inputs to produce a uniform product. In his explication of the factory system, Leijonhufvud notes, “specialization of labor in team production will require *standardization of product*” (1986, p. 209, emphasis original). In vinification cooperatives, it was the other way around: standardization of product required increased specialization of labor.

The primacy of specialization of labor versus standardization of product is neither a chicken-and-egg phenomenon nor an arbitrary ordering that reflects basic interdependence. When increased specialization of labor drives the reorganization of industry, *cost reduction* is the goal, and standardization of output is a necessary, though often valueless, byproduct. For example, I care not at all whether the stitching on my glove matches yours; it is enough that my glove fits me. By contrast, when standardization of product is itself desired by the consumer (the *négociant* in the example of vinification), then the goal of restructuring is to increase demand and raise price, not to lower costs. Thus the process of industrial development that created the factory system fundamentally differs from the dynamic through which cottage winemakers formed cooperatives. Price elasticities of demand help explain the difference. As Langlois and Robertson (1995, p. 104) note, price inelasticity of demand favors organizational inertia since cost savings would not increase sales proportionately. Thus, cooperative winegrowers retained the institutions of independent viticulture and private farmland while increasing the market value of their fermented product.

Although I argue that the vinification cooperatives have as their aim to increase price, some more-or-less incidental cost savings did result. As already noted, the technology of vinification emerging at the beginning of the twentieth century increased the capital intensity of the process. Agricultural labor from Italy and Spain was available for hire, but capital was scarce, consisting only of

the land and the vines for most growers (Ulin, 1986, n., p.28). Gavingnaud refers to the viticulturist as “a capitalist without capital” (1983, p. 293). The move to cooperative vinification was capital-saving. The geometry of volume ensures that larger hoppers, vats, and storage facilities will yield economies of scale, thereby conserving capital, provided the firm can amortize the costs of these investments over a sufficiently high volume of product.

Although capital-saving for the industry, larger vinification facilities required increased *concentration* of capital. Because of financial capital market institutions, the move to capital-intensive vinification technology created incentives to reorganize ownership. Capital requirements necessitated large borrowing, and government grants and guarantees were easily available to cooperatives, whose combined resources could collateralize large outlays. Cooperatives thus overcame barriers to the concentration of capital.

Additionally, whereas dispersed ownership was resistant to rapid dissemination of technical change, reorganized ownership that included a collective entity allowed the French government to provide more than capital. Vinification cooperatives provided the institutional means to disseminate the benefits of national agricultural research to the small farmer. In this way, vinification cooperatives resembled a “venture capital network” with the government as the capitalist. Cooperatives allowed producers to respond en masse to changes in technology and consumer demand. The government

believed that modern technology would keep small winegrowers competitive and thus designed its support of cooperatives to encourage modernization.

Changes in Demand Characteristics

Changes in demand characteristics increased the MES of vinification. Increasingly impersonal, rivalrous, and brand-based marketing strategies accompanied the *négociants'* rise to power. Effective marketing in wine requires conformity to interrelated quantitative and qualitative standards. Thus development of channels for mass marketing required uniform quality both within a vintage and from year to year. Pooling grapes from many farms improves the uniformity of the fermented product, effectively making the cooperative more than the sum of its parts. Additionally, proportioning the volume of the finished product to the volume required by the wholesale market adds economic value. Growers are thus suppliers of complementary inputs.

The entire produce of a small farm will not be large enough for a *négociant* to consider, but when farmers vinify collectively and accumulate a much larger inventory of a uniform product, many brokers will bid up the price. An increase in the scale of production thus generates higher effective demand and brings higher profits, without necessarily changing per unit costs of production, the traditional source of economies of scale. In the case of the French winegrowers, big players on the demand side thus influenced the supply-side selection mechanism through institutional change in marketing and wholesaling. Since only a unified vinification process could produce wine of uniform quality, the

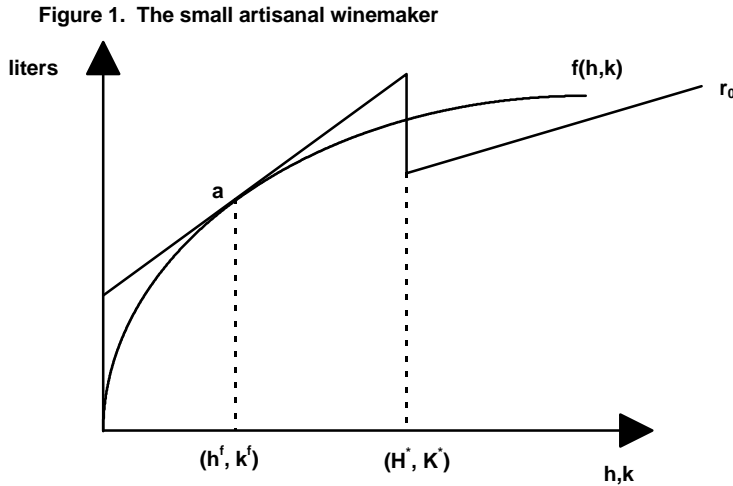
scale of marketing activity had implications for the scale of the production process itself.

The reader will note that the analysis that follows critically depends on the contention that larger batches fetched a higher per-unit price in the wholesale wine market. My evidence for this contention is anecdotal, perhaps necessarily so, as comparative price data is unavailable. For example, Loubère notes,

[I]n the lower Midi . . . members allowed the cooperative to sell their wines because it was in a better bargaining position vis-à-vis the shippers and almost always won a higher price. Most merchants were by no means reluctant to do business with well-run cooperatives. They recognized the advantage of getting a better product and, just as important, a consistent one. These benefits reduced their costs of searching for suitable wines among many small vintners and having to deal with so many different qualities (1990, p. 140).

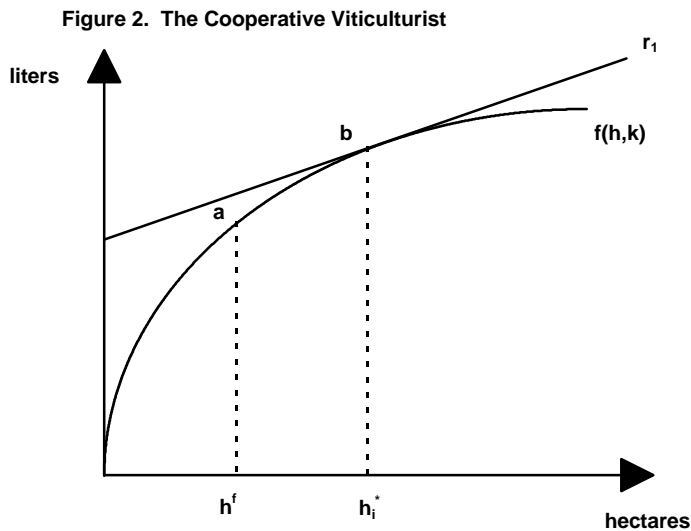
A graphical analysis illustrates the increased profitability of winemaking cooperatives as a result of these demand-side factors. The small, integrated winemaker faces a nonlinear isoprofit curve (Figure 1). The nonlinearity occurs at that scale of production where a firm produces wine in sufficient volume to be demanded by the large *négociants*. I have presented this nonlinear isoprofit

curve as a kinked curve for the sake of clarity, but one could model this threshold as part of a continuous isoprofit function without qualitatively changing the production decision.

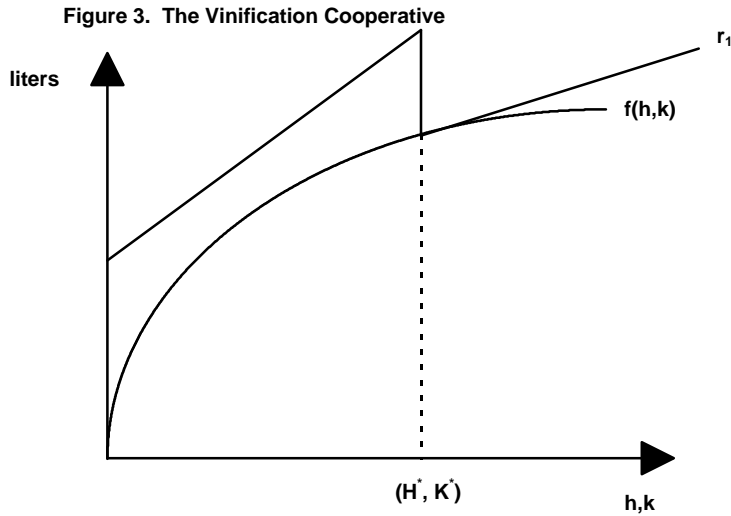


The small wine grower and producer faces a production function $f(h,k)$ that depends on the number of hectares under cultivation (h) and the level of capital investment in vinification equipment (k). The kinked isoprofit curve for profit r_0 is tangential to the farmer's production function at point a , which corresponds to a scale of production labeled (h^f, k^f) . At scales of production marginally above and below (h^f, k^f) , profit decreases as the farmer is forced onto a lower isoprofit curve. Thus marginal incentives lead the farmer to scale (h^f, k^f) , although we see that the farm could reach a higher isoprofit curve by producing at (H^*, K^*) . Even with perfect information about the isoprofit curve, a constraint

on either acreage or capital below H^* or K^* , respectively, would force the winegrower back to (h^f, k^f) .



The cooperative farmer, by contrast, faces a flat isoprofit curve, the lower slope of which is given by the higher price the cooperative offers (Figure 2). *Ceteris paribus*, this leads the farmer to expand the scale of viticulture, while divesting himself of the vinification capital. The cooperative sets a price such that $\Sigma h_i^* = H^*$, yielding the production shown in Figure 3. Lest the price-taking behavior of these farmers towards the cooperative seem naive, Mendras has observed, “Their wine is not treated as a particular product that deserves a particular evaluation; most farmers think that prices cannot be discussed, ‘they’re already set.’ And when they bring their grapes to the cooperative their product is out of their hands even before it exists; they furnish only the raw material” (1970, p. 189).



The *cave coopérative* thus attains the globally optimal isoprofit curve, r_1 , generating a higher return for its members than they could have achieved independently.

Although in this model the scale of vinification is central to obtaining higher prices, the scale of viticulture has no relevant impact on marketing considerations. In fact, French winemakers, in order to diversify against the risks posed by the weaknesses inherent in particular varieties, have long planted and blended several grape varieties, varieties which might just as well come from scattered plots in a village as from the unified vineyards of a single château. This tradition of blending explains their labeling of wine according to locale of origin rather than variety of grape, a practice that also avoids commoditization of their product.

Brand maintenance then becomes the impetus for putting only the best grapes under the most prestigious label, and so on down the line. Impersonal markets, mediated by *négociants*, increased the potential value of branding as a means of differentiating the product and combating fraud. For a brand to have value, however, it must denote not only a central tendency but also a limited variation. The critical contribution of the cave cooperative to brand identification was in limiting variation in the finished product. French authorities followed the precedent set by the *Grands Crus* guidelines in drafting the *Appellation d'Origine* legislation of this century. Although cooperatives began by producing table wine, by the 1980's many were eligible to produce *Vin d'Appellation d'Origine Contrôlée* (AOC). Many cooperatives now even produce château-labeled wines, a practice that requires separate vinification of the harvest of a single grower. A fuller discussion of the economics of brands is beyond the scope of this paper.⁷

Though clearly not achievable in an absolute sense because of the vicissitudes of nature, increased scientization in the vinification process can improve consistency from year to year. Temperature control, proper blending, and other technical manipulations can all compensate for characteristics of the harvest in such a way as to improve consistency from year to year. Without scientific manipulation, variations from one year's harvest to the next are fully

⁷ The intricate system of French brand legislation raises transactions costs issues such as those discussed by Barzel (1983). The the impact of brands on measurement costs may indicate that

expressed in the final product, making the wine less consistently marketable and reducing the value of the brand. The cooperative allows a specialization of labor that makes such manipulation feasible.

A Comparative-Organizational Analysis

As Coase has noted, “The main reason why it is profitable to establish a firm would seem to be that there is a cost of using the price mechanism” (1937, p. 390). Knowledge about prices, while easily transferable, may not have been freely available to small wine producers. One study of winegrower behavior revealed that “there was a strong correlation between the purchase of instruments of production (fertilizer, machines and so on) and purchasing power based on the *previous* year’s crop; the correlation between the [prevailing] price of wine and such purchases is much weaker” (Mendras, 1970, p. 82, emphasis added). Historians who fault the family firm’s inability or unwillingness to secure debt financing would not find this revealing (for example, Landes, 1969, p. 147). But this lagged response to prices suggests imperfect information more than it does credit market imperfections or underutilization. Given the easy credit provided by *Crédit Agricole* and other agencies, one may infer that current price information was either unavailable or believed to be unreliable.

French vintners may be “over-branding” in the way that consumers may engage in “over-sorting,” for example.

The vinification cooperative reduced coordination costs arising from such price uncertainty. In a dynamic akin to the Lucas (1973) “islands model,” atomistic producers had little knowledge about the level of wine production outside their community. A bumper crop construed as a relative increase in production would mean capturing a larger market share, whereas general increases in production heralded only impoverishment as the relatively inelastic demand for wine guaranteed low prices. But costs of using the price system are greater for an independent vintner than for the cooperative. Confederations of cooperatives, such as the *Fédération des Caves Coopératives de Vinification des Pyrénées-Orientales* (Gavingnaud, 1983, p. 489), were able to aggregate production data before sending wine to market. Better production data enabled cooperatives, in accordance with government mandates, to hold back some portion of the vintage when oversupply conditions existed. The cooperative would either release such hold-backs to the market at a later date or sell them to the spirits industry for distillation in accordance with government programs. Small independent wine makers had neither the information nor the storage facilities necessary to efficiently regulate the flow of product to market. Cooperative vinification, and the information consolidation function served by the network of cooperatives, reduced the extent of disequilibrium by improving private and governmental organizations’ ability to forecast production and prices. In this way, cooperative vinification reduced the cost of using the price mechanism and thus enhanced efficiency, irrespective of its technological merits.

The vinification cooperative is clearly not the only form of organization capable of reducing the cost of using the price mechanism. Therefore, one must consider a range of organizational alternatives if one is to evaluate the efficiency of this particular form. These alternatives vary along two dimensions. First, they vary according to the extent of vertical integration, which is to say, according to the tightness of the governance structure. Second, they vary according to the role owners play in the organization's productive activity. In the analysis that follows, I consider three alternatives to the cooperative form of organization. These three alternatives represent different combinations of integration and ownership in winemaking.

Prior to the emergence of vinification cooperatives, winemakers formed cooperatives that provided storage space and marketing services, and that increased the political influence of independent winemakers. These early cooperatives, which did not undertake vinification, provide the first organizational alternative I want to consider. The winemakers owned the cooperative, but operations were less integrated since the farmers fermented their own grapes. And although these early cooperatives collectivized the storage and marketing functions, members paid rental fees for storage space and accounted for sales on a consignment basis. Unlike organizations supplying only cooperative storage and marketing facilities, vinification cooperatives were able to dampen price fluctuations by withholding wine from market in times of oversupply. Winegrowers needed storage facilities both to age the better

varieties and to stabilize prices by regulating the flow of product to market. Independent, for-profit storage facilities could not serve this function because only coordinated, cartel-like control of supply affects price. With plentiful storage space available for rent, individual farmers would have incentive to cheat by increasing their volume for sale. Indeed, this was the plight of early cooperatives that provided storage and marketing without coordinating production. By contrast, the governance structure of vinification cooperatives and the larger regional associations to which they belonged allowed them to manage the flow of product to market to a degree that cooperative storage facilities could not.

Seen from this point of view, cooperative vinification and marketing was a solution to the prisoner's dilemma of overproduction. Even if production information could be instantly and costlessly disseminated, individual winemakers would have incentive to cheat. Cooperative vinification and marketing integrated the fortunes of separate growers by compensating them according to a schedule set as a function of collective volume and market conditions. Cheating could still pay, of course, but in general the incentive to cheat diminishes as the decision-making entity becomes a larger proportion of the market and so bears a larger percentage of the costs of its own cheating. The monitor who changes the payoffs to the cooperative growers is the cooperative itself.

The capital requirements of a higher MES for vinification might indicate that an independent organization that would buy grapes from many farmers should undertake vinification. This is the second organizational alternative I consider. An independently owned vinification facility would be less vertically integrated than the vinification cooperative, and those who control the vinification and marketing would also own the firm. A variation on this structure would incorporate investors of capital who would own the facility without having control of day-to-day operations. At first blush, either arrangement might seem an efficient alternative to the vinification cooperative. The technology of, and the capabilities required for, viticulture and vinification had been diverging since the introduction of *Grands Crus* guidelines. Given increased specialization of this sort, separate ownership of viticulture and vinification processes would add profit incentive to the decision authority of both management groups. But independent vinification facilities were not feasible. Vintners had to crush and ferment grapes as quickly as possible after harvest, especially when white wine is produced; and since refrigerated transport was not available, this time exigency would have limited the geographical reach of the firm. Indeed, in Languedoc intra-regional rail service was slow and unreliable for a variety of historical reasons. (See Johnson, 1995, ch. 7.) An independent vinification facility, constrained in its geographic reach, would have faced threats of holdup at the hands of local growers. Thus asset

site-specificity disfavored establishment of independent vintners.⁸ One might also consider the threat of monopsony power. Again: because of limited market area, a single regional firm could behave opportunistically toward its suppliers. Hansmann (1988) analyzes American dairy cooperatives as a response to this kind of monopsony power.

Even if the hazards of asset specificity and opportunism could have been dealt with contractually, the structure of the wine production industry might have promoted non-traditional governance structures. Michael Spence (1976) has theorized that some socially desirable services are more likely to be produced by clubs than by profit-seeking firms. Vinification services may fall into this category of “club goods.” Spence refers to the inability of independent, profit-seeking firms to perfectly price discriminate, and thus take into account society’s total surplus when deciding whether or not to produce. When a firm cannot perfectly price discriminate, some inelastically demanded services will not be produced, even if the total costs of production would be less than the total surplus. Clubs, or in this case cooperatives, can overcome this difficulty because they “do not use the pure price system” (Spence, 1976, p. 410). Independent vinification facilities would face a relatively small market and inelastic demand curve, a function of fixed vineyard acreage and limited geographical extent of the market. If the profit-maximizing price such an independent facility could charge its customers was not sufficiently above its cost for grapes to cover fixed

⁸ For an explanation of asset site specificity, see Williamson (1985), especially p. 95.

costs, farmers could agree to transfer some of their surplus. But significant transactions costs would attend the negotiation and execution of such a transfer, owing to information asymmetries, among other factors. These transactions costs are what Spence argues favor club or non-profit provision of services. In the case of vinification cooperatives, farmers assume ownership of the facility, allowing a relatively costless transfer of surplus sufficient to sustain the cooperative's operations.

The vinification cooperative arrangement may contradict Barzel's maxim that whoever is in a position to affect the odds the most will own under uncertainty (Barzel, 1987). The cooperative marketing and administration are the entities charged with combating the uncertainty created by international competition, market power, and fluctuations in national and world production. The member-owners of the cooperative affect only the odds of obtaining a salable harvest under varying natural conditions. Barzel's analysis is not strictly applicable to the vinification cooperative because of latter's separation of ownership and effective control. The winegrowers are the owners and residual claimants, but they take little interest in the day-to-day operations of the cooperative (Ulin, 1986, p. 34). Their lack of involvement may simply reflect the transactions costs of governance. "When there are many residual claimants, it is costly for all of them to be involved in decision control and it is efficient for them to delegate decision control" (Fama and Jensen, 1983, p. 309). Those in the best

position to affect the odds do effectively control the relevant aspects of the cooperative.

This observation raises the question, why should the cooperative administrators not own the firm, lending profit incentive to their decision authority? I have already given a partial answer regarding the hazards of asset site specificity for the vinification facility. But forward integration into grape farming would eliminate those hazards. Thus, the third organizational alternative I address is the a fully-integrated wine growing and wine making firm owned by executive administrators. An efficiency explanation for preferring the vinification cooperative to this form relies on the economic value of preserving the institution of small, independent viticulture.

The preservation of small, independent growers is an instance of “flexible specialization,” where a smaller scale of production is preserved for the sake of inherent variety in what the organization needs to accomplish (Piore and Sabel, 1984). Small vineyards are tied to dispersed knowledge, which will only be used efficiently if growers retain residual claimant status. Each plot may have idiosyncratic characteristics to which the proprietor is accustomed to responding. Small proprietors whose families tended plots and vines for generations developed tacit knowledge about the interaction of soil, climate and weather with the particular vines planted there. This knowledge of what the French call *terroir* could not be easily codified, and was connected to the first-hand experience of tending the vines under a variety of different conditions. In

Oliver Williamson's (1985) terminology, we are speaking here of "human asset specificity," while David Teece (1986, p. 188) might say that the farmer and his plot are "cospecialized assets". Whatever the terminology, cooperative owners had the ability and incentive to use their idiosyncratic knowledge to maximize the yield from their vineyards when unpredictable growing conditions called for creative reactions. Frank Knight aptly describes the rationale for farmer ownership of the cooperative in his maxim, "You can't hire judgment."

The skills required of oenologists and cooperative administrators are technically defined to a greater degree than those of the wine grower. The scientific oenologist is charged with adhering to chemical specifications, while the grower's role is more artistic than technical. Agricultural science certainly aides the grower, but matters of quasi-artistic judgment concerning extent and timing are more relevant to viticulture than to vinification. The importance of such judgment may explain the residual claimant status of growers in the cooperative. Their status is not unlike that of corporate shareholders in the following respect: although relinquishing control of day-to-day operations, they retain a credible threat of ousting management. Vitaliano (1983) provides an analysis of how the threat of replacing management or merging with neighboring cooperatives effectively constrains managers from extracting nonpecuniary rents from cooperative enterprises.

Decentralized ownership may seem likely to undercut efficiency, as no doubt it often does. But owing to the importance of tacit knowledge and

economic capabilities in viticulture, decentralization in this field turns out to have the opposite effect. A focus on the importance of capabilities in organizational evolution suggests that “[t]he role of professional management in this process is, in fact, a centrifugal not a centripetal one. Once the large-scale investments have been made, once the economic capabilities have been forcibly rearranged, the imperative then becomes one of *decentralization*” (Langlois, 1991, p. 523, emphasis original). In the case of vinification cooperatives, government intervention, not professional management, is largely responsible for the forcible rearrangement of capabilities; but the decentralization imperative is embedded in the very structure of ownership.

Given such decentralized ownership, the efficiency of vinification cooperatives would seem to hinge on the design of a compensation scheme that could align incentives while promoting quality. The efficiency of any variable compensation scheme depends in part on the costs of measuring contributions from individual claimants. When individual contributions to the finished product cannot be distinguished, individual contributions must be measured via a proxy. A distant proxy, such as labor hours in team production, may encourage individual workers to shirk or free ride on the efforts of others. (See Alchian and Demsetz, 1972.) Early vinification cooperatives benefited from an easy, bright-line rule for allocating rents: weight adjusted for sugar content. This rule aligns incentives since the basis for remuneration is one that translates

directly into economic value in the finished product.⁹ In other words, for *vin ordinaire*, sugar content is a good proxy for quality. Since more effort maintenance is required the further the proxy is removed from the underlying target variable, the ease of measuring a closely related proxy meant that the cooperative expended minimal resources to monitor the efforts of its members.

The large, integrated wineries of California would seem to present a challenge to the claims I have made above. One conjectural response to this challenge is that the role of local knowledge in the Midi's wine cooperatives may be greater than its role in west-coast wineries. This would be the case if climatic and soil conditions exhibited greater variation in the Midi. Additionally, capabilities exist in France for historical reasons that predate winemaking on the West Coast. That vinification cooperatives utilize this knowledge-base exhibits path-dependence, but this path-dependence does not entail that cooperatives will be less efficient than wineries that lack detailed local knowledge, and for that reason organize themselves differently. The same might be said of land ownership structure. If viticulture exhibits constant returns to scale even at very low levels of production, nothing is gained by a consolidation of land holdings. But neither do constant returns to scale inhibit the cultivation of large consolidated holdings where such real estate is available, as in California. Finally, in his book *Trust*, Francis Fukuyama (1995) presents compelling

⁹ At least this was true prior to the 1980s, when many cooperatives began producing higher-quality wines. This reorientation required that the cooperatives measure and reward other qualitative characteristics of the harvest.

arguments for why different cultures tend to organize industry differently. In brief, his argument claims that cultural factors make large-scale enterprises inefficient in France from a transactions cost point of view, while the history of voluntary association in the US makes large integrated enterprises more viable.

Prospects for the future

One criterion for predicting the degree of organizational unity and central direction at a given stage of production is the pace and kind of innovation. The dynamic rationale for vinification cooperatives is “architectural innovation,” Henderson and Clark’s term for a dynamic when innovation in the combining of components is critical, but the components themselves change little. Architectural innovation has allowed cooperatives to keep pace with scientific advances in winemaking. But this strength may decline in importance. Advances in genetic engineering have expanded the ability to influence the vinified product by breeding the right grapes, as opposed to tweaking the vinification process. (See Johnson and Halliday, 1992.)

Since the cooperative traditionally pays growers only according to the volume and the sugar content of their harvest, farmers have no incentive to innovate on other margins; in fact, they will economize on other margins, free-riding on the quality of others’ grapes. This limitation on innovation has become important as cooperatives reorient themselves toward the production of quality wines. For cooperatives to survive, the proxy according to which farmers are compensated must expand to include all relevant characteristics of the harvest.

French researchers report that cooperatives are having some success with measuring and rewarding other qualitative characteristics of the harvest. (See Temple *et al*, 1996.)

Just as marketing considerations dictated that farmers adopt a larger scale of operation early in this century, new market forces are forcing cooperatives to restructure. Mere volume no longer commands the market premium that it once did. Instead, cooperatives must offer higher quality wines, varietal wines, or a fuller range of products in order to obtain the best prices. These imperatives imply a yet larger scale of operation than most village cooperatives enjoy. As a result, mergers and technical change, both in viticulture and in vinification, have swept through the industry. Temple *et al* (1996) discuss these developments in some detail.

The success or failure of this transformation will confirm or refute this paper's contention that vinification cooperatives were a progressive adaptation to economic forces. If the restructured cooperatives fail, one could conclude that the cooperatives were, after all, merely a means of preserving local identity, social stability, and traditional agriculture. According to this view, the trend toward consolidated, regional cooperatives that impose stricter guidelines on members and encourage larger-scale cultivation undermines the cooperative's original *raison d'être*. In opposition to my thesis, the failure of these mega-cooperatives would suggest that cooperatives were, after all, conservative, perhaps even backward. If the current restructuring is successful, however, the

cooperative form of organization will emerge as an institutional adaptation whose success is more clearly based on economic efficiency.

Sources

- Alchian, Armen A. (1950). "Uncertainty, Evolution, and Economic Theory," *Journal of Political Economy* 58(3):211-221.
- Alchian, Armen and Harold Demsetz (1972). "Production, Information Costs, and Economic Organization," *American Economic Review* 62(5):
- Barzel, Yoram
1987. "The Entrepreneur's Reward for Self-Policing," *Economic Inquiry* 25:103-116.
1982. "Measurement Costs and the Organization of Markets," *Journal of Law and Economics* 5: 27-48.
- Carstensen, Fred 1995. "Civil Authority and the Articulation of Markets," *Critical Review* 9(4):585-594 Fall.
- Chandler, Alfred D., Jr. 1977. *The Visible Hand: The Managerial Revolution in American Business*. Cambridge, MA: The Belknap Press of Harvard University Press.
- Cheung, Steven N. S. 1983. "The Contractual Nature of the Firm," *Journal of Law and Economics* 26: 1-22 April.
- Coase, Ronald H. 1937. "The Nature of the Firm," *Economica* 4:386-405 November.
- Commission of the European Communities 1984. *Prospects for Workers' Cooperatives in Europe*.
- Dahlman, Carl J. 1980. *The Open Field System and Beyond*, New York: Cambridge University Press.
- David, Paul A. 1966. "The Mechanization of Reaping in the Ante-Bellum Midwest," In Henry Rosovsky, ed., *Industrialization in Two Systems: Essays in Honor of Alexander Gerschenkron*. New York: pp. 3-39.
- Fama, Eugene F. and Michael Jensen 1983. "The Separation of Ownership and Control," *Journal of Law and Economics* 26(2): 301-27 June.
- Fukuyama, Francis. 1995. *Trust: The Social Virtues and the Creation of Prosperity*. New York: The Free Press.
- Gavingnaud, Geneviève. 1983. *Propriétaires-Viticulteurs en Rousillon/ Structures - Conjonctures - Société/ XVIII-XX siècles*, Paris: Université de Paris I - Panthéon-Sorbonne
- Hansmann, Henry. 1988. "Ownership of the Firm," *Journal of Law, Economics, and Organization* vol. 4, no. 2 Fall 1988, pp. 267-304.

- Henderson, Rebecca M. and Kim B. Clark 1990. "Architectural Innovation: the Reconfiguration of Existing Product Technologies and the Failure of Established Firms," *Administrative Science Quarterly* 31:439-65 March.
- Johnson, Christopher H. (1995). *The Life and Death of Industrial Languedoc, 1700-1920*. New York: Oxford University Press.
- Johnson, Hugh and James Halliday 1992. *The Vintner's Art: How Great Wines are Made*, New York: Simon and Schuster.
- Kimball, Miles S. 1988. "Farmers' Cooperatives as Behavior Toward Risk," *The American Economic Review* 78:224-32 March.
- Koppl, Roger and Richard N. Langlois 1994. When Do Ideas Matter? "A Study in the Natural Selection of Social Games," *Advances in Austrian Economics* 1:84-104.
- Landes, David (1969). *The Unbound Prometheus*. Cambridge: Cambridge University Press.
- Langlois, Richard N. 1991. "The Capabilities of Industrial Capitalism," *Critical Review* 5(4):513-530 Fall.
- Langlois, Richard N. and Paul L. Robertson (1995). *Firms, Markets, and Economic Change: A Dynamic Theory of Business Institutions*. London: Routledge.
- Leijonhufvud, Axel 1986. "Capitalism and the Factory System," in R.N.Langlois, ed., *Economics as a Process: Essays in the New Institutional Economics* New York: Cambridge University Press.
- Loubière, Leo A. (1990). *The Wine Revolution in France: The Twentieth Century*. Princeton: Princeton University Press.
- Loubière, Leo A. et al (1985). *The Vine Remembers: French Vignerons Recall Their Past*: Albany: State University of New York Press.
- Lucas, R. E., Jr. (1973). "Some International Evidence on Output-Inflation Tradeoffs," *American Economic Review* 63(3): 326-34.
- Mendras, Henri. 1970 English translation. *The Vanishing Peasant/ Innovation and Change in French Agriculture*, Cambridge, MA: The MIT Press.
- Nelson, Richard R. and Sidney G. Winter. 1982. *An Evolutionary Theory of Economic Change*, Cambridge, MA: The Belknap Press of Harvard University.
- Niederbacher, Antonio. (1988). *Wine in the European Community*. Luxembourg: Office for Official Publications of the European Communities.
- Nye, John Vincent. 1987. "Firm Size and Economic Backwardness: A New Look at the French Industrialization Debate," *Journal of Economic History*, Vol. XLVII(3), pp. 649-69.

- Olmstead, Alan L. and Paul W. Rhode. 1995. "Beyond the Threshold: An Analysis of the Character and Behavior of early Reaper Adopters," *Journal of Economic History* 55(1): 27-57 March.
- Piore, M. and C. Sabel (1984). *The Second Industrial Divide*, New York: Basic Books.
- Porter, Philip K. and Gerald W. Scully. 1987. "Economic Efficiency in Cooperatives," *The Journal of Law & Economics* vol. XXX October 1987, pp. 489-512.
- Sexton, Richard J. (1986). "The Formation of Cooperatives: A Game-Theoretic Approach with Implications for Cooperative Finance, Decision Making and Stability," *American Journal of Agricultural Economics*, 68: 214-25.
- Sivéry, Gérard (1969). *Les Comtes de Hainaut et le Commerce du Vin: Au XIVe Siècle et au Début du XVe Siècle*. Lille, France: Publications du Centre Régional d'études Historiques de L'Université de Lille.
- Spence, A. Michael. 1976. "Product Differentiation and Welfare," *American Economic Review* 66(2), pp. 407-14.
- Temple, Ludovic, Jean-Marc Touzard and Françoise Jarrige. 1996. "La Restructuration des Coopératives Viticoles en Languedoc Rousillon: Du Modèle Communal à la Diversité des Adaptations Actuelles," *REM* vol. 44, n° 176, pp. 73-93.
- Ulin, Robert C.
 1996. *Vintages and Traditions: An Ethnohistory of Southwest French Wine Cooperatives*. Washington: Smithsonian Institution Press.
 1986. "Social Change through a Southwest French Wine Cooperative," *Ethnologia Europaea* XVI: 25-38.
 1988. "Cooperation or Cooptation: A Southwest French Wine Cooperative," *Dialectical Anthropology* 13: 253-267.
 1987. "Writing and Power: The Recovery of Winegrowing Histories in the Southwest of France," *Anthropological Quarterly* pp. 77-82.
 1995. "Invention and Representation as Cultural Capital: Southwest French Winegrowing History," *American Anthropologist* 97(3): 519-527
- Vitaliano, Peter (1983). "Cooperative Enterprise: An Alternative Conceptual Basis for Analyzing a Complex Institution," *American Journal of Agricultural Economics*, 65: 1078-83.
- Warner, Charles K. 1960. *The Winegrowers of France and the Government Since 1875*, New York: Columbia University Press.

- Williamson, Oliver E. 1985. *The Economic Institutions of Capitalism*, New York: The Free Press.
- Wright, Gavin and Howard Kunreuther (1975). "Cotton, Corn and Risk in the Nineteenth Century," *Journal of Economic History*, vol 35.
- Yoon, Soon Young Song 1975. "Provençal Wine Cooperatives," In *Beyond the Community: Social Process in Europe*, ed. Jeremy Boissevain and John Friedl. The Hague: Department of Educational Science of the Netherlands.