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Vertical Integration and Financial Performance of French Wine Farms and Co-operatives

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21.1 Introduction: Benefits and Costs of Vertical Integration

Most studies and policymakers state that vertical integration is required to create value, such as Bijmanet al. (2012) who observe that, on the European scale, the most sustainable wine co-operatives are those which have implemented vertical integration or Couderc et al. (2010) who consider that the Languedoc-Roussillon wine firms should maintain control of their bottling and branding activities to capture more value on the regional scale. Moreover, Cadot (2015) observed that vertical integration significantly increases the margin of all wine firms but that it depends on the ownership structure of the firm. This reveals that vertical integration implies internal costs related to the relationship between the ownership and the management of the firm.

Therefore, the choice of vertical integration can be seen as a trade-off between a decrease in transaction costs and an increase in internal costs. Vertical integration requires an upper-skilled management which should

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develop a specific human capital through learning by doing (Couderc et al. 2010). This changes the relationship between the owners of the firm and the managers (Cadot 2015). The management benefits from an informational advantage which could lead to agency costs.[1] In other words, because of their dominant position, the managers could adopt a behavior and an investment policy which do not strictly optimize value for the firm's owners. This mechanism should be different according to the ownership structure of the firm. Indeed, there should be no agency costs when the manager is also the owner of the firm. And, following the Jensen and Meckling (1976) approach, the level of these costs should be inversely related to the proportion of ownership held by the manager. The agency costs of certical integration should not affect farmers, but the issue can be critical for co-operatives, because of their "vaguely" defined ownership structure (Cook 1995) due to the double quality of the members, who are user-owners, and other principles of the co-operative structures such as the "one member one vote". Cadot (2015) shows that vertical integration implies agency costs[2] for outsider-managed firms but the overall impact of vertical integration remains positive. Unexpectedly, the agency costs associated with vertical integration do not increase in the case of co-operatives. However, co-operatives show the lowest overall impact of vertical integration on performance. Cadot and Viviani (2013) observe that the downstream structures related to Languedoc-Roussillon wine co-operatives, either a union of co-operatives or a subsidiary, stated that they are financially constrained, while the first-tier co-operatives are not. This could reveal that the co-operatives are reluctant to allocate sufficient resources to support their strategies of vertical integration.

In this chapter, we gather results about vertical-integration strategies of wine farms (and especially co-operative members compared to the others) and wine co-operatives in France to explore wine farms' performance in relation to their vertical-integration level. In the following section, we present the samples used for two studies, one focusing on vertical integration by wine firms, and the other by wine co-operatives. Then, we present the results.

[1] This is the concept of "entrenchment" of managers, formalized by Shleifer and Vishny (1989).

[2] This result is in line with D'aveni and Ravenscraft (1994).

21.2 Description of the Samples: French Wine Farms and Bordeaux Wine Co-operatives

21.2.1 French Wine Farms

The Farm Accountancy Data Network (FADN) in Europe provides representative data on farms according to three criteria: region, economic size and type of farm (ETO[3]). Here we used the data of the ETO viticulture for France over three years (2010, 2011 and 2012) on a constant sample. Insofar as this database does not differentiate between co-operative members and wine farms selling bulk wine (not registered in the database that refers only to the product sold) (Delord 2011), we coupled this data with the CVI.[4] We use the information on the destination of sales of wine farms to differentiate (Cadot et al. 2017):

- The co-operative members who deliver their grapes to a co-operative (over 75% of volumes). Then the co-operative processes and sells the wine on behalf of its members.
- The wine farms called "bulk" that produce wine from their grapes and sell more than 75% of their volume in bulk.
- The wine farms called "mixed", producing and selling wine in bulk and in bottles, each representing 25–75% of the volumes.
- The wine farms called "bottle", producing and selling wine in bottles for more than 75% of the volumes.
- The others, using several of these distribution channels and possibly selling fresh grapes and which do not fit in any of the categories proposed above.

The pairing of the FADN and the CVI allows us to create a file with 801 winegrowers. We exclude the farms with less than three registered years and the wine farms from the Champagne and Poitou-Charentes[5] (mainly Cognac) regions, to set a sample of 684 wine farms, including 258 wine co-operative members, 108 wine farms selling mainly bottled wine ("bottle"), 137 wine farms selling bulk wine ("bulk") and 111 "mixed" wine farms (Table 21.1). Thirty-eight percent of the wine farms deliver most of their grapes to a wine

[3] ETO: economic and technical orientation.

[4] CVI: computerized vineyard register in France.

[5] The financial characteristics of Champagne and Cognac farms are fundamentally different from the average French wine farms in terms of strategy.

Table 21.1 Number and wine farms' allocation

	Number of farms	Distribution (%)
Co-operative members	258	38
Bulk	137	20
Mixed	111	16
Bottle	108	16
Others	70	10
Total	684	100

co-operative. Fifty-two percent process wine and sell the wine in bulk or in bottles, by themselves or through intermediaries (negociants or wholesalers). The remaining 10% are composed of a variety of models and it is difficult to classify them (fresh harvest as the main activity or as an addition to wine selling). We do not present the results for this latest category which is very heterogeneous.

Appendix shows the distribution of these wine farms by wine region.

21.2.2 Bordeaux Wine Co-operatives

In 2010, the Bordeaux wine region encompasses 7400 farms cultivating vineyards, with 5700 farms specialized in wine growing. The vineyard covers 124,000 ha (about 50% of the agricultural area of the Gironde department) and generates 90% of this area's agricultural value. Two thousand four hundred and sixty winegrowers are co-operative members. They operate 24,279 ha, that is, 20% of the wine area in this department. The 39 Bordeaux co-operatives process about 36% of the 5.8 million hectoliters (hl) of the wine produced. The average size of farms exclusively making wine through the co-operatives is about 10 ha (DRAAF 2011).

There is no official database about co-operatives in France, so we used a survey to extract economic and financial information on all the Bordeaux wine co-operatives. This original database includes accounting data and information on the distribution channels and the volumes (both from the *déclaration de récolte*), the number of co-operative members and the area they operate in. Some questions (such as investment or winemaking costs per hl) are directly answered by the co-operative accountants. As a result, we are able to compute the sales per hl as well as the price paid to producers per hl and to make the link with the distribution channel, general co-operative features and financial ratios for the 2005–2010 period.

Our approach relies on the distinction of co-operatives according to their downstream strategy: "traditional", "union" or "vertical integration" following and adapting Cook (1995). We consider that the downstream strategy is:

– "Traditional", when co-operatives have implemented neither a union nor a vertical-integration strategy (12 co-operatives in 2010).
– "Union", when more than 30% of turnover is made up of sales thanks to a union of co-operatives for the commercial part (10 co-operatives in 2010).
– "Vertical integration", when bottled wine represents more than 30% of the turnover (15 co-operatives in 2010).

The "traditional" and "union" co-operatives are comparable in size considering the number of producers (Table 21.2). However, the size of the producers' farms is higher for producers who belong to a co-operative in "union". We observe that sales of co-operatives in "union" are also, on average, higher than sales of "traditional" co-operatives. This may be a direct consequence of the average size of producers' farms. The vertically integrated co-operatives seem to be more heterogeneous than the others in terms of size. Indeed, they encompass both the co-operatives with the highest number of producers and those with the lowest number. We make the same observation for the total area operated by co-operative members. It seems that the vineyard of each winegrower is smaller for these co-operatives than for co-operatives in "union".

Table 21.2 Size, sales and distribution channel

		Number of members	Area (ha)	Sales (€)
Traditional	*Obs*	*57*	*76*	*76*
	Mean	69	524	3,147,210
	Min	30	125	416,569
	Max	185	1935	14,600,000
Union	*Obs*	*29*	*35*	*35*
	Mean	77	785	4,351,052
	Min	33	100	466,085
	Max	208	2560	15,200,000
Vertical integration	*Obs*	*73*	*102*	*102*
	Mean	134	647	7,170,552
	Min	12	30	462,991
	Max	549	3671	25,400,000
Total	*Obs*	*159*	*213*	*213*
	Mean	100	626	5,271,695
	Min	12	30	416,569
	Max	549	3671	25,400,000

Note: Observations are co-operative-year, for example, 37 co-operatives over a five-year period (2005–2010)

Indeed, the average number of producers is higher for "vertically integrated" co-operatives, but the average area operated by each co-operative is smaller. The wine price (sales per hl) is closely comparable for "traditional" and "union" co-operatives.

In France, some co-operatives are specialized in the first stage of processing and sell the wine in bulk as a raw material to private companies (negociants) which will blend and market the product—the bottle of wine—to retailers. Traditionally, the main activity of Bordeaux wine co-operatives is to process the wine grapes produced by the co-operative members and to sell bulk wine to negociants, who blend, bottle and market the wine to retailers. This is what we consider as the "traditional" co-operatives. Others have chosen to blend and market their own wines to retailers, the "vertically integrated" co-operatives. They have successfully entered niche markets through vertical integration, that is, bottling and branding their own wine, such as the co-operatives of Saint-Émilion and Listrac in the Bordeaux wine region. Some other co-operatives have chosen to constitute a co-operative with other co-operatives, called a "union", specialized in the blending and marketing of wine. These co-operatives—the co-operative "unions"—have chosen to federate into second-tier co-operatives which directly compete with negociants.

The distinction between the first-tier co-operatives and the union of co-operatives is made in only a few studies. Cadot et al. (2016) collected data for the Bordeaux wine industry and show that 32% of Bordeaux wine co-operatives sell more than 75% of their wine in bulk, 27% sell more than 75% of their wine through a co-operative union and 40% sell more than 75% of their wine in bottles.

21.3 Wine Farms' Performance and Vertical-Integration Level

21.3.1 Ratios

Wine farms' performance is analyzed considering economic indicators but also financial performance ratios. The FADN provides the income generated by farms, taking into account the specificities of the farm: rents and distinction between employment and family work. Here, we present the production

of the year[6] and, following Delord (2011), two specific balances in the financial analysis of farms, total income and family income for farms according to their degree of vertical integration.[7] The most relevant and operational measure of family income is the current income before tax (Chassard and Chevalier 2007; Delord 2011). The current income before tax, the sum of operating income and the financial result of the firm, corresponds to the benefit that can be assigned to the remuneration of the manager and self-employed caregivers who work on the farm. It is useful to analyze the ability of farms to generate income for all permanent workers, paid or unpaid, through the total income registered with the FADN. It is the amount of family income (not employees) and all expenses for employees, salaries and benefits, expressed per annual work unit (Delord 2011). The annual work unit represents the number of hours for a person employed full time for one year on a farm.

To explore the financial structure, we then propose an analysis of simplified average operating balances by wine farm category. We present, on one hand, the economic assets, defined by the consideration of two aggregates, fixed assets and working capital requirements (WCR).[8] Secondly, we present the financial liability which includes equity and net debt.[9] We propose to analyze financial performance by type of operation from average financial characteristics. To this end, we decompose the profitability of the activity depending on the margin and capital turnover, following a fairly standard approach in financial analysis, which can be applied to the analysis of farms (Barry and Ellinger 2012). We present an analysis of WCR in days of turnover[10] and debt ratios by measuring the amount of debt to equity and the debt ratio on the result. Finally, we look at two ratios that approximate the maturity of the debt to that asset: the medium- and long-term debts on the amount of assets and short-term debt on WCR.

[6] The production of the year is the aggregation of production sold, inventory variations, capitalized production, production and own consumption of various products from inseparable secondary activities, less purchases of animals. Production for the year does not include subsidies.

[7] We are interested in co-operative members as a reference, bulk, mixed and bottled private cellars. "Other" farms represent a minority and are not considered in the analysis of the degree of vertical integration.

[8] The need for working capital is the sum of trade receivables and payables less stocks. This is the amount necessary to fund the business operating cycle, that is to say, the gap between cash expenses incurred for the production and receipts from sales of products.

[9] Net debt is the sum of financial debt less cash operating assets (cash and securities). Debt allows us to consider only the debts that cannot be repaid immediately by farms.

[10] As seen above, the working capital is a highly dependent variable of the position of the companies in their sectors. Considering vertical integration leads us to attend to this aggregate.

21.3.2 Economic Performance

Table 21.3 shows the average data for four aggregates of the farm balance sheet. Co-operative members correspond to grape farms that combine the least assets (€250,000 against €440,000 for the entire sample). In particular, they have a much lower WCR compared to the amount of capital assets, while WCR is roughly equivalent to the amount of capital assets for all farms. The co-operatives are also the farms for which the net debt is the lowest since it only represents 13% of the financial liability (Fig. 21.1). At first reading, we see that the wine farms are well capitalized since the amount of equity is higher than the average capital assets (balance sheet analysis above), indicating that the working capital is necessarily positive. The debt level is generally low; it is generally less than one third of the total economic record.

The balance sheet of private cellars bottling their wine ("bottle") is over three times that of co-operative members (€870,000 against €250,000 on average). WCR represents 52% of total assets and 320 days of sales, which is higher than the average of the sample. Net debt represents 30% of the balance sheet, which is higher than that observed for all other wine farms. The balance sheet of wine farms processing and selling bulk wine ("bulk") is closer to the one of co-operative members. Fixed assets are higher (€213,915 against €152,567) and WCR as well (€156,355 against €94,490). The share of assets (58%) is also higher than the WCR in the economic assets (42%). Net debt is also quite low: 16% of the financial liability. "Mixed" wine firms have an amount of assets which is quite close to the one of private cellars processing and selling bulk wine ("bulk"), but the WCR is much higher. It represents 57% of the balance sheet and in days of turnover,

Table 21.3 Economic balance by level of vertical integration

	Economic assets (€)			Financial liability (€)		
Co-operative members	Fixed assets (€)	152,567	61%	Equity (€)	215,890	87%
	WCR (€)	96,490	39%	Net debt (€)	33,594	13%
Bulk	Fixed assets (€)	213,915	58%	Equity (€)	312,590	84%
	WCR (€)	156,355	42%	Net debt (€)	59,530	16%
Mixed	Fixed assets (€)	231,179	43%	Equity (€)	405,854	76%
	WCR (€)	302,238	57%	Net debt (€)	129,867	24%
Bottle	Fixed assets (€)	450,424	52%	Equity (€)	613,966	70%
	WCR (€)	420,964	48%	Net debt (€)	260,014	30%
Total	Fixed assets (€)	223,477	51%	Equity (€)	327,869	78%
	WCR (€)	196,614	49%	Net debt (€)	93,684	22%

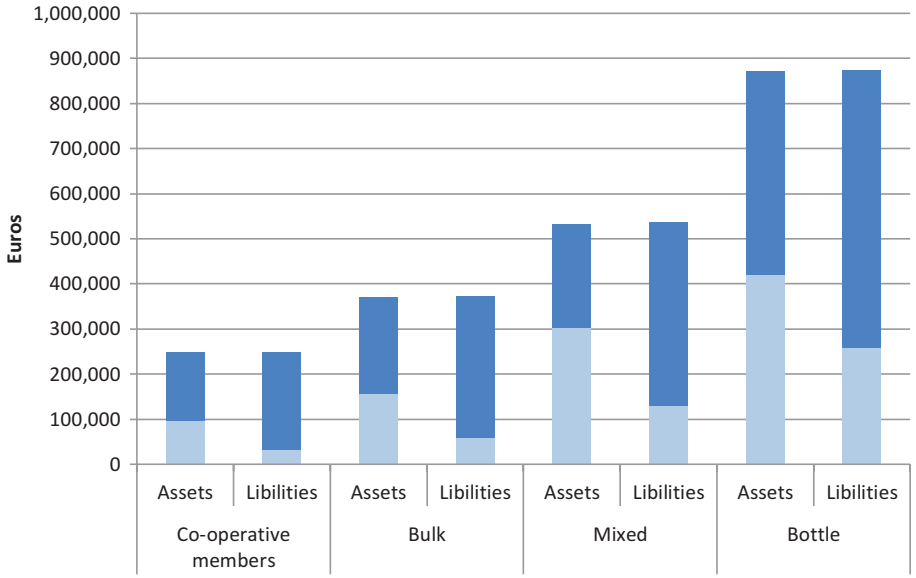

Fig. 21.1 Economic balance by level of vertical integration. (In dark gray, "high balance" on the asset and liabilities, respectively, corresponds to fixed assets and equity. In light gray, the "low balance" to match assets and liabilities, respectively, in WCR and net debt)

Table 21.4 Vertical integration and profitability ratios

	Margin (%)	Capital turnover	Working capital requirements	Profitability (%)
Co-operative members	25	0.48	290	11.82
Bulk	15	0.57	267	8.74
Mixed	17	0.66	309	11.96
Bottle	19	0.64	271	12.42
Total	20	0.60	282	11.41

and it is equivalent to the "bottle" wine farms' (318 against 320 days). The level of debt, 24% of the balance sheet, is as close to these same wine firms bottling the wine.

21.3.3 Financial Performance

The analysis of the production, the results and the financial structure allows us to calculate financial ratios. For the total sample, the average margin (family income over production) is 20% (Table 21.4). The capital turnover ratio is

0.60 (1 active euro is required to achieve production of €0.60), which positions the wine farms in the capital-intensive businesses (Vernimmen et al. 2015): this ratio of capital turnover is close to that of Eutelsat, whose business model is based on the ownership of a fleet of satellites. The profitability of operating assets is 11%. This result should be interpreted with caution. However, this return does not take into account the income of the farmer. Considering a minimum income of €20,000 per year, the economic profitability drops to 7.20% which is rather low, given the risk of the activity. Under these conditions, the return on average equity is 9.26%. Financial liabilities represent 28.3% of equity and less than twice the result of the company (financial debt/income = 1.95) (Table 21.5). Fixed assets are funded at 47% by medium- and long-term debts (medium- and long-term debts/assets) and short-term debt represents 11% of the WCR, which is rather low. The wine farms are profitable and have a low debt level, whether in the long or the medium term (see Tables 21.4 and 21.5).

21.3.3.1 Co-operative Members: A Significant Working Capital Requirement and Very Limited Bank Financing

The margin obtained by co-operative members is higher than the margin of wine farms that have chosen to integrate downstream activities. This margin indicates a capital-intensive behavior, with a turnover ratio of assets of 0.48, much lower than the average farm (0.60). These characteristics are typical of companies whose business is centered on production (grape production in this case).

The WCR represents 290 days of sales, which is higher than the one of private cellars bottling the wine (271 days) and private cellars processing and selling bulk (267 days). This significant amount reflects the relationship between the co-operative and the co-operative members. The producer brings

Table 21.5 Vertical integration and financial risk

	Financial debt/equity (%)	Financial debt/ income	Medium- and long-term debts/assets (%)	Short-term debt/ working capital requirements (%)
Co-operative members	15.56	3.56	28.18	5.81
Bulk	19.04	4.82	36.86	12.15
Mixed	32.00	2.96	56.51	14.18
Bottle	42.35	1.29	62.66	11.54
Total	28.57	3.35	47.46	11.24

his production to the co-operative and his income is smoothed over the whole year, usually with a delay of three months. Conversely, the farmer gets the amount of production sold in the weeks following the transaction if the wine sold by the co-operative is bulk wine. Ultimately, the efficiency obtained is 11.82%, which is greater than for the entire sample. This result, however, is relative: if we take into account an income of €20,000 for the farmer, the economic profitability drops to 4% and the return on equity would be only 4.82%, which seems very low to cover the risk associated with the activity.

The debt level is low, with net debt representing 15.56% of equity. It represents a little more than the result of a year. But if we take into account an income of €20,000 for the farmer, it represents 3.56 times the result, which is not negligible. Net assets are financed for less than a third of the debt in the medium and long term, and short-term debt represents only 5.8% of the WCR. These figures can be explained in two ways: a low level of investment, which can be alarming for the future of the co-operative system whose base is the competitiveness of co-operative producers, or a limited banking support. Note that members do not present short-term financial risks. The analysis shows that they have a short-term debt margin in the eventuality of temporary difficulties.

21.3.3.2 The Wine Farms Selling Bulk: Low Profitability and Low Debt

The margin obtained by "bulk" wine farms is lower on average than the one obtained by the "bottle" wine farms, with a capital turnover that is not better. Economic profitability falls to 8.74% but amounts to only 3.12% when considering an income of €20,000 for the farmer, which is not nearly enough to offset the economic risk on the activity. Thirty-six percent of the capital is financed by medium- and long-term debts which are slightly higher than the amount observed for co-operative members but very far from wine farms bottling the wine. However, the debt represents 1.82 times the family's income and 4.82 times the adjusted result, which is by far the highest ratio.

21.3.3.3 The "Mixed" Wine Farms: An Interesting Profitability but a Risk on WCR

The margin of "mixed" private cellars is between that of "bulk" private cellars and "bottle" ones. However, the capital turnover ratio is higher than that of

these two categories of wine farms, which is explained both by the value added by the integration and the relatively small amount of assets (closer to "bulk" wine farms than "bottle" ones). Therefore, the “mixed” private cellars have an economic profitability of 11.96%, which is close to the profitability achieved by the “bottle” wine farms. The total debt level is 32%, which is just in between the “bulk” and the “bottle” wine farms. One point must be noticed: these wine farms are those with the highest WCR, with 309 days of production, and working capital financing rate of short-term debt is the highest (14.18%). Among the various types of wine farms observed in the sample, “mixed” private cellars are those that are most at risk of short-term failure. Note, however, that by correcting the result of a minimum income of €20,000 for the farmer, the result net debt ratio of these operations is better than the ratio for “bulk private” cellars or co-operative grape growers.

21.3.3.4 The Wine Farms Bottling and Selling the Wine: An Interesting Profitability and a Reasonable Debt

The valuation induced by bottling production improves the capital turnover ratio, but the cost of labor relative to the co-operative members reduces their margin. The “bottle” wine firms have the highest economic return of 12.42%. Net debt represents 42% of equity, against 28% for the entire sample. This debt can result in more favorable investment dynamics for these operations: the medium- and long-term debts account for almost two thirds of the assets. Despite this, the average debt represents 1.18 times the result (and only 1.29 times when we take into account the minimum income for the farmer), which is really reasonable. Similarly, the short-term risk is on average very limited since the short-term debt financing represents less than 11.5% of WCR.

From the co-operative members to the wine farms that sell bottled wine on the market, the producing firms have different degrees of vertical integration. It should be noted that the intermediate degrees of vertical integration have weaknesses, which are consistent with the bipolarization tendency of wine farms toward specialization or total integration observed by Traversac et al. (2007). According to our results, integrating the winemaking activity can lead to an increase of production, in value, by wine farm and by unit of work or area, but the expenses associated with the integration result in a lower income per unit of work and per area than the one obtained by co-operative members. The profitability of the capital employed on these farms is low and insignificant when we take into account the need for a minimum income for the farmer. The situation of “mixed” private cellars is different: the integration of

the bottling activity improves the income of the wine farms and the profitability of the farm. But they face difficulties to manage their WCR. As a result, these farms are the ones facing the highest risk of bankruptcy. In this context, supply is an important issue for wine co-operatives and trading companies (negociants), not only in a long-term development perspective but also to avoid facing production overcapacity. Our analysis shows that co-operative members have a large debt capacity, probably due to lack of investment dynamics. The positive point is that this debt capacity makes it possible to finance their development if co-operatives are able to provide attractive growth prospects. Co-operatives can adopt strategies involving a partnership with trading companies, where one of the sources of supply, the "bulk" private cellars, is drying up.

21.4 Vertical Integration by the Wine-Processing Firms: Economic and Financial Performance in Bordeaux Wine Co-operatives

21.4.1 Descriptive Statistics

To go further with the vertical-integration process, we focus on the relationship between the price paid to co-operative members and the downstream strategies of co-operatives (Cadot et al. 2016). We analyze the trade-off between co-operatives' current payments to members relative to their investment, that is, a larger cash payout. When the co-operatives prioritize the price paid to producers, putting short-term decision-making ahead of the value of the firm, they tend to weaken the long-term strategy of the co-operative (through underinvestment). As a result, the horizon problem is a threat to the co-operatives' sustainability, especially when facing a crisis on the wine market. We propose to explore the relationship between the horizon problem of co-operatives and their downstream strategies. This should help us reveal the real long-term commitment of producers (co-operative members) to their co-operatives, according to the strategies chosen, and through this the sustainability of the different types of co-operatives.

Within the Bordeaux wine co-operatives, we observe that the wine price (sales per hl) is closely comparable for "traditional" and "union" co-operatives (Table 21.6). Both types of co-operatives deliver the same price to the producers per hl on average. However, the lowest value, for one "traditional"

Table 21.6 Product price and price paid to producers

		Sales per hl (€)	Price paid to producers (€/hl)
Traditional	*Obs*	*71*	*71*
	Mean	105	73
	Min	30	45
	Max	189	132
Union	*Obs*	*29*	*35*
	Mean	105	74
	Min	62	43
	Max	170	123
Vertical integration	*Obs*	*29*	*50*
	Mean	131	105
	Min	91	46
	Max	255	223
Total	*Obs*	*129*	*156*
	Mean	111	83
	Min	30	43
	Max	255	223

Note: Observations are co-operative-year, for example, 37 co-operatives over a 5-year period (2005–2010)

co-operative, is far below the lowest value observed for co-operatives in "union". Moreover, a striking point is that the minimum price paid to producers is higher than the output price. It can be interpreted as an extreme case of the horizon problem. As expected, the output price is higher for vertically integrated firms (+€26/hl for the average price). The price paid to producers is also higher (+€31/hl for the average payment).

Then, the margins (before the payment to producers), the obsolescence ratio and the leverage are, on average, highly similar for each type of co-operative (Table 21.7). The level of obsolescence is high for all categories of firms. These levels are far above the 50% which would represent the average obsolescence of a firm regularly renewing its assets.

21.4.2 The Co-operatives and Vertical Integration: Alone or Through a Union?

The results obtained confirm that the payment to producers is significantly higher in "vertically integrated" co-operatives (Cadot et al. 2016). The additional output price (sales per hl) largely explains this additional payment as the surplus due to belonging to a union is no longer significant and decreases by about €16/hl (from 23.76 to 8.00) for "vertically integrated" co-operatives when we introduce the sales per hl in the regression. If we introduce the margin, we do not see a difference: the output price explains most of the surplus.

Table 21.7 Margins, obsolescence and leverage

		Margins	Obsolescence	Leverage
Traditional	*Obs*	*70*	*69*	*71*
	Mean	76%	64%	0.45
	Min	48%	0%	0.02
	Max	97%	94%	1.41
Union	*Obs*	*29*	*35*	*35*
	Mean	70%	71%	0.37
	Min	44%	4%	0.00
	Max	94%	94%	1.35
Vertical integration	*Obs*	*29*	*35*	*102*
	Mean	70%	67%	0.48
	Min	48%	47%	0.00
	Max	91%	90%	2.11
Total	*Obs*	*128*	*139*	*208*
	Mean	73%	66%	0.45
	Min	44%	0%	0.00
	Max	97%	94%	2.11

The margin is the difference between the price paid to producers and the winemaking costs; the asset obsolescence is the ratio of asset amortization on the gross value of assets; and the leverage is the ratio of medium- and long-term debts on equity

However, when considering the interaction terms of margin with the downstream strategies, we observe that the premium for "vertically integrated" co-operative members disappears, which means that the surplus obtained by these producers is directly related to them. The price paid to producers is highly sensitive to the margin for co-operatives in "union" and less for "traditional" co-operatives. This may reveal a stronger connection between the co-operatives' capacity and the cash transfer to producers for co-operatives in "union", explaining why these latter are less risky than "traditional" co-operatives. For "vertically integrated" co-operatives, the more comfortable margins may provide a slack, making the price paid to producers independent of the yearly variations of margin.

There is an almost negligible difference between the price paid to producers in "traditional" co-operatives, that is, those which sell bulk wine to negociants, and the price paid to producers in co-operatives which have chosen to federate into a "union". By contrast, the "vertically integrated" co-operatives are able to offer a significantly better price for the production of the co-operative members. This research shows that "traditional" co-operatives prioritize payment to producers over renewal of assets, while co-operatives in "union" seem to anticipate the need for investment by a decrease of the price paid to producers when the capital obsolescence reaches a certain level. This mechanism would reveal a form of financial constraint which is not observed

for "vertically integrated" co-operatives. It would come that the "traditional" co-operatives are prone to short-termism, while co-operatives which have chosen vertical integration throughout a "union" preserve their future financial capacities and the co-operatives which have chosen full vertical integration are able to provide a better price to the producers. However, it is hard to disentangle these effects of the co-operative strategy from those of the geographical indication that the wine co-operative can use to brand its wines.

21.5 Conclusion

Altogether, these results show that vertical integration for wine-grape producers can be carried out at the farm level or collectively via co-operative membership. In both cases, it seems that operating on the bulk-wine market is not profitable. Indeed, bulk-wine producers display low financial performance, and "traditional" co-operatives seem to be affected by short-termism, by prioritizing the payment to producers over the co-operative's sustainability. As such, vertical integration appears an efficient way to create value for wine-grape producers, but it should not stop at the bulk-wine production stage. They should rather bottle the wine. Moreover, vertical integration requires a full consideration of costs and investments necessary to perform well. In our view, this implies specific learning and presents wine-grape producers with new challenges, whether they choose to perform vertical integration alone or within a wine co-operative.

Appendix: Number of Wine Farms by Level of Vertical Integration for the Main Wine Regions (France, Viticulture)

	Co-operative members	Bulk	Mixed	Bottle	Others	Total
Alsace	13	0	11	8	10	42
Val de Loire Centre	1	14	14	10	12	51
Bourgogne-Beaujolais-Jura-Savoie	8	9	15	28	27	87
Bordeaux Aquitaine	31	51	39	26	5	152
Sud-Ouest	6	9	5	1	3	24
Vallée du Rhône-Provence	94	18	17	14	6	149
Languedoc-Roussillon	100	32	6	12	7	157
Corse	5	4	4	9	0	22
Total	258	137	111	108	70	684

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