TRANSACTION COSTS, CAPABILITIES AND GRAPE PROCUREMENT STRATEGIES IN
U.S. EMERGING WINE REGIONS

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Abstract: What are the drivers of grape procurement strategies in U.S. emerging wine regions? Are these choices constrained by the same factors as in established wine areas? This paper uses a mixed-methods approach to discuss the "make-or-buy" decisions of small American wineries from five states: Illinois, Michigan, Missouri, New York and Vermont. Departing from the existing empirical literature on grape procurement strategies in the wine industry, we argue that the study of organizational decisions in American nascent clusters has to consider both their structural characteristics and the features of their participants. Based on semi-structured interviews with Missouri winery owners, we argue that, given the heterogeneity in the bundles of capabilities and resources owned by firms from emerging areas, a rationale exclusively inspired by Oliver Williamson's transaction cost economics is insufficient to explain grape procurement strategies. The evidence presented here is consistent with the view that knowledge plays a decisive role in boundary decisions. Also, the results point out to the importance of informal ties in the governance of the transactions carried out by the wineries in the sample. In special, trust appears to be an essential supporting mechanism in the governance of less coordinated exchanges, reflecting the constraints faced by many firms to devise complex formal arrangements.

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1. INTRODUCTION

Few agribusiness sectors have expanded faster in the United States than the wine industry. As Robinson and Murphy (2012) remark, a "wine revolution" has taken place, changing the landscape of several rural areas. Between 1970 and 2014, almost 8,000 wineries were established, spreading the activity to all 50 American states. From these firms, 96% are considered small wineries, producing up to 50,000 cases of wine (Wines & Vines, 2015). The progressive broadening of the so-called "emerging regions", geographical denominations that until recently have not been associated with the wine industry, has brought new opportunities and challenges. While a growing body of knowledge identifies the potential economic benefits of such transformations (Alonso and Liu, 2010; Boatto et al., 2013), long-term survival is still a concern for hundreds of these wineries.

Previous research points out quality as a fundamental factor for the success of both individual wineries and regional clusters (Oshenfelter, 2008; Storchmann, 2010; Giuliani, 2011; Castriota and Delmastro, 2014). Not surprisingly, a growing number of studies has turned its attentions to the logic behind grape procurement decisions in the wine industry. Relying on the hypotheses forwarded by Williamson's (1985) transaction cost economics (TCE), several studies relate the "make-or-buy" decisions of wineries to the relative specificity of the grapes used in production (Goodhue et al., 2003; Fraser, 2005; Zylbersztajn and Miele, 2005; Fernández-Olmos et al., 2009; Fernández-Olmos, 2010; Codron et al., 2013; Franken, 2014). However, as noted by Franken and Bacon (2014), such analyses have mostly concentrated on established wine regions, leading to an unavoidable question: are the procurement strategies of wineries in emerging clusters motivated by the same factors?

This paper departs from a slightly different question: are the grape procurement strategies of wineries in emerging regions constrained by the same factors as in established areas? In fact, as Miranda and Chaddad (2014) argue, "make-or-buy" decisions in emerging wine regions are directly affected by (i)
the considerable heterogeneity in the bundles of capabilities and resources owned by each firm; and (ii) the peculiar features of these fledging clusters, such as the existence of experienced independent grape growers in the surroundings. Or, to put in another words, often small wineries in emerging regions are not able to properly "make" or may find it difficult to "buy" quality grapes, having to adapt their procurement strategies to these limitations (see Madhok, 2002, for a theoretical discussion).

We adopt a mixed-methods approach to explore the logic behind procurement decisions of small wineries from five American states: Illinois, Michigan, Missouri, New York and Vermont. Following Greene et al. (1989), we use a "development approach", departing from a series of interviews conducted with Missouri wineries to lay the foundations for a quantitative analysis. According to the qualitative evidence available, although small wineries perceive full vertical integration as the optimal grape sourcing strategy, actual procurement decisions vary widely (Miranda and Chaddad, 2014). To explain such divergence, the hypotheses discussed in Section 4 are rooted in insights from three branches of the literature on the boundaries of the firm: the aforementioned Williamson's (1985) TCE, the so-called Resource-Based View (Wernerfelt, 1984; Kogut and Zander, 1992; Barney, 1999; Argyres and Zenger, 2012) and the embeddedness theory (Granovetter, 1985; Bradach and Eccles, 1989; Uzzi, 1996).

Consistent with the view that knowledge plays a decisive role in boundary decisions (Demsetz, 1988; Kogut and Zander, 1992; Argyres and Zenger, 2012), we show that previous experience with viticulture is positively associated with higher levels of vertical integration in the emerging clusters analyzed. On the other hand, the ability to measure the relevant attributes of grapes produced by independent growers appears to exert a limited influence on actual procurement decisions, suggesting a widespread lack of such skills among the surveyed firms. The results also point out to the importance of informal ties in the governance of the transactions carried out by the wineries in the sample. In special, trust is an essential supporting mechanism in the governance of less coordinated exchanges, reflecting the constraints faced by many firms to devise complex formal arrangements.
2. GRAPE PROCUREMENT STRATEGIES AND ORGANIZATIONAL DIVERSITY

The United States is the largest wine market in the world. Domestic consumption has increased every year since the turn of the twenty-first century, reaching 29.1 millions of hectoliters in 2013. Total imports in the same year corresponded to 37% of this volume, mainly from Italy, France, Australia, Argentina, Spain and Chile (OIV, 2014). Fuelled by the growing interest of consumers, several wine clusters have been formed around the country in the last two decades, increasing by more than 400% the number of wineries since 2000. Geographic dispersion has been the rule: although California still accounts for around 90% of both the value and the production of wine in the United States, only 47% of the 7,762 American wineries were located in the state in 2013 (Wines & Vines, 2014).

Conquering new frontiers, wine has changed the landscape of several rural portions across the United States. Along with similar phenomena in other countries (Fensterseifer, 2007), this expansion has transformed the geography of the industry, inspiring the creation of new terms. Historically, the so-called "established areas" have been divided between those located in the "Old World" - France, Germany, Italy, Portugal and Spain - and the "New World", which encompasses traditional clusters outside Europe such as Argentina's province of Mendoza, California, Chile and South Australia (Simpson, 2011). However, the rise of new producing regions since the 1990s led experts to add expressions such as "emerging regions" and "New Latitude Wines" to the daily lexicon of the field (Robinson, 2004; Veseth, 2014).

From an organizational standpoint, a relevant empirical question is whether wineries from emerging regions adopt the same grape procurement strategies of firms from traditional wine clusters (Franken and Bacon, 2014). In either case, transaction cost economics (TCE) has been the theoretical approach used to study such decisions. The framework is summarized by the "efficient alignment hypothesis", which supposes the existence of a clear optimal choice under any scenario. Given the features of a transaction, economic agents will devise organizational arrangements that minimize governance costs, defined as the costs of negotiating, supervising and enforcing contracts (Klein et al., 1978; Williamson, 1985). Before deciding, individuals compare among discrete alternatives, each one
characterized by (i) a particular dispute settlement system; (ii) a given level of exposure to the incentives furnished by the market mechanism and (iii) a specific contract law regime (Tadelis and Williamson, 2012).

Since the publication of "The Economic Institutions of Capitalism", thousands of pages have been written to discuss the realism of TCE. Williamson (1993a, 1993b) himself has carried over an active defense of the framework, highlighting the centrality of its behavioral assumptions, "bounded rationality" and "opportunism", to the "efficient alignment hypothesis". On the empirical front, a growing literature demonstrates that, irrespective of TCE's ability to accurately depict the economic system, predictive power has been fairly high (Shelanski and Klein, 1995; Klein, 2008). Yet, several authors have offered critical appraisals of Oliver Williamson's ideas. Contentious theoretical issues include the role of asset specificity in the determination of the boundaries of the firm (Coase, 1988; Demsetz, 1988; Simon, 1991; Kogut and Zander, 1992; Conner and Prahalad, 1996), the sufficiency of the "efficient alignment hypothesis" to explain order in economic governance (Granovetter, 1985; Bradach and Eccles, 1989; Hennart, 1993; Uzzi, 1996) and the convenience of forwarding a message rooted in the notion of "opportunism" to practitioners (Ghoshal and Moran, 1996).

Perhaps the main limitations of TCE are not those related to its explicit assumptions, but rather to its implicit ones. For example, the "efficient alignment hypothesis" applies to successive stages of production using separable technologies (Williamson, 1985; Tadelis and Williamson, 2012). A consequence of the focus on the study of specific vertical transactions is the lack of attention to the role of horizontal complementarities in the determination of firm boundaries (Milgrom and Roberts; 1990; Jacobides and Winter, 2005; Parmigiani and Mitchell, 2009; Puranam et al., 2013). TCE also departs from a theoretical scenario in which firms own identical capabilities or, at least, their acquisition is not problematic (Langlois and Foss, 1999; Argyres et al., 2012). Finally, Williamson's addition of "bounded rationality" to TCE's framework does not preclude a maximizing outcome in the main choice variable of
the model. In fact, if "farsighted contracting" is as pervasive as Williamson (1998) suggests, it is reasonable to ask whether the notion of "satisficing" (Simon, 1955) plays a role at all in TCE.

TCE's strengths and weaknesses have shaped the research design of several empirical studies on grape procurement strategies in the wine industry. Departing from the "efficient alignment hypothesis", these contributions reach a similar conclusion: in established clusters, firms producing higher-quality wines tend to adopt stricter levels of coordination in the governance of grape transactions (Goodhue et al., 2003; Zylbersztajn and Miele, 2005; Fraser, 2005; Fernández-Olmos et al., 2009; Fernández-Olmos, 2010; Codron et al., 2013; Franken, 2014). Remarkably, this consensus has not been affected by the fact that, inside the term "established area", diverse governance models coexist. Indeed, the drivers of organizational choices in the "Old World" and in the "New World" differ considerably, affecting the relative size and the boundaries of the typical firm in each case (Simpson, 2011). In Europe, the dominant arrangements are the "family vineyard" and the "cooperative", which vertically integrate grape growing and wine making (see also Simpson, 2000; Couderc and Marchini, 2011). "New World" wineries, in turn, have been characterized by the large-scale of production supported by the use of cutting-edge technology and the acquisition of large amounts of inputs from independent growers (see also Porter, 1999; Codron et al., 2013).

Interestingly, the existing literature inadvertently acknowledges the organizational heterogeneity across the oceans. While studies focused on European clusters frame the decisions of wineries as a "make-or-buy" tradeoff (Fernández-Olmos et al., 2009; Fernández-Olmos, 2010), scholars dealing with "New World" wineries explain strategies as the outcome of a "formal-contract-or-informal-contract" tradeoff (Goodhue et al., 2003; Fraser, 2005; Franken, 2012). To a great extent, fitting such diversity into the same theoretical framework has been possible thanks to the core features of TCE. Although Williamson (1991) conceives organizational arrangements as discrete structural alternatives with unique attributes, in his model agents are able to adapt to new circumstances nearly frictionless (Nickerson and Silverman, 2003). Consequently, different modes of governance can still be placed in a continuum from
"spot market exchange" to "vertical integration", being chosen according to the characteristics of each transaction.

To be more specific, TCE implicitly assumes that all organizational choices are available to every economic agent. It is true, most empirical studies based on Williamson's ideas are not affected by the potential shortcomings brought by this assumption. By relating observable organizational choices to different levels of asset specificity, TCE does not aim to explain what economic agents can do but, rather, why they did what they did (see Argyres et al., 2012 for a discussion). As Williamson (1985) argues, deviations from the "efficient alignment hypothesis" should be seen as a transitory phenomenon, suggesting the existence of a long-term equilibrium (for a critical view, see Langlois, 1992). In this sense, having two actual arrangements - "make" and "buy", for example - is a sufficient condition to test TCE's postulates in a stable industry. After all, if firms have used a certain structure and seem satisfied with this choice, scholars can always resort to the idea that no superior option exist, at least when the criterion is the minimization of governance costs.

Back to the research on grape procurement strategies in "established areas", the centuries of existence of most European wine clusters justify the assumption that a fairly static equilibrium exists. In fact, wineries from the "Old World" have dealt with two or more procurement alternatives long enough to adapt its governance structures to the "make-or-buy" logic. The same applies to the "New World", even recognizing that the traditional separation between grape growing and winemaking has progressively given room to more coordinated strategies (Goodhue et al., 2003; Codron et al., 2013). For the most part, a favorable terroir and the ownership of a considerable bundle of capabilities and resources has allowed a smooth transition process. Even in developing countries, such as Argentina and Chile, the combination of an extensive stock of knowledge and partnerships with public agencies and "Old World" wineries contributed to the emergence of modern wine clusters in no more than a decade (McDermott et al., 2009; Giuliani, 2011).
Are the American emerging wine regions similar to either the "Old World" or the "New World"? The scarce available evidence reveals a different scenario. According to Miranda and Chaddad (2014), although small Missouri wineries tend to perceive "full vertical integration" as the optimal long-term procurement strategy, several firms have been unable to reach such goal. Not rarely, the lack of capabilities and resources restrict the feasible sourcing choices to less coordinated ones, such as spot market transactions and informal contracts. On the other hand, a few large-scale Missouri wineries have adopted strategies that resemble those of their "New World" counterparts, following a logic similar to TCE's principles. Therefore, assessing the empirical question posed by Franken and Bacon (2014) demands an explicit recognition that organizational decisions in fledging wine clusters are often constrained by both internal and external factors.

3. HOW DOES THE TYPICAL WINERY IN AN EMERGING REGION LOOK LIKE?

Understanding the rationale behind grape procurement strategies in emerging areas is contingent on the identification of the typical attributes of the organizations where such decisions are made. From the 7,762 American wineries in 2013, 47% were located in the "New World" region of California, which contributed to almost 90% of the national production in the same year. Remarkably, 96% of the United States wineries are considered small, producing up to 50,000 cases (Wines & Vines, 2014). Even this group is strongly skewed towards micro wineries, with 3,189 firms producing up to 5,000 cases and 2,828 firms with an output of less than 1,000 cases. Hence it is safe to assume that the absolute majority of wineries in nascent clusters is characterized by the limited scale of production.

Each of these wineries is surrounded by diverse environments. While clusters such as Washington's state Walla Walla and New York state's Finger Lakes receive hundreds of thousands of visitors every year, others are still unknown beyond regional boundaries. Their legitimacy also vary widely. The establishment of broad coalitions in some emerging regions have allowed the consolidation of a common identity and the subsequent exploitation of its economic benefits, such as higher prices per bottle of wine and increased tourism (Benjamin and Podolny, 1999; Alonso and Liu, 2010; Boatto et al.,
In other areas, the existence of a vineyard is still seen as an exotic occurrence. Anecdotal evidence suggests a growing number of conflicts between winery owners and grain farmers due to the use of herbicides (Ball et al., 2014). This is only one among the many constraints for the building of a solid reputation in many of these clusters.

Indeed, convincing the neighbors to refrain from using herbicides or political officers to foster promotion policies is insufficient for the consolidation of an emerging region. Perhaps the main attribute shared by all established wine areas is the complex pattern of competition and cooperation among multiple agents (McDermott et al., 2009, Giuliani, 2011). For example, the availability of inputs is directly affected by the economic decisions made outside the organizational boundaries of a winery. In fledging clusters, the limited scale of most firms precludes the acquisition of grapes from more traditional - and distant - locations. Thus, "buying" depends on the existence of independent growers in the surroundings. As a series of interviews conducted in Missouri in 2014 reveal, the leading players appear to be aware of this scenario. The manager of one of the biggest Missouri wineries pointed out that, even though cheaper grapes could be obtained from other American states, "[...] the idea is to buy as much as we can from here, so we support the local industry and increase consumer awareness".

The account above reveals two fundamental characteristics of emerging areas. Firstly, the decision to acquire grapes from local producers does not imply the absence of economic calculation. Given the importance of a strong regional reputation to the success of a wine cluster (Benjamin and Podolny, 1999; Castriota and Delmastro, 2014), it is in the best interest of the wineries with higher stakes in the activity to support the establishment of other businesses in the same geographical region. Moreover, that large size wineries often prefer to incur higher costs to incentivize the consolidation of a regional network of providers evidences its inexistence. Of course, carrying this strategy out demands specific capabilities, such as the ability to effectively design and supervise contracts (Argyres, 1996). It would be unrealistic to assume that smaller firms can equally foster the consolidation of a wine cluster in their surrounding areas or easily access suppliers from other regions in times of shortage. Therefore, the
structural characteristics of emerging wine regions are highly diverse, directly affecting the possibility of
wineries to "buy" grapes from independent growers.

Mostly living in geographical areas marked by the cool climate, these newcomers have to deal
with challenging conditions. Contrary to the popular belief, this is not exclusive to North America.
Simpson (2011) argues that, historically, a primary reason for the integration between grape growing and
winemaking in Europe was the high risk of investing in a vineyard due to the inclement weather. At the
same time, small European producers grew several varietals in the same plot of land as a strategy to
minimize the losses from climatic damage. The emerging wine areas in the United States share both the
fear of bad news from the weather forecast and the preference for diversified vineyards. Among the 104
wineries which furnished detailed information on their grape procurement strategies in our survey, 87.5%
inform the use of at least five varietals\(^1\). By the same token, the available qualitative evidence suggests
the desire for the adoption of a "make-as-much-as-you-can" strategy by many wineries from emerging
regions (Miranda and Chaddad, 2014). Consequently, assuming vertical integration as the default
organizational form in these clusters seems reasonable. Or, to put in another words, the typical winery
from a nascent cluster perceives "full vertical integration" as the optimal organizational strategy.

By expanding its frontier, the wine industry has not only incorporated additional acres of land
traditionally used to other ends, but also entrepreneurs with characteristics that differ from the typical
winery owner from established areas. Again, the comparison with the "Old World" is illustrative. In
European rural areas, grape growing and winemaking were widespread until the beginning of the
twentieth century. Hundreds of thousands of families took advantage of the fact that vineyards can be
grown in marginal lands to diversify agricultural production and increase annual income (Simpson, 2011).
Many of these individuals would eventually emigrate to other countries, using their knowledge to produce

\(^1\) Throughout this paper, we use data from a survey with wineries from five U.S. states characterized by their emerging wine
industries: Illinois, Michigan, Missouri, New York and Vermont (see Section 5 for more details). The descriptive statistics
presented in the next few pages to support our arguments reflect the total number of answers received to the specific question of
interest, unless specified. As it will be shown, the quantitative analysis in Section 6 is based on a sample of 76 small firms whose
surveys had answers to all relevant variables in our model.
wine elsewhere. In fact, two of the three largest wineries in the world in 1900 were located in the United States\(^2\). Nevertheless, the enactment of Prohibition in 1920 would vanish this flourishing industry, creating a void that lasted for many decades. Except for California and a few other areas, its rebirth would only occur in the 1990, propelled by the publicizing of the health benefits of wine consumption in the mass media (Cattell, 2013).

Not rarely, the owners of the firms opened in the wake of such renewed interest have little to do with the pioneers from the past or with the industry at all before establishing their businesses. Examples of celebrities acquiring a vineyard abound in the press (Wise, 2013). Others are motivated by the search of a new lifestyle: among the 89 owners of small wineries who responded the survey that informs this study, 57.3% pointed out "passion for wine and food" and "lifestyle objectives" as motivations for its establishment. In turn, the option "business opportunity" was chosen by a lower percentage, of 44.9%. Additional features shed light on the profile of these entrepreneurs. In the same sample, 58.4% have no training in enology, while 57.3% have no training in viticulture. Also, it is worth to highlight that the attachment of most respondents to the sector appears to be a direct result of the so-called "wine revolution". The average experiences with the wine industry and grape production are equivalent to 13.39 and 14.05 years respectively, period that coincides with the peak of the expansion of the industry towards emerging regions.

Along with the characteristics of transactions, boundary decisions are affected by the capabilities and resources owned by agents (Madhok, 2002; Argyres et al., 2012). While the lack of experienced providers affects the possibility of "buying", the inability to properly manage a vineyard poses a critical constraint on vertical integration. Considering that 85.5% of the aforementioned wineries have five or less full-time employees - with a mean of 2.73 -, it is clear that the skills of their owners directly influence procurement choices. Although "make-as-much-as-you-can" is commonly pointed out as the perceived

\(^2\) For example, Stone Hill Winery, founded by German settlers in Hermann (Missouri), annually produced more than a million of gallons in the period. (Pinney, 1989).
optimal strategy, the qualitative evidence from small Missouri wineries epitomizes the hardship faced by many entrepreneurs in their effort to "make". Asked about how information on vineyard management techniques was obtained, a winery owner showed a cabinet with four introductory books on viticulture. Other interviewed individual recounted that, after five years of constant warnings about the convenience of setting up an irrigation system in his vineyard, a drought in 2012 finally convinced him. In his words, "[...] maybe that is why they call Missouri the 'Show me State'. You see a lot of trial-and-error going on in this industry".

The lack of capabilities and resources also affects the ability to "buy" appropriable inputs. Miranda and Chaddad (2014) describe the difficulties faced by some Missouri wineries to measure the attributes of grapes from independent grape growers. Two years before, Allen (2012) interviewed a winery owner who, after conceding his inaptitude to access the quality of the inputs purchased through spot market transactions, concluded: "[...] give me another ten years and I can tell you whether it is a good grape or not". Obviously, inputs are still bought somewhere. Nevertheless, the features of the organizational arrangements supporting such exchanges are strongly shaped by the lack of skills to devise complex governance structures. Often, actual procurement decisions embody the only feasible form given the characteristics of the firm. In summary, capabilities and resources are highly heterogeneous in emerging regions, affecting the comparative ability to "make" and "buy".

In summary, the typical winery from an emerging region in the United States is characterized by (i) the limited scale of production; (ii) the participation in underdeveloped clusters; and (iii) the recent attachment of its owners to the wine industry. Comparatively, these firms (i) face diverse levels of access to inputs and (ii) own highly heterogeneous bundles of capabilities and resources, which determine the ability to "make" or the capacity to adopt complex organizational arrangements to "buy". Next section discusses the consequences of such features on the grape procurement strategies pursued by these firms, presenting a series of testable hypotheses.
4. GRAPE PROCUREMENT STRATEGIES IN EMERGING REGIONS

What are the drivers of grape procurement decisions in U.S. emerging wine areas? The scarce available evidence leads to mixed conclusions. Although Franken and Bacon (2014) identify commonalities between the strategies pursued by Illinois wineries and the practices in established areas, the conclusions are inferred from the quantitative analysis of a relatively small sample. Miranda and Chaddad (2014), in turn, argue that many Missouri wineries face constraints to implement procurement strategies based on a "make-or-buy" rationale. Case studies suggest that, while a few large-scale firms have pursued strategies resembling TCE's logic, the typical Missouri small winery perceives full vertical integration as the optimal organizational setup. The same study also contrasts this homogeneous goal with the considerable heterogeneity found in actual procurement strategies.

Indeed, organizational diversity is widespread in American emerging wine regions. Research with 121 wineries between February and October of 2015 shows that, on average, firms from the Midwestern states of Illinois, Michigan and Missouri vertically integrated 42.21% of the grapes used in 2014. In the Northeastern states of New York and Vermont, in-house grape production reached 53.38%. The aggregate data presented by the Northern Grapes project from a research conducted in 13 states also depicts a rich mosaic of arrangements. Even though vertical integration is pointed out as the main sourcing choice, it corresponds to only 35% of the transactions (Tuck and Gartner, 2013). Remarkably, many respondents informed purchases of grapes from other wineries, an option not originally included in the survey.

Of course, the aggregate data presented above does not invalidate TCE's core tenets per se. As Williamson (1985) argues, an apparent case of "make-and-buy" of the same good might be transitory or due to the use of different technologies (see Parmigiani, 2007, for a critical appraisal). After all, TCE's unit of analysis is the transaction, not the total procurement of a firm. Nevertheless, evidence based on a more microanalytic approach does not appear to support TCE's "efficient alignment hypothesis". The same research with 121 wineries collected data on specific procurement decisions according to different grape varietals. Among the five most representative types used by the surveyed firms, organizational
heterogeneity is pervasive (see table 1). Wineries not only pursue diverse strategies to source the same grape types, but also adopt concurrent sourcing commonly\(^3\).

<table>
<thead>
<tr>
<th>Varietal</th>
<th>Vertical Integration</th>
<th>Spot Market Transactions</th>
<th>Handshake Contracts</th>
<th>Formal Contracts</th>
<th>Concurrent sourcing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cabernet Franc</td>
<td>16</td>
<td>42.10%</td>
<td>5.26%</td>
<td>13.15%</td>
<td>13.15%</td>
</tr>
<tr>
<td>Chambourcin</td>
<td>17</td>
<td>40.47%</td>
<td>4.76%</td>
<td>26.19%</td>
<td>4.76%</td>
</tr>
<tr>
<td>Norton</td>
<td>13</td>
<td>44.82%</td>
<td>3.44%</td>
<td>17.24%</td>
<td>3.44%</td>
</tr>
<tr>
<td>Riesling</td>
<td>18</td>
<td>42.85%</td>
<td>2.43%</td>
<td>17.07%</td>
<td>12.19%</td>
</tr>
<tr>
<td>Vignoles</td>
<td>14</td>
<td>37.83%</td>
<td>13.51%</td>
<td>10.81%</td>
<td>8.10%</td>
</tr>
</tbody>
</table>

Source: Survey conducted by the authors between February and October of 2015 with wineries from five U.S. states - Illinois, Missouri, Michigan, New York and Vermont. For concurrent sourcing, firms used at least two procurement options to acquire the same grape type.

What would explain such empirical puzzle? Madhok (2002) argues that sourcing decisions derive from a trilateral alignment among the characteristics of the transactions, the features of the organizational arrangement and the bundle of capabilities and resources involved in the exchange\(^4\). In other words, a transaction will only be internalized if nobody else can supply the good or service more efficiently (see also Argyres and Zenger, 2012). It should not surprise, therefore, that the same grape varietal can be obtained through very different arrangements. For instance, Miranda and Chaddad (2014) note that small wineries established by independent growers tend to "make" a higher percentage of their grapes. Given our general assumptions (Section 3) and the importance of the skills of key individuals to the materialization of this goal, we expect that:

\(^3\) According to Parmigiani (2007, pp. 285), the notion of concurrent sourcing "[...] emphasizes that firms are making and buying the same good, in contrast to considering a broader unit of analysis and/or one with more heterogeneity". See also: Ménard (2013) and Heide et al., (2014).

\(^4\) Williamson (1999, pp. 1103) himself appears to agree with this reasoning, by arguing that, in the "[...] traditional transaction cost query, the question to be put instead is: How should a firm A - which has preexisting strengths and weaknesses (core competences and disabilities) - organize X?". On the other hand, later theoretical developments linked to the TCE tradition (e.g. Tadelis and Williamson, 2012) have not pursued an integration with the so-called capabilities literature. See Argyres et al. (2012) for a discussion.
Hypothesis 1: The higher the number of years of experience in grape growing of a key respondent, the higher the level of vertical integration of the respective winery.

A common argument among winery owners is that vertical integration allows greater control over quality. On the other hand, no infallible organizational arrangement exists (Williamson, 1991). As the widespread adoption of "make-and-buy" strategies in established areas demonstrate, relying on informal contracts or spot market transactions might be an appealing strategy from a comparative institutional perspective under specific circumstances. Of course, effectively "buying" implies the ability to measure the relevant attributes (Barzel, 1982) of the purchased grapes, such as sugar content, pH level and acidity. We hypothesize that, as wineries enhance their capacity to oversee transactions with independent growers, a smaller percentage of their total procurement will be vertically integrated.

Hypothesis 2: Wineries able to measure the objective attributes of grapes will "make" a smaller percentage of their total procurement.

Having the ability to evaluate grape quality attributes is an insufficient condition for the materialization of "buying" decisions though. Embedded in highly diverse clusters, small wineries may face prohibitive searching costs to locate potential providers. Indeed, the preference for a "make-or-make" strategy partially ensues from the lack of skilled growers - or potential partners at all - in the surroundings. On the other hand, such reality often incentivizes the cooperation among potential competitors, as the acquisition of inputs from other wineries demonstrate (Tuck and Gartner, 2013). At least in the short term, we expect that strong ties to independent producers or other firms will reduce the governance costs of less coordinated sourcing decisions (Uzzi, 1996), reducing the incentives to the pursuit of full vertical integration.

Hypothesis 3a: The greater the level of cooperation with other wineries and independent grape growers, the lower the level of vertical integration of a winery.

Hypothesis 3b: The longer a winery formally belongs to a wine trail, the lower its level of vertical integration.
To say that capabilities and resources help to shape boundary decisions is not the same as arguing that the minimization of governance costs plays no role (Argyres and Zenger, 2012; Argyres et al., 2012). Together with structural features, such as the availability of potential partners, capabilities and resources determine the set of feasible arrangements to a firm. Once the available alternatives are identified, a search for "efficient alignment" ensues. However, the reasons behind the adoption of more complex governance structures in the wine industry possibly go beyond the protection of appropriable quasi-rents (Klein et al., 1978; Williamson, 1985). Managing a vineyard allows firms with the proper set of skills to make experiments and consolidate their reputation in the market (Giuliani, 2011). It is expected, therefore, that wineries will "make" those grapes with a higher quality potential.

**Hypothesis 4:** The greater the differentiation of the grapes used by a winery, the higher its level of vertical integration.

Even though wineries prefer to grow those grapes believed to lead to differentiated wines, it is unclear whether such decision derives from the fear of haggling from a partner. This is especially true in emerging regions, where independent growers would probably have no credible threats against wineries. How rational would be a holdup if nobody else in the neighborhood can use the same inputs as well as the original buyer does? By the same token, no obvious theoretical relationship exists between the notions of "differentiation" and "opportunism". In fact, the idea of appropriable quasi-rent is not related to the intrinsic features of an asset, but to its alternative uses\(^5\) (Klein et al., 1978). On the other hand, nascent clusters may offer very limited options for those interested in "buying" inputs. Hence, we hypothesize that the level of dependence from a certain varietal furnishes a strong justification for "making", irrespective of the features of the grape.

**Hypothesis 5:** The level of dependence from the two most relevant grape varietals used in production will be positively correlated with higher percentages of vertical integration.

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\(^5\) Not surprisingly, authors such as Williamson (1991) and Klein (2010) highlight the existence of different types of asset specificity: dedicated assets, site specificity, physical asset specificity, human asset specificity, temporal specificity and brand name capital specificity.
The empirical research on economic organization has traditionally related an observed arrangement to the characteristics of a transaction (see Shelanski and Klein, 1995, and Klein, 2008, for a review). In this sense, while Hypotheses 2 and 3 extend TCE's core tenets by including capabilities and resources as explanatory variables for the procurement strategies adopted, Hypothesis 4 discusses the real influence of asset specificity on boundary decisions. Yet, even the most constrained firm makes organizational choices, devising structures that mitigate the shortage of appropriable skills. Miranda and Chaddad (2014) shows that trust replaces active monitoring in many transactions carried out by newcomers to the Missouri industry. Strong ties also support long-term relationships in other wine clusters, reducing the governance costs associated with contract enforcement (Somogyi et al., 2010; Wilson et al., 2015).

A fundamental TCE's theoretical cornerstone is the idea that organizational arrangements are characterized by a specific supporting mechanism (Williamson, 1991; Williamson and Tadelis, 2012). Reacting to the "efficient alignment hypothesis", several scholars stress the importance of social relations to economic order (Granovetter, 1985; Bradach and Eccles, 1989; Hennard, 1993). Consistent with the literature from other industries (Uzzi, 1996; 1999; Lazzarini et al., 2004), the available evidence from emerging wine regions points to a complementary relationship between trust and formal supporting mechanisms. Importantly, the nature of such interaction varies depending on the organizational arrangement. Our hypothesis is that trust is a decisive feature of weakly coordinated exchanges carried out in fledging clusters, denoting the inability of wineries to carry out complex procurement strategies. Or, to put in another words, the more constrained the organizational choice of a firm is, the greater the importance of more informal governance mechanisms.

**Hypothesis 6:** The existence of a relationship based on trust is negatively correlated with the level of vertical integration of a winery.

Finally, how does the interaction with public and private organizations affect the procurement decisions of firms? A growing literature (e.g., McDermott et al., 2009; Giuliani, 2011) discusses the
nature of the relationship between wineries and industry associations, public agencies and universities. As potential providers of knowledge, these organizations directly influence the configuration of the set of feasible arrangements to firms from emerging regions. An empirical issue is defining whether the "making" enhancing effect outweighs the "buying" enhancing effect. More specifically, these relationships might improve wineries' ability both to manage vineyards and to measure the quality attributes from inputs grown elsewhere. Although we assume that the typical small winery from emerging region perceives its optimal strategy as "make-as-much-as-you-can", it is also true that firms with strongly constrained organizational choices might prefer to focus on acquiring basic expertise on the governance of "buying" relationships. Given the inexistence of a clear answer, no specific prediction will be made.

5. RESEARCH METHODS AND VARIABLE OPERATIONALIZATION

This study adopts a mixed-methods approach. Following Greene et al. (1989), we use a "development strategy", which consists on the use of a qualitative analysis to inform and establish the basis for the quantitative research (see Table 2 for a summary of predictions and results). On-site semi-structured interviews with the owners of six Missouri wineries were conducted between February and May of 2014. Originally planned to assess the "make-or-buy" decisions in the industry, the interviews showed that, among the smaller firms in the sample, the perceived optimal strategy was closer to a "make-as-much-as-you-can" setup (Miranda and Chaddad, 2014). The qualitative evidence also suggested a huge gap between preferences and actual decisions, inspiring the hypotheses tested here.

Quantitative data were collected through a survey sent to key informants from wineries located in five American states. Lists of firms were obtained from the Grape and Wine Boards of four of the states in the sample: Illinois, Michigan, Missouri and New York. A fifth state would be added after a respondent from New York strongly tied to the Vermont wine industry provided a list of wineries from the state. The final mailing list included 549 firms, which received an electronic survey along with a support letter from
### Table 2: Summary of Predictions and Results
(Independent Variable is Percentage of Vertical Integration in Total Grape Procurement)

<table>
<thead>
<tr>
<th>Hypothesis</th>
<th>Variable</th>
<th>Description</th>
<th>Expected sign</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) The higher the number of years of experience in grape growing of a key respondent, the higher the level of vertical integration.</td>
<td>Experience with viticulture</td>
<td>Years of experience in grape production.</td>
<td>+</td>
<td>Supported by models 2, 3, 4, and 5.</td>
</tr>
<tr>
<td>(2) Wineries able to measure the objective attributes of grapes will “make” a smaller percentage of their total procurement.</td>
<td>Measurement Ability</td>
<td>Dummy variable, resulting from the sum of the responses given to a Likert scale-type item for the two most representative varietals used by a winery. Values between 0 and 6 were coded as 0 and values between 7 and 10 were coded as 1.</td>
<td>-</td>
<td>Supported by model 2.</td>
</tr>
<tr>
<td>(3a) The greater the level of cooperation with other wineries and independent grape growers, the lower the level of vertical integration.</td>
<td>Ties to wineries and independent growers</td>
<td>Sum of the number of ties with individual grape growers and other wineries informed by the respondent.</td>
<td>-</td>
<td>Supported by models 4 and 5.</td>
</tr>
<tr>
<td>(3b) The longer a winery formally belongs to a wine trail, the lower its level of vertical integration.</td>
<td>Wine Trail</td>
<td>Years of participation in a wine trail.</td>
<td>-</td>
<td>Not supported.</td>
</tr>
<tr>
<td>(4) The greater the “differentiation” of the grapes used by a winery, the higher its level of vertical integration.</td>
<td>Differentiation</td>
<td>Variable created from the sum of the answers given to the two most representative varietals (Crombach’s alpha = 0.755).</td>
<td>+</td>
<td>Supported by model 1.</td>
</tr>
<tr>
<td>(5) The level of dependence from the two most relevant grape varietals used in production will be positively correlated with higher percentages of vertical integration.</td>
<td>Importance Grape</td>
<td>Variable based on the relative importance of the two most representative varietals to the total production of the winery.</td>
<td>+</td>
<td>Supported by models 1, 2, 3, 4, and 5.</td>
</tr>
<tr>
<td>(6) The existence of a relationship based on trust is negatively correlated with the level of vertical integration of a winery.</td>
<td>Trust in independent growers</td>
<td>Dummy variable, resulting from the sum of the responses given to a Likert scale-type item for the two most representative varietals used by a winery. Values between 0 and 6 were coded as 0 and values between 7 and 10 were coded as 1.</td>
<td>-</td>
<td>Supported by models 3, 4, and 5.</td>
</tr>
</tbody>
</table>
the respective Board between February and March of 2015. Remainders were sent twice, followed by a round of phone calls to the wineries that had not answered the survey. Overall, between two and four contacts were made with each firm. The aggregate response rate, of 22%, is similar to the rates commonly obtained in firm-level studies\(^6\) (Paxson et al., 1995).

The survey that informs this study results from multiple stages of pre-testing. A summarized version of the questionnaire was sent in 2012 to wineries from the states of Michigan, Missouri and New York, obtaining a response rate of 33%. The original instrument would then be evaluated by academic researchers from three different universities - Cornell University, Michigan State University and University of Missouri -, an expert from the University of Missouri's Grape and Wine Institute and participants of the first round of the research. Additionally, both the qualitative evidence collected by the on-site structured interviews with Missouri winery owners and the preliminary conclusions obtained from the summarized survey were presented in three occasions, motivating comments from scholars, industry leaders and entrepreneurs.

From the 121 respondents, 79 surveys had complete answers for all of the variables used here. To limit the sample to small wineries, we adopt a cut-off measure based on total production. As a result, three firms that produced more than 50,000 cases of wine in 2014 were excluded from the analysis, leading to a final sample of 76 wineries. Table 3 presents descriptive statistics, as well as correlations. Among these firms, 82.9% produced less than 10,000 cases of wine in 2014. Both their average age - 16 years - and their average link to a wine trail, - 5.66 years - suggest a predominance of organizations established in the wake of the "revolution" described by Robinson and Murphy (2012) in the sample. The average experience with grape production among respondents, in turn, is of 14.79 years.

Our unit of analysis is the winery. We use data collected at both the firm level and the transaction level, constructing aggregate variables from the latter when necessary. Contrary to most empirical studies

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\(^6\) The specific response rates for each state are the following: Illinois, 17.8%; Michigan, 28.2%; Missouri, 31%; New York, 13.9% and Vermont, 28.5%.
<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>S.D.</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
<th>13</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Vertical Integration (0/1)</td>
<td>45.49</td>
<td>36.401</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>2. Size</td>
<td>20.99</td>
<td>40.201</td>
<td>0.019</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>3. Vinifera</td>
<td>36.59</td>
<td>38.148</td>
<td>-0.08</td>
<td>0.031</td>
<td>1</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Age</td>
<td>16.00</td>
<td>12.490</td>
<td>0.133</td>
<td>0.567*</td>
<td>0.075</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Geographic Location (0/1)</td>
<td>0.29</td>
<td>0.457</td>
<td>0.242*</td>
<td>0.053</td>
<td>0.293*</td>
<td>0.320**</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>6. Importance Grape</td>
<td>0.547</td>
<td>0.467</td>
<td>0.317**</td>
<td>-0.116</td>
<td>-0.122</td>
<td>-0.054</td>
<td>-0.015</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Wine Trail</td>
<td>5.66</td>
<td>7.293</td>
<td>0.179</td>
<td>0.401**</td>
<td>0.212</td>
<td>0.435**</td>
<td>0.359**</td>
<td>-0.056</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Differentiation</td>
<td>7.309</td>
<td>1.229</td>
<td>0.199</td>
<td>0.062</td>
<td>0.350**</td>
<td>0.074</td>
<td>0.207</td>
<td>0.108</td>
<td>0.244*</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. Measurement Ability (0/1)</td>
<td>0.66</td>
<td>0.478</td>
<td>-0.209</td>
<td>0.134</td>
<td>-0.019</td>
<td>0.208</td>
<td>-0.029</td>
<td>0.008</td>
<td>0.620</td>
<td>0.024</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. Experience with Viticulture</td>
<td>14.79</td>
<td>13.439</td>
<td>0.266*</td>
<td>0.374**</td>
<td>0.105</td>
<td>0.473*</td>
<td>0.080</td>
<td>0.042</td>
<td>0.388**</td>
<td>0.218</td>
<td>0.057</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11. Trust in Independent Growers (0/1)</td>
<td>0.61</td>
<td>0.492</td>
<td>-0.247*</td>
<td>0.095</td>
<td>-0.005</td>
<td>0.082</td>
<td>0.041</td>
<td>0.103</td>
<td>0.066</td>
<td>-0.021</td>
<td>0.496**</td>
<td>-0.011</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12. Ties to Public and Private Organizations</td>
<td>18.99</td>
<td>19.767</td>
<td>0.236*</td>
<td>0.197</td>
<td>-0.100</td>
<td>0.325**</td>
<td>0.191</td>
<td>0.087</td>
<td>0.351**</td>
<td>0.188</td>
<td>0.149</td>
<td>0.216</td>
<td>0.069</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>13. Ties to wineries and independent growers</td>
<td>48.93</td>
<td>41.952</td>
<td>-0.062</td>
<td>0.147</td>
<td>-0.059</td>
<td>-0.025</td>
<td>0.151</td>
<td>-0.063</td>
<td>0.067</td>
<td>0.100</td>
<td>-0.092</td>
<td>0.087</td>
<td>-0.110</td>
<td>0.200</td>
<td>1</td>
</tr>
</tbody>
</table>

b n = 76.
* p < 0.05; p < 0.01 (Two-Tailed Test).
on organizational economics (Sykuta, 2008), the dependent variable here is continuous, reflecting the percentage of the total grape procurement vertically integrated by each winery in 2014. Previous research used similar data to test Williamson's (1985) "efficient alignment hypothesis", adopting a cut-off measure to classify each firm in a specific group - hierarchy, e.g. - according to its predominant sourcing choice (Monteverde and Teece, 1982; Poppo and Zenger, 1998; Fernández-Olmos et al., 2009). We believe such approach would be unsuitable in the case at hand for two reasons.

First of all, we characterize the typical organizational strategy in U.S. emerging wine regions as "make-as-much-as-you-can". Consequently, firms are assessed in terms of how close they get to full vertical integration. The adoption of a continuous dependent variable does not rule out transaction cost considerations from the decisions of the surveyed individuals. Rather, it denotes the search for an explanation which encompasses not only the relationship between the characteristics of transactions and organizational choices, but also the role of firms' features and the nature of their ties to the external world. Moreover, studies aiming at testing the "make-or-buy" hypothesis in American nascent clusters have to consider that most wineries use different varietals in the production process. In this sense, a dichotomous aggregate dependent variable would encompass grape types with diverse characteristics under the same label.

The controls are measured as follows. Inspired by Benjamin and Podolny (1999) and Fernández-Olmos (2010), size is measured as storage capacity. The reason is straightforward: other variables, such as the numbers of acres owned by the winery or the number of employees, could be directly related to the boundary decisions of the firm, producing biased estimates. The variable Vinifera is measured as the percentage of total procurement composed by Vinifera grapes, which are more sensible to the cold weather found in emerging regions. Other control variables include the age of the wineries and a dummy variable for geographical location, with 0 equivalent to Midwest - Illinois, Michigan and Missouri - and 1 equal to Northeast - New York and Vermont.
A variable was created to assess the influence of the level of dependence on the two most representative grapes used in the total wine production on grape procurement decisions. Since the data originally furnished by respondents was in "tons of grape per varietal", we converted such values to gallons by multiplying them by 150. The results were divided by the total production of the winery, which was also converted to gallons after multiplying the initial answers given in "cases" by 2.37753 (TTB, 2015). Importantly, the final value can be greater than 1, reflecting the fact that many wineries from U.S. emerging regions sell grapes to potential competitors (Tuck and Gartner, 2013).

The variable "Differentiation" is a composite variable (Crombach's alpha = 0.755), created from four Likert scale-type questions, those are: (i) Relative to other varietals, growing this grape varietal demands very specific knowledge on vineyard management; (ii) This grape varietal allows me to produce highly differentiated (distinctive) wines; (iii) Compared to other grape varietals, the average cost of growing this varietal is relatively high; (iv) Considering the industry as a whole, consumers perceive wines produced with this grape varietal as high quality wines. Given that answers in the survey were given to specific varietals and the unit of analysis adopted here is the winery, the following procedure was adopted: after selecting the two most representative types used by each firm - in terms of amount in tons -, the answers given to each of the Likert-type items above were summed. The construction of the composite variable depart from such summed values, which potentially range between 2 and 10.

The variables "Measurement Ability" and "Trust in Independent Growers" derive from the answers given by respondents to two questions, respectively: (i) We are able to easily and accurately measure all relevant quality attributes of this grape varietal if we have to acquire it from an independent grape grower; (ii) For this varietal, I know independent growers whose production I do not need to evaluate much because it has always been high quality. Responses were given according to a 5-item Likert scale and applied to specific grape varietals. Following the option adopted in the construction of the variable "Differentiation", we selected the two most representative variables from each small winery and summed the answers for each Likert-type item. Final results from 2 to 6 were coded as 0, meaning
lack of measurement ability or lack of trust on independent growers. Final results from 7 to 10 were coded as 1, implying either the ability to evaluate grapes or the trust on producers.

The decision to create a dummy variable from data at the transaction-level derives from the characteristics of the problem at hand. Since a single Likert-type item cannot be interpreted as continuous (Clason and Dormody, 1994; DeVellis, 2012), the original numbers could not produce statistically meaningful results. Also, the surveyed wineries tend to carry out diverse relationships depending on the varietal used. Using a question to measure "trust" or the "ownership of capabilities" taking the winery as a whole from the outset could lead to serious bias, such as respondents using their experience with a single varietal or specific provider as a proxy to assess their influence on their total procurement strategy. Finally, by coding answer between 7 and 10 as a sign of trust or measurement ability, our approach offers conservative estimates of the influence of both variables on strategies.

The variable "Experience with Viticulture" is measured in years and reflects the personal trajectories of respondents. Given the small size of the wineries in the sample - mean of 3.56 full-time employees -, this variable offers a fairly accurate proxy of the capabilities found in the organization. For instance, respondents hold key positions in the surveyed firms: 76.3% are the owners, 15.8% the managers and 7.9% the winemakers. The variable "Wine Trail", in turn, represents years of formal attachment to one of these initiatives.

Finally, the variables related to ties, were obtained with the summation of more specific categories. More specifically, the variable "Ties to public and private organizations" results from (i) ties with universities; (ii) ties with public agencies; (iii) ties with industry association, while the variable "Ties to wineries and independent growers" represents the summation of two separate categories. We multiplied the number of ties by the extent of collaboration with each of these categories - measured with a Likert scale from 1 to 5. Similar procedures have been adopted by the literature (e.g., Giuliani, 2011), justified by the fact that the networks derive their effectiveness from the concrete relationships developed by their members.
6. RESULTS AND DISCUSSION

The results of the regression analysis are presented in Table 4. Among the control variables, geographical location has a significant effect on the rate of vertical integration (Models 1, 2, 3, 4 and 5). Indeed, the Midwestern wineries in the sample rely on much lower average levels of in-house grape production - 39.91% - than the analyzed Northeastern firms - 59.18%. The qualitative evidence collected during the research points to a potential influence of exogenous factors on such outcome. In special, many Michigan wineries reported that their vineyards were severely affected by a harsh winter in 2014. Not surprisingly, the surveyed Michigan firms "made" 36.32% of the used grapes in the same year, against 57.50% in New York. On the other hand, the use of a more comprehensive dataset suggests a higher level of vertical integration for Northeastern wineries irrespective of climatic events. Further studies can assess whether these differences are transitory, as well as the influence of the structural characteristics of clusters on percentages.

As predicted by Hypothesis 5, the relative importance of the two most used grape varietals exerts a decisive influence on procurement strategies in U.S. emerging areas (Models 1, 2, 3, 4 and 5). Their differentiation potential, in turn, does not appear to play a significant role on the boundary decisions of the surveyed firms. These results can be interpreted in the light of the available qualitative evidence from Missouri wineries. As an interviewed owner pointed out, "[...] you will never learn it unless you give yourself a try". It is a well-established fact that control over a vineyard is tantamount to developing new wines or improving the quality of those currently produced (Giuliani, 2011). Small wineries, therefore, might decide to focus on the "making" of a few varietals, some of them considered to be easier to grow. Of course, these choices often have little to do with the reputation of the grape in the market, leading to an unexpected outcome under the lenses of TCE.

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7 In 2014, the average rate of vertical integration per U.S. state among the firms in the sample was the following: 44.67% in Illinois, 36.32% in Michigan, 40.39% in Missouri, 57.50% in New York and 76% in Vermont. For the sake of comparison, the same percentages calculated from a broader sample - 119 wineries - are: 43.29% in Illinois, 45.47% in Michigan; 44.06% in Missouri; 53.38% in New York and 58.38% in Vermont.
Table 4: Results. Dependent Variable is Percentage of Vertical Integration in Total Grape Procurement

<table>
<thead>
<tr>
<th>Variables</th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
<th>Model 4</th>
<th>Model 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>-2.483 (19.68)</td>
<td>9.061 (21.29)</td>
<td>15.998 (20.94)</td>
<td>25.959 (20.62)</td>
<td>37.282 (10.15)***</td>
</tr>
<tr>
<td>Size</td>
<td>-0.036 (0.16)</td>
<td>-0.051 (0.16)</td>
<td>-0.032 (0.16)</td>
<td>0.021 (0.16)</td>
<td></td>
</tr>
<tr>
<td>Vinifera</td>
<td>-0.096 (0.12)</td>
<td>-0.106 (0.49)</td>
<td>-0.102 (0.12)</td>
<td>-0.093 (0.11)</td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>0.184 (0.48)</td>
<td>0.098 (0.49)</td>
<td>0.42 (0.47)</td>
<td>-0.222 (0.46)</td>
<td></td>
</tr>
<tr>
<td>Geographic location</td>
<td>15.362 (11.26)*</td>
<td>16.314 (11.33)*</td>
<td>17.691 (10.51)**</td>
<td>20.783 (11.23)**</td>
<td>17.941 (8.27)**</td>
</tr>
<tr>
<td>Importance grape</td>
<td>23.170 (10.13)***</td>
<td>22.214 (9.34)***</td>
<td>24.406 (9.49)***</td>
<td>22.432 (9.53)***</td>
<td>24.17 (8.82)***</td>
</tr>
<tr>
<td>Wine Trail</td>
<td>0.514 (0.68)</td>
<td>0.267 (0.61)</td>
<td>0.323 (0.61)</td>
<td>0.053 (0.64)</td>
<td></td>
</tr>
<tr>
<td>Differentiation</td>
<td>4.003 (2.798)*</td>
<td>3.257 (3.01)</td>
<td>2.781 (2.86)</td>
<td>2.476 (2.74)</td>
<td></td>
</tr>
<tr>
<td>Measurement Ability</td>
<td>-17.179 (8.36)***</td>
<td>-8.191 (9.05)</td>
<td>-9.861 (9.39)</td>
<td>-10.485 (8.91)</td>
<td></td>
</tr>
<tr>
<td>Experience with viticulture</td>
<td>0.602 (0.29)**</td>
<td>0.571 (0.28)**</td>
<td>0.626 (0.30)**</td>
<td>0.578 (0.21)***</td>
<td></td>
</tr>
<tr>
<td>Trust in independent growers</td>
<td>-17.294 (7.91)***</td>
<td>-18.547 (7.84)***</td>
<td>-18.536 (7.86)***</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ties to public and private</td>
<td>0.329 (0.26)</td>
<td>0.355 (0.18)*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>organizations</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ties to wineries and independent</td>
<td>-0.173 (0.11)*</td>
<td>-0.151 (0.096)*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>growers</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$R^2$</td>
<td>0.19</td>
<td>0.28</td>
<td>0.32</td>
<td>0.36</td>
<td>0.35</td>
</tr>
</tbody>
</table>

* p < 0.10; ** p < 0.05; *** p < 0.01; *Two-Tailed Test.
The widespread adoption of a "trial-and-error approach" possibly influences the assessment of the relationship between experience with viticulture and procurement strategies. In fact, knowing how to "make" should influence both the total amount grown and the overall quality of the harvested grapes, an issue not considered here. Yet, Hypothesis 1 is supported by Models 2, 3, 4 and 5. For the future, research might explore the consequences of these additional years dealing with vines on the performance of wineries. More specifically, does the ability to manage a vineyard explain the prices paid to a bottle from a firm located in an emerging region? How important are these skills to the establishment of reputation? Previous studies have discussed the relationship between identity and economic results in the wine industry (Benjamin and Podolny, 1999). We believe that fledging clusters, given their unstable features, offer an appealing empirical setting for the analysis of the diverse factors behind the success of wineries.

Model 2 supports Hypothesis 2. Interestingly though, the coefficient of "Measurement Ability" becomes insignificant after "Trust in Independent Growers" is added to the analysis. Consistent with Hypothesis 3, the existence of trust seems to be an essential component in the relationship between wineries and independent grape growers in emerging areas (Models 3, 4 and 5). These combined results reinforce the qualitative evidence collected by Miranda and Chaddad (2014), who highlight that importance of trust to the minimization of governance costs by wineries unable to evaluate the quality attributes of grapes produced elsewhere. A relevant question is: does trust represent a requisite or a consequence for the establishment of informal procurement relationships in emerging wine areas? Moreover, to what extent are measurement ability and trust substitutes? Does the acquisition of capabilities reduce the use of informal governance mechanisms?

Finally, the existence of ties with independent grape growers and other wineries is negatively correlated with the level of vertical integration (Models 4 and 5). However, the coefficient that measures the influence of wine trails on "making" decisions is not only insignificant, but also characterized by a much smaller effect once all of the variables are added to the model. The results in Table 4 suggest that informal ties to producers or other firms influence more decisively the procurement decisions of small
wineries from U.S. emerging regions than the participation in formal initiatives. Given the incipiency of several wine trails, further research is needed to verify this hypothesis. The same applies to the role of public and private organizations, such as Grape and Wine Boards, public agencies and universities: although Model 5 offers some guidance, it should be interpreted with caution. Further studies can assess the comparative impact of each of these organizations on the distribution of relevant knowledge to wineries.

7. CONCLUDING REMARKS

What are the drivers of grape procurement strategies in U.S. emerging wine regions? Are these decisions constrained by the same factors as in established areas? This paper discusses the two aforementioned questions. As the "wine revolution" in rural America takes shape, an unavoidable question relates to the nature of the thousands of firms recently established throughout the country since the turn of the twenty-first century. By offering an interpretation to the sourcing choices of small American wineries based on their actual characteristics and patterns of relationship with the external world, we expect to pave the way for a more comprehensive assessment of both their economic performance and survival prospects. Moreover, the findings presented here shed light on potential roles to be played by public and private organizations dedicated to supporting the growth of the U.S. wine industry.

8. REFERENCES


