An empirical investigation of the vertical boundary determinants of wineries in emerging regions.

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JEROMIE ALLEN

Dr. Fabio R. Chaddad, Thesis Supervisor

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The undersigned, appointed by the dean of the Graduate School,

have examined the Thesis entitled

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Presented by Jeromie Allen

A candidate for the degree of

M.S. Agricultural Economics

And hereby certify that, in their opinion, it is worthy of acceptance.

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Dr. Fabio R. Chaddad

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Dr. Michael L. Cook

_____

Dr. J. Isaac Miller

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ABSTRACT

This thesis examines the vertical boundary determinants of small- to medium-sized wineries in emerging regions of the United States. This study integrates multiple vertical boundary theories (Transaction Cost Economics, Resource Based View, and Measurement Cost theories) and two research methods (Quantitative and Qualitative) to empirically examine the key determinants of vertical boundary decisions of wineries in emerging regions. The study finds that the quantitative model provides strong support for the Transaction Cost Economics theory, while the qualitative method lends strong support to the Measurement Cost and Resource Based View theories of vertical boundaries. Therefore, by integrating multiple theories and research methods, there is more explanatory power for the key determinants of vertical boundaries than a single standalone theory or research method.

CHAPTER 1 - INTRODUCTION

Although there has been a large amount of research published on the subject of vertical integration, little attention has been paid to, thus limited information exists on, the subject of vertical integration within the research area of small- to medium-sized wineries in emerging regions. The literature that does exist on the subject of vertical integration in the small- to medium-sized wineries focuses mainly on the transaction cost economics (TCE) theory of vertical integration. Furthermore, other vertical boundary theories are included in some studies as a complement to the TCE theory. However, minimal attention is paid to the principal-agent paradigm and impact of formal written contracts within the research of vertical boundary determinants of small- to medium-sized wineries.

The topic of this thesis is the vertical boundaries of small- to medium-sized wineries in emerging regions, particularly in the states of Missouri, Michigan and New York. More precisely, the particular focus of this thesis is to better understand the vertical boundary determinants of small- to medium-sized wineries in emerging regions by integrating multiple vertical boundary theories. This is done through both an econometric analysis of survey data collected from wineries in the three states (MO, MI and NY) and qualitative mini case studies of 10 wineries from the state of Missouri. The empirical study of this thesis is adopted from and expands on Fernández-Olmos *et al.* (2008, 2009a and 2009b).

The relevance of this study of wineries in emerging regions becomes greater as the number of wineries continue to grow in the United States. For a graphical

representation showing the number of wineries in the United States, please see Figure 1 of Appendix A. For a state-level example, the number of wineries in Missouri alone has grown from approximately 30 in 2005 to more than 100 today (Missouri Wines). Similar trends have been seen in other states, such as Michigan and New York, as well. However, although the number of wineries has grown in emerging regions, the research that has concentrated on wineries from an economic standpoint is minimal. Furthermore, wineries in emerging regions are faced with many challenges, including marketing, grape production, regulatory issues, and finance, among many others. For a list of the challenges wineries in emerging regions face, please see Table 1 in Appendix A, which summarizes the challenges identified in a survey of wineries in Michigan, Missouri and New York conducted in 2011.

Therefore, as more research in this particular area is performed, not only will more information be available to the industry, but resources can be developed through cooperation with industry leaders and interest groups (e.g., wine and grape boards and groups focused on improving wine quality). Furthermore, these resources could help wineries develop and adopt best practices. Not only would this promote the growth and success of currently operating wineries in these areas, but also, potentially, encourage the establishment of new wineries in the future.

In addition to the success of wineries comes the potential for economic growth and success for the local communities and states with winery growth and development. When a group of wineries are formed in an area, they have the potential to form a cluster. A cluster has the potential to drive positive economic impacts through tourism, taxes and employment opportunities, to name a few. In the state of Missouri alone, with 97

wineries in 2009, the total economic impact was approximately $1.6 billion, which nearly tripled the economic impact of the Missouri wine industry in 2005 (Stonebridge Research Group, 2009). Furthermore, the wine industry in Missouri paid $81.7 million in local and state taxes and provided more than 14,000 jobs throughout the state in 2009 (Stonebridge Research Group, 2009). Moreover, the economic impacts of wineries for the states of Michigan and New York were $790 million in 2005 and $2.5 billion in 2009, respectively (Michigan Grape and Wine Industry Council and New York Wine and Grape Foundation). Therefore, the potential for continuing growth of the wine industry allows for gains in the broader economy, overall.

As mentioned earlier, research on the subject of wineries in emerging regions is minimal. However, the work that has been done (i.e., Fernández-Olmos, 2010 and Fernández-Olmos *et al.,* 2009a, 2009b and 2008) focuses mainly on transaction cost economics (TCE) but also stretches beyond TCE to incorporate other vertical boundary theories. Therefore, due to minimal research in the subject area, there is need for more studies to test the relevance of theories and frameworks, such as TCE and other competing theories of vertical boundaries of firms, within the context of the wine industry.

The purpose of this research is not to fill a theoretical gap, but rather to provide additional empirical tests of vertical boundary theories and thus generate new information to emerging wine industries. The main focus of this thesis is to better understand the determinants of the vertical boundaries of wineries in emerging regions. Furthermore, another goal, beyond understanding the determinants of vertical integration, is to bring

new information to emerging wine industries to help better understand how procurement decisions impact the success of wineries.

The remainder of this thesis is organized in seven chapters. Chapter 2 is an extensive literature review that discusses the TCE vertical boundary theory, as well as other competing theories of vertical boundary decisions. Chapter 3 explains the methods for empirical examination of determinants of vertical boundaries of grape provisions. Chapter 4 discusses the findings and results from the empirical work. Chapter 5 presents the qualitative research performed through in depth interviews with 10 wineries in the state of Missouri. Chapter 6 compares the results of the two research methods used in this study. Finally, Chapter 7 concludes the thesis with a summary of research results and also discusses the limitations of this thesis and suggestions for future research.

CHAPTER 2 – LITERATURE REVIEW

Chapter 2 is divided into four sections. The next section, 2.1, concentrates on the literature surrounding the TCE approach to vertical integration. Section 2.2 reviews competing and alternative views of vertical boundary decisions (e.g., Measurement Costs, Resource-Based View and Knowledge-Based View, and Property Rights and Incomplete Contracts). Section 2.3 discusses articles that attempt to integrate multiple competing views. Finally, section 2.4 reviews the literature that examines vertical boundary decisions within the wine industry.

2.1 – LITERATURE REVIEW OF TRANSACTION COST ECONOMICS

It is important to start the review of the literature where the original thoughts about firm existence and boundaries began – Coase's seminal work "The Nature of the Firm" (1937). The purpose of Coase (1937) was to "bridge the gap in economic theory between the assumption … that resources are allocated by means of the price mechanism and the assumption … that this allocation is dependent on the entrepreneur co-ordination" (p. 389). Coase states, "Co-ordination is the work of price-mechanism in one case and of the entrepreneur in another" (p. 389), and "The degree to which the price mechanism is superseded varies greatly" (p. 388). Therefore, Coase defines reasons why firms superseded the price mechanism to bridge this gap in the theory of the firm.

Coase (1937) finds that firms emerge and supersede the market (price mechanism) because of marketing costs for two primary reasons. First, marketing costs

(i.e., cost of using the price mechanism) give rise to firms because organization through the price mechanism leads to the emergence of firms to internalize transactions, thus economizing on marketing costs. Second, firms emerge in specialized exchange economies, where rationing of production (e.g., quota schemes and price control) takes place, as lower costs are realized through firms. Furthermore, Coase (1937) also identifies that firms substitute for the price mechanism to reduce risk and uncertainty and realize profits (Coase 1937).

Beyond just the establishment of the firm, Coase (1937) also suggests that several factors must be examined in order for a firm to decide to supersede the market and thus expand through vertical integration. What Coase (1937) discovers is costs (e.g., transaction, contract and coordination) must be taken into account before vertical integration occurs. Therefore, at the margin, firms have to compare the cost of the firm versus the cost of the market; from this, the firm should choose the form of governance form and procurement method with the lowest cost (Coase, 1937).

After the seminal work of Coase (1937) first introduced marketing costs (later known as transaction costs), there was a long gap in the vertical coordination literature until Williamson (1975 and 1979) and Klein, Crawford and Alchian (1978) pioneered the theory of transaction cost economics (TCE). The advent of TCE paved the way for the study of governance mode choice (Macher and Richman, 2008).

Williamson (1979) assumes bounded rationality, such that individuals do not have limitless information; therefore, incomplete contracts exist. Furthermore, because of imperfect information, opportunism, such as hold up and quasi rent appropriation, exists; thus, people might take advantage of others for their own benefit (Williamson, 1979).

Under the microanalytic approach of TCE, Williamson (1979) uses the transaction between the buyer and seller as the unit of analysis. Williamson (1979) examines three critical dimensions of the transaction: 1) uncertainty, 2) frequency, and 3) degree to which investments are idiosyncratic (transaction specific). From this, Williamson (1979) makes the general argument that "special governance structures supplant standard market-cum-classic contract exchange when transaction-specific values are great" (p. 244). Therefore, the most important of these three dimensions and the main driver of TCE is asset specificity. Moreover, asset specificity can take on many forms, such as physical, human, temporal, dedicated, site, and brand name (Williamson, 1991).

The forms of governance first identified by Williamson (1979) are market and hierarchy. Through examining each governance structure, Williamson (1979 and 1991) identify the pros and cons of each form of governance. Williamson (1991) argues that markets have high-powered incentives, as producers have to compete to produce high-quality products while maintaining efficiency. On the other hand, the major disadvantage of spot market transactions are transaction costs especially in the presence of specific assets. The hierarchy form of ownership, in turn, has pros and cons, as well. The pros of the hierarchy form of ownership include control over employees and quality of the input (Williamson, 1991). The cons of the hierarchy governance structure include low-powered incentives and bureaucratic costs, which are not present in the market (Williamson, 1991).

Beyond the realm of the polar opposites of market and hierarchy governance structures, Williamson (1991) concentrates on and acknowledges, for the first time, the importance of a third, intermediate form of organizational architecture, which is the

hybrid form of governance. Williamson (1991) notes that markets and hierarchies use different means of achieving supplies, services, etc., which further gives rise for a type of firm that displays characteristics of both the market (high-powered incentives) and hierarchy (fiat control). According to Williamson (1991), there are four attributes that distinguish each form of governance.

These four attributes of alternative modes of governance are incentive intensity, administrative controls, adaptation (performance attributes), and contract law. Incentive intensity relates to the extent that incentives are used to govern the transaction (Williamson, 1991). Administrative controls refer to the intensity at which control mechanisms are being utilized. For the market form of governance, incentive intensity is very high, due to the competitive nature of the market, while very low in a hierarchal governance mode. Administrative controls are very weak in the market as buyers and sellers adapt autonomously to price changes; however, administrative controls are very high in the hierarchal governance structure, do to the lack of high-powered incentives and the need for cooperative adaptation, which leads to the need for more control of administrators (Williamson, 1991).

Performance attributes are seen to be a measure of adaptability of the firm from two different approaches. First, the market is said to have type (A) adaptability, which leads to autonomous adaptability, mostly attributed to the price mechanism (Hayek, 1945). Therefore, the market is a better form of governance when the decisions to adapt are autonomous among firms. Furthermore, a hierarchy displays cooperative or coordinated adaptability, which Williamson (1991) adopts from Barnard (1938).

The third attribute which Williamson (1991) notes, as a factor of governance mode choice, is contract law. Williamson (1991, p. 270) notes, "Market, hybrid, and hierarchy differ in contract law respects." Under a market form of governance, contract law is enforced by a third party (e.g., court or arbitration). Within a hybrid, contract law is a bit more flexible and adapted for the specific hybrid case. In the case of a hierarchy governance structure, managers and monitors within the firm handle disputes, but add bureaucratic costs from internalization (Williamson, 1991). Therefore, based on the pros and cons of each form of governance structure, Williamson (1991 and 1979) identifies the form of governance that should be used for a given transaction to minimize transaction costs.

When examining the uncertainty surrounding the transaction, Williamson (1979) finds that if the transaction were standardized, the market would be a sufficient means of procurement, no matter the uncertainty surrounding the transaction. Furthermore, as transaction specific investments increase and uncertainty increases, other forms of governance, besides the market, will be utilized. However, as the industry matures, uncertainty will eventually decrease (Williamson, 1979 and 1991).

Comparative institutional analysis of market, hierarchies and intermediate forms (hybrids) is used to examine the most efficient (cost minimizing) form of organization (Williamson, 1979). Through the discriminating alignment hypothesis, Williamson (1979) identifies that cost economizing is the main factor when choosing governance structure, which includes both the costs of production and transaction costs. Williamson (1979) finds that this "essentially reduces to economizing on bounded rationality while simultaneously safeguarding the transactions in question against the hazards of

opportunism" (Williamson, 1979, pp. 245-246). Furthermore, Williamson (1991, p. 277) states, "The discriminating alignment hypothesis to which transaction-cost economics owes much of its predictive content holds that transactions, which differ in their attributes, are aligned with governance structures, which differ in their costs and competencies, in a discriminating (mainly, transaction-cost-economizing) way."

Building on Coase (1937), Klein *et al.* (1978) attempt to answer the question: "When will vertical integration be observed as a solution, and when will the use of market-contracting process occur" (p. 302), when the market fails to suffice as the main means of procurement? From their study, Klein *et al.* (1978) find that there is not one simple answer to the form of governance; rather, since the assumption that transaction costs are zero is not used in this article, forms of governance vary among firms. In addition, Klein *et al.* (1978) state that firms are a "set of interrelated contracts" and then pose the question: "What kinds of contracts are used for what kinds of activities, and why" (p. 326)?

To study these questions, Klein *et al.* (1978) look to the petroleum industry and find that joint ownership of specific assets was the most efficient form of governance for the industry, due to the possibility of holdup and quasi-rent appropriation. Therefore, from their study, Klein *et al.* (1978, p 298) realize that

> "as assets become more specific and more appropriable, quasi rents are created (and therefore the possible gain from opportunistic behavior increases), the costs of contracting will generally increase more than [the costs of] vertical integration. Hence, *ceteris paribus*, we are more likely to observe vertical integration."

Furthermore, as the quality of the input becomes harder to judge and the uncertainty of the quantity delivered increases, the real costs of contracting increase, leading to the possibility of vertical integration (Klein *et al.,* 1978).

Another study that focuses on the TCE theory is Macher and Richman (2008). According to Macher and Richman (2008, p. 3), "The key conceptual move to TCE is to describe firms not in neoclassical terms (as production functions) but in organizational terms (as governance structures)." Therefore, since transaction costs exist, and are not assumed zero, every exchange has costs. Moreover, there must be some form of monitoring surrounding each transaction, thus the form of governance that minimizes these costs will be the optimal choice over other governance modes (Macher and Richman, 2008).

Macher and Richman (2008) note that the more complex the transaction, the more complex will be the mode of governance (vertical integration will increase), and where there is little complexity in the transaction, simpler forms of ownership will be found (extreme cases market or other cases hybrid). Failing to match the correct type of organization to the correct type of transaction will cause increased costs, of which Williamson (1979 and 1991) state should be economized on. Therefore, agreeing with Williamson (1979 and 1991), "more integrated governance modes are associated with a higher degree of relationship-specific assets, more complex transactions, greater uncertainty … or more frequent exchange" (Macher and Richman, 2008, p. 5).

As firms move from a market form of governance towards a more hierarchal structure, unilateral or bilateral dependency is created between contractual parties, "which introduces bargaining problems as contractual parties attempt to appropriate the

quasi-rents generated from relationship specific investments" (Macher and Richman, 2008, p. 13). This dependency is created due to the fact that the assets are no longer as easily redeployed for other uses, as would be the case under the market form of ownership (Macher and Richman, 2008). This, in turn, could lead to the possibility of holdup, and give rise to vertical integration.

As mentioned above, asset specificity is the key determinant of firm boundary choice according to TCE (e.g., Williamson, 1979 and 1991; Klein *et al.,* 1978; Macher and Richman, 2008). Therefore, when asset specificity is high, there will, most likely, be a larger probability of the recognizing the hierarchal form of governance than the market form of governance. Klein (2005, p. 5) states, "Asset specificity has received the most attention, presumably because of the central role it plays in the transaction cost approach of vertical integration."

2.2 – EMPIRICAL ANALYSIS OF TCE

Even though asset specificity plays such a central role in TCE, proxies for this key variable have been and continue to be one of the largest limits for testing the theory (Klein, 2005). Proxies for asset specificity include technical specifications, as a proxy for physical asset specificity; worker knowledge, to proxy for human asset specificity; physical proximity, for site specificity proxy; and both spatial and temporal proxies (Klein, 2005). Furthermore, it is sometimes the case where asset specificity is difficult or even impossible to measure; therefore, small-numbers bargaining captured by the concentration within a particular industry is used in place of asset specificity (Klein,

2005). Moreover, the TCE literature is made up of primarily case studies due to the difficulty in measuring the specific variables that comprise the TCE theory (Klein, 2005).

A seminal piece of work on the empirical TCE literature is Masten *et al.* (1991). Masten *et al.* (1991) call attention to the selection problem, which is that one can only measure the given transaction cost for the governance structure chosen (and observed) and not for the alternative models that are not chosen (and hence not observed). To bypass selection problem, Masten *et al.* (1991) introduce a reduced form equation, which assumes that whatever governance structure is observed is actually more efficient than any other alternative form of organization for the particular transaction. However, Masten *et al.* (1991) recognize and draw attention to the limitations of the reduced form equation: 1) only ordinal measures of the transaction cost are taken into account; and 2) although generally supported, the results are weak.

Using case study data collected from one naval shipbuilding firm, Masten *et al.* (1991) utilize a reinterpreted reduced form equation to attempt to actually estimate a dollar value on transaction costs, with a censored regression model that was originally used for labor supply application. The benefits of this model are, given the observed organization form, both market and internal costs (dollar amounts) are observed and the costs (dollar amounts) of alternative governance forms not chosen can be estimated (Masten *et al.*, 1991).

Furthermore, differing further from other previous studies, Masten *et al.* (1991), in their model, introduce temporal asset specificity and similarity as determinants of vertical boundary choice. Other determinants used for boundary choice in this study were physical asset specificity, human asset specificity and uncertainty/complexity. To

examine the vertical boundaries of the case study firm, Masten *et al.* (1991) observe the costs of 43 internal tasks and 31 outsourced tasks, along with a 1-10 Likert scale ranking of the before mentioned determinants of boundary choice.

To estimate the reduced form equation, Masten *et al.* (1991) use Heckman and probit models to analyze the determinants of vertical integration. What they find is temporal asset specificity has a significant positive impact on vertical integration, human asset specificity is only marginally significant (when similarity was in the model), while physical asset specificity is not significant. Furthermore, Masten *et al.* (1991) also find that increases in complexity of components leads to less integration; however, once the complexity reaches a certain threshold, they see an increase in the probability of integration. Moreover, similarity tends to increase the probability of integration for labor-intensive activities more so than engineering intensive activities.

Switching to estimating dollar amounts of transaction costs, Masten *et al.* (1991) regress internal organization costs against the dependent variables and find that the results help confirm the probit results. Therefore, temporal asset specificity (scheduling) is found to increase the probability of integration because of market exchange hazards, and notices decreased costs of integration. No support was found for complexity, as it was found to have a nonmonotonic impact on internal costs. In addition, the regression results suggest that "the correlation between human asset specificity and the likelihood of integration found in the first stage is a consequence of a decrease in internal organization costs rather than the increase in the costs of market exchange … Hence, this result illustrates the hazards of relying on estimates from reduce-form models of economic organization" (Masten *et al.,* 1991, p. 19).

Masten *et al.* (1991) conclude that some but not all of the TCE arguments are supported and that human asset specificity and complexity incentives of vertical integration stem from decreased internal cost and not from market transaction costs. Moreover, Masten *et al.* (1991) find that the firm increases its procurement cost by 70 percent if it internalizes production of a component that should be procured from the market, and it spends 3 times as much on market procurement if internal production is the most efficient means of procurement.

Nevertheless, even after this seminal empirical work by Masten *et al.* (1991), Klein (2005) still finds that the main limitation in the empirical analysis of TCE is finding proxies and measuring the categories of asset specificity. The measurement techniques and proxies for asset specificity utilized in studies focusing on emerging wine regions will be examined and explained later and are taken into consideration when developing the questions for this study.

2.3 – EXAMINATION OF COMPETING AND ALTERNATIVE THEORIES OF FIRM BOUNDARIES

Transitioning from the literature on Transaction Cost Economics, alternative and competing theories of firm boundaries will now be examined. As mentioned earlier, these other theories include, but are not limited to, Measurement Costs (MC), Resource-Based View (RBV) and Property Rights and Incomplete Contracts (PR/IC).

Measurement Cost Theory (MC)

The Measurement Cost (MC) view of vertical integration complements the TCE theory; it essentially adds another dimension to the theory, measurement cost, which can be thought of as a form of transaction cost. According to Barzel (1982), what is measured when examining the quality of a product is often times not the attributes that are truly desired by the buyer. The main reason for measuring something other than the desired attributes is because of the costliness of the measuring task. Therefore, because of the costs of measuring, there are errors that occur in the purchasing process. These errors that occur often times lead to wealth transfer, as a seller may gain from willingly selling a lower valued product because of measuring errors by the buyer (Barzel, 1982). Therefore, these costs and errors create incentives that can lead to a move from market organization to a more hierarchal structure.

When final product quality is highly correlated with and contingent upon the quality of the input, measuring costs increase, as determining the desired attributes of the input become crucial to the procurement process. Barzel (1982) argues that if a supply chain were completely organized as a set of market transactions, and the quality of the final product depended on the quality of the input, each successive buyer would have to monitor the quality of the inputs going into the product they purchase. Therefore, "when inputs have to be measured by two successive junctures, a rationale for an integrated firm emerges … [as] the problem is obviously compounded as the number of steps increases" (Barzel, 1982, p. 41). Moreover, if inputs are the best proxy for quality of the final output, vertical integration can help reduce measurement costs (Barzel, 1982).

As the difficulty of measuring the quality of the input increases and the variability of product quality increases, the incentive to vertically integrate increases; therefore,

suggesting measurement costs can be decreased through vertical integration. However, even though measurement costs may be decreased, other costs, such as bureaucratic costs and "shirking", increase (Barzel, 1982). This is due to the fact that the person who is now producing the product is no longer remunerated based on input or output; therefore the high-powered incentives of the market are lost and shirking may occur (Barzel, 1982).

Therefore, the MC theory of vertical boundary suggests that as the difficulty of measuring inputs increases, the decision to vertically integrate increases. If the variability of the quality of the inputs increases, the incentive to vertically integrate also increases. The level of measurement costs within the firm is more than likely lower than in the market when the quality of the input is difficult to observe (Barzel, 1982).

Resource Based View Theory (RBV)

The resource-based view (RBV) of vertical integration changes the focus of vertical integration from market failure (i.e., transaction costs), and shifts the decision to vertically integrate on the attributes of individual firms (Madhok, 2002). Therefore, the unit of analysis in the RBV theory is now an individual firm and that firm's attributes and no longer the transaction itself. Madhok (2002) notes that Coase (1937) made a large contribution to RBV; however, scholars have not yet recognized the large role RBV plays in understanding governance structures of firms. Furthermore, RBV scholars suggest that firms exist because of their ability to successfully organize resources internally (Madhok, 2002).

In order to increase productivity, a firm must expand its resources. However, the firm has limited boundaries because of its skills and resources available to the firm

(Madhok, 2002). Nevertheless, according to Madhok (2002), firms accumulate competence over time, which, along with other factors, can lead to the firm's competitive advantage in particular activities. Therefore, as suggested by Madhok (2002) and Teece, Pisano and Shuen (1997), the RBV decision to vertically integrate is based on achieving and maintaining an individual firm's competitive advantage. Madhok (2002, p. 539) states, "The source of firm advantage lies in those activities which it is able to conduct in a superior manner *vis-à-vis* other firms and which are difficult for other firms to emulate competitively within an acceptable time frame or cost." Moreover, in order to maintain that competitive advantage, the firm must recognize its new boundaries, as vertically integrating too far would cause excessive diversification and the firm's performance could suffer as a result (Madhok, 2002).

According the RBV theory, there are many determinants used by scholars to determine vertical boundaries. For example, Poppo and Zenger (1998) use skill set of the firm (degree of performing a function require personnel with extensive knowledge); economies of scale (degree that the firm has sufficient scale to perform function efficiently); and firm size (measured by number of employees). Fernández-Olmos et al. (2009a, 2009b, 2008) examine the RBV variable of experience of the firm by using the number of years the firm has participated in a certain skill as a proxy. Furthermore, Fernández-Olmos et al. (2009a, 2009b, 2008) and Ohanian (1994) take log average holding capacity of the firm as a proxy for the RBV variable of size of the firm. Anderson (1985) uses assets of the firm as a RBV determinant and Leiblein and Miller (2003) utilize sales of the firm as a determinant. Therefore, it can be seen that the RBV theory

determinants truly depend on the firm and its skills and assets.

Property Rights and Incomplete Contracts (PR/IC)

Another competing view of TCE is the property rights/incomplete contracts (PR/IC) theory of firm boundaries. A main difference between TCE and PR/IC is that the "property-rights models focus exclusively on ex ante underinvestment in relationship-specific human capital brought about by inefficient ownership arrangement, while transaction cost theories look more at the ex post contract-execution stage" (Klein, 2005, p. 25). Furthermore, Klein (2005) notes there have not been many empirical studies within PR/IC, when compared to TCE, as it is more difficult to measure ex ante underinvestment compared to ex post contractual problems.

The main contributors to the PR/IC view of firm boundaries are Grossman and Hart (Klein, 2005). Grossman and Hart (1986) build upon TCE theory, as the main determinants of vertical integration of PR/IC are still asset specificity, quasi-rent appropriation, and the threat of holdup. However, Grossman and Hart (1986) recognize that ownership is linked with residual rights of control, and since incomplete contracts exist, there is an optimal assignment of residual control rights. This optimal level of residual control goes hand-in-hand with the optimal level of ownership, therefore Grossman and Hart's (1986) breakthrough idea gives rise to the PR/IC theory.

Hart (1998, p. 123) states, "Incompleteness of contracts opens the door to a theory of ownership." Moreover, since incompleteness of contracts may lead to opportunistic behavior, it is important to explore the relative importance of the efforts of each party involved in the contract to understand to whom the ownership (residual control) should

be allocated to (Hart, 1988). Furthermore, Hart (1988) focuses on understanding not only if vertical integration should occur but also which direction (upstream or downstream) the integration should flow.

From the study, Hart (1988) realizes that ownership of an asset should only occur if the person responsible for operating that asset receives the residual claim produced by that asset. This is because "standard moral hazard ideas tell us that the operator's incentives will be dulled if he does not earn the return from his activities" (Hart, 1988, p. 125). If the manager owns the asset, there can be an optimal contract, which leads to the highest performance; this is not possible if another party owns that asset (Hart, 1988).

To examine complementary assets, Hart (1988) gives examples, such as a furniture department and hardware department in a department store and both the compact and subcompact divisions of an automobile manufacturer, where there is nonintegration (two managers, two assets) and integration (one manager, two assets). From this, Hart (1988) finds that there are differences between feasible allocations under integration when compared to feasible allocation under nonintegration. Therefore, as long as the parameters allow, the best possible outcome can be found when integration occurs, as the incentives are aligned because one manager has control of both profit streams. Furthermore, Hart (1988, p. 133) states, "If there are increasing returns to management, so that one person can manage two firms, then these firms should have a common owner." In addition, it was found that relative to the other, the party who makes the most specific investments should retain residual control over the asset (Hart, 1988).

The main benefit of the PR/IC theory, as Grossman and Hart (1986) and Hart (1988) note, is that it helps solve the problems of holdup, opportunistic behavior and

lock-in, through granting residual control rights to the person(s) who have made relationship-specific investments. However, the main disadvantage of the PR/IC theory is that there could possibly be an incentive problem created after integration. To address this disadvantage Hart (1988, p. 133) notes, "To resolve incentive problems, it is necessary not only to assign the various parts of the return scheme to the different managers efficiently, but also to allocate ownerships and control rights to support this assignment."

2.4 – INTEGRATION OF COMPETING THEORIES

Now that alternative theories of firm boundaries have been recognized and discussed, two empirical articles (e.g. Poppo and Zenger, 1998 and Franken *et al.,* 2009) that bring these alternative theories together will be examined. Further examples of empirical articles that integrate competing vertical boundary theories can be found in Tables 1-8 in Appendix B. This is important as Klein (2005, p. 21) states that one of the main problems with the TCE literature is that "many studies do not explicitly compare rival explanations for vertical relationships." Comparing across competing theories can allow us to better understand which theories work better under what circumstances and what theories can be combined to better explain vertical boundary decisions of firms. Williamson (1999) describes how opposing theories of vertical boundaries are viewed, as both rival and complement theories, and these complement theories are important in helping better understand the science behind organizational architecture.

Poppo and Zenger (1988) recognize and attempt to fill the gap between boundary decisions and governance performance by testing determinants from alternative theories (TCE, KB, RBV, and MC), including asset specificity, measurement difficulty, uncertainty, scale, skill set, and firm size. They examine these determinants in the context of procurement decisions for information services in several different firms through different industries. Poppo and Zenger's (1998) analysis differs from previous studies as they examine exchange performance instead of governance costs across competing explanations of boundary choice by using both production and governance efficiency. Furthermore, Poppo and Zenger (1998) do not use dollar values, as Masten *et al.* (1991) does when comparing governance forms; rather, they examine transaction performance measures not just based on cost measures but also on quality and responsiveness.

The data Poppo and Zenger (1998) use was collected from a mail survey that was returned by 152 information services departments of companies across several industries. To examine the determinants of exchange performance, Poppo and Zenger (1998) estimate "a model of the influence of exchange attributes on the performance of both markets and firms" (p. 855). They use a maximum likelihood Heckman model, similar to Masten *et al.* (1991), to accurately define models of both market and firm performance. Furthermore, to examine determinants of boundary choice across different dependent variables, Poppo and Zenger (1998) use OLS and two probit models.

Poppo and Zenger (1998) recognize that TCE and KB are alike in the respect that asset specificity is the main driver of boundary choice. However, the theories differ in their reason for vertical integration as TCE avoids market failure (a negative) while KB capitalizes on firm capabilities (a positive) (Poppo and Zenger, 1998). Furthermore, KB

concentrates on the firm as the unit of measure, while TCE concentrates on the transaction. Poppo and Zenger (1998) measure asset specificity with three survey questions that primarily focus on human asset specificity of specialized knowledge or skills. Poppo and Zenger (1998) find empirical support for TCE but not KB as means of vertical integration as asset specificity increases. However, they still find overall support for vertical integration, as "hierarchies better cope with asset specificity than markets" (Poppo and Zenger, 1998, p. 867).

Measurement difficulty, as Poppo and Zenger (1998) find, determines governance performance when both market and hierarchal forms are tested. To understand the measurement difficulty of firms, Poppo and Zenger (1998, p. 866) ask, "To what degree is it difficult to measure the collective performance of those individuals who perform this function?" As measurement difficulty increases, it was found that internalization (hierarchy) increases; however, the decision to integrate comes with increased costs of management and leads to low-powered incentives within the firm. Furthermore, Poppo and Zenger (1998) recognize that cost performance can be hindered in the presence of measurement difficulty for both market and hierarchal structures. This is important to note, as cost performance is a key determinant of governance structure choice. However, as measurement becomes more difficult, hierarchies fail "to a lesser degree, presumably, because they can substitute monitoring for output measurement" (Poppo and Zenger, 1998, p. 873).

The measurement of uncertainty used by Poppo and Zenger (1998) is technological uncertainty. To determine the degree of technical uncertainty, they use two questions that focus on skills and change within information services. They find,

however, no significant support that uncertainty has an impact on boundary decisions. Nevertheless, market governance may be observed as the degree of technological change and skill development within information evolves rapidly (Poppo and Zenger, 1998).

Taking scale of the firm into consideration, when internal demand is high, Poppo and Zenger (1998) observe significant results on the satisfaction of performance on internal activities. They measure firm scale by determining the degree a firm can produce efficiently in-house. In addition, internal demand does not impact satisfaction of outsourced activities. Furthermore, as skill set of the technology increases and firm size increases, market governance has significant and better performance than hierarchy governance (Poppo and Zenger, 1998).

Taken together, the results of Poppo and Zenger (1998) suggest that vertical boundary choices are better explained by avoiding transaction costs (TCE) rather than by the firm's capabilities (KB) and that as measurement costs increase, the hierarchal form of governance suffers to a lesser degree than a market when coping with measurement costs. When examining uncertainty, Poppo and Zenger (1998) find no support that increased technological uncertainty leads to a greater degree of vertical integration. Finally, as size of the firm and technological skill set increase, the market appears to perform better than the hierarchy.

Franken *et al.* (2009) utilize TCE and risk behavior theories of firm boundaries, along with unifying the separate theories together, to examine the marketing decision of 48 Illinois hog farms and to understand which of the theories offers the most significant explanation. Franken *et al.* (2009) differ from other studies in that they examine family hog farms and not corporations, as many other studies do (e.g., Masten *et al.,* 1991 and

Poppo and Zenger, 1988). Therefore, because the study examines a family farm, the argument for including risk (attitude and perception) within the model becomes more relevant. Risk, in this study, is measured as the interaction between risk attitude and risk perception.

Three primary sets of questions were used in the survey to measure the main constructs: 1) Risk Perception (7 questions), 2) Risk Attitude (7 questions), and 3) Asset specificity (15 questions). Furthermore, within the asset specificity construct, there were five questions about human asset specificity, five questions concerning physical asset specificity, and five questions regarding site asset specificity. Due to the large number of questions in each construct, Franken *et al.* (2009) use factor analysis to measure the variables pertaining to risk behavior (perception and attitude) and transaction cost (asset specificity). Through the factor analysis, they examine the variance between the questions within each construct and test Chronbach's Alpha, which are above the cutoff of .70.

Franken *et al.* (2009) use three binary logit models (TCE, risk behavior, and unified) with binary dependent variables (1=Contract and 0=Otherwise and 1=Spot and 0=Otherwise), to examine the determinants of the vertical boundary choice. Even though, as mentioned above, several questions were asked under each construct of asset specificity, such as human, physical and site, the final model only uses one question that focuses on the asset specificity: the use of specific genetics (included only in the TCE and unified models). The other determinants included in the model are size, leverage, age, education, uncertainty (only in the TCE model) and the interaction between risk

preference and risk attitude (which takes the place of uncertainty in both the risk behavior model and the unified model).

Franken *et al.'s* (2009) empirical analysis suggests that the unified model (combining TCE and risk behavior theories) offers a more complete explanation of vertical boundary choice of Illinois hog farms when compared with either of the independent models. Furthermore, the TCE Contract model has a larger McFadden's R^2 value than the risk behavior Contract model, and the risk behavior Spot model has a larger McFadden's R^2 than the TCE Spot model. In addition, Franken *et al.* (2009) find that hog farmers who are more price risk averse and perceive more risk are more inclined to choose long-term contracting over the spot market. Moreover, producers who make more specific investments are more likely to choose long-term contracts as opposed to the spot market.

From Poppo and Zenger (1998) and Franken *et al.* (2009), it can be recognized that integrating competing theories, rather than just focusing on one specific theory, gives a more complete explanation of vertical boundary theories of firms. It was found that the asset specificity aspect TCE theory was the most prominent in both studies; however, by complementing a TCE model with other theories, vertical boundary determinants were better explained.

Klein (2005) notes that other studies examine transaction costs and rival theories. However, according to Klein (2005, p. 25), "Most of these comparative studies appear in the strategic management literature, where theories of the firm based on capabilities, power, and trust are important rivals to the transaction cost view." Nevertheless, it is

important to recognize that Klein (2005) finds that the studies that integrate multiple theories offer a more complete explanation of vertical boundary decisions than just a standalone model that only includes one theory.

2.5 – WINERY VERTICAL BOUNDARY STUDIES

Now that the broad literature of TCE has been reviewed and other theories of firm boundaries have been examined, I will now turn to the vertical boundary literature applied to the wine industry.

The majority of the information available on vertical integration opportunities of wineries has been written by Marta Fernández-Olmos (2010) and Marta Fernández-Olmos, Jorge Rosell-Martinez and Manuel A. Espitia-Escuer (2009a, 2009b and 2008). Fernández-Olmos (2010) and Fernández-Olmos *et al.* (2009a, 2009b and 2008) contribute to vertical boundary research by broadening the knowledge within the field through testing TCE and utilizing other theories of vertical integration to examine the performance implications of governance mode choice of 187 wineries in the viticulture area of the DOCa Rioja region in Spain. Fernández-Olmos (2010) and Fernández-Olmos *et al*. (2009a, 2009b and 2008) use a survey method to attain the information needed for their research.

Fernández-Olmos (2010) recognizes that viticulture offers a great opportunity to study the performance implications of vertical integration for two reasons.

> "First, only a few papers have extended transaction cost economics (TCE) to include performance implications and to the best of our knowledge no study has to date has been conducted on data from neither viticultural firms nor agrarian firms in general. Second, good performance in the first step of the wine value

> chain (i.e., acquisition of wine grapes) is an important dimension of competition in this market" (Fernández-Olmos, 2010, p. 257).

Therefore, with these two reasons in mind, the study of viticulture and wineries through the use and extension of transaction cost economics to include other competing theories of vertical boundary choice offers valuable knowledge to the area of vertical boundaries of firms.

Within the wine producing industry, judging the quality of inputs (e.g. grapes) is difficult but essential to the success of wineries, as wineries gain their competitive advantage over other wineries if they produce differentiated wines (Fernández-Olmos *et al*., 2009a and 2009b). Therefore, because of the difficulty of grading, imperfect information exists between the wine producer and grape producers (Fernández-Olmos, 2010; Fernández-Olmos *et al.*, 2009a, 2009b & 2008). According to Fernández-Olmos *et al*. (2009a and 2009b), because imperfect information exists and grape quality is important to the final wine product, there is an incentive for the wine producer to seek out alternative methods besides the spot market to assure quality of the input. One alternative to the spot market is entering into contractual agreements with grape producers, in order to help control the quality of the input. However, since judging the final quality of a grape proves to be difficult, the producer may not be able to assure quality to the degree that he or she wishes through contracts.

Utilizing the theory of transaction cost economics, Fernández-Olmos (2010) and Fernández-Olmos *et al.* (2009a, 2009b and 2008) explore asset specificity and uncertainty surrounding the transaction, as well as using other determinants of governance structure, such as winery size, age (experience), and product quality, to

understand the vertical integration decision of 187 wine producers in the DOCa Rioja region of Spain.

The theoretical framework of transaction cost economics (TCE) for Fernández-Olmos *et al.* (2008) analyzes the "discrete governance structures" that firms chose, based on certain factors (Fernández-Olmos *et al.,* 2008). Fernández-Olmos *et al.* (2008) use a generalized ordered logit to analyze the data, with three specific cutoff points to establish the governance mode choice of the wineries in the sample. A winery is considered "Market mode" (0) if it acquires at least 80 percent of its grapes through the market; "Hierarchical mode" (2) is granted if the winery produces (i.e. integrates vertically) at least 80 percent of the grapes needed to operate; and "Hybrid mode" (1) is assigned to the wineries that do not fall under the other two categories (Fernández-Olmos *et al.*, 2008).

Fernández-Olmos *et al.* (2009a, 2009b) examine the correlation between the quality of the final product and the decision to vertically integrate by utilizing the TCE and RBV theories. However, the two articles use different methods to analyze the data. Fernández-Olmos *et al.* (2009a) use a binomial logit to estimate the model and test the hypotheses, while Fernández-Olmos *et al.* (2009b) utilize the method of a generalized ordered logit. However, even though different methods were used in Fernández-Olmos *et al.* (2009a and 2009b), both calculated the marginal effects "to interpret the sensitivity of the probability of observing a certain outcome (market, hybrid and hierarchy) with respect to explanatory variables" (Fernández-Olmos *et al.,* 2009b, p. 288).

To study asset specificity, Fernández-Olmos *et al.* (2009a, 2009b and 2008) use a Likert scale of 1 to 7 for each question asked. Grower physical asset specificity examines the grape grower's investment in viticulture that is difficult to be redeployed to other

activities. The winery's physical asset specificity measures the degree to which investments made by the winery are difficult to be redeployed and used for other activities. Dedicated asset specificity measures "the degree to which the assets were assigned for the purpose of that transaction would result in significant excess capacity … if the transaction [were] terminated prematurely" (Fernández-Olmos *et al.,* 2009b, p. 293).

Behavioral uncertainty is measured by the degree to which it is difficult to measure the grape grower's effort in grape production if no supervision exists. Environmental uncertainty measures the "perception of environmental volatility, that is, the difficulty to predict the exact production of grape that will be obtained taking into account the numerous contingencies that may arise during the grape production life cycle" (Fernández-Olmos *et al.*, 2008b, p. 293). In addition, environmental uncertainty (EU) is measured as an interaction between the EU experienced by each winery and a dummy variable, that was coded either "1" or "0", based on the asset specificity answers. Size of the winery is measured as the storage capacity of the winery in liters and quality of the wine is measured by percent of wine that falls under three separate classifications granted to the winery by the wine board in the Rioja region.

Fernández-Olmos *et al.* (2009a, 2009b and 2008) conclude that their empirical findings, for the most part and overall, support TCE theory and add relevance to the RBV theories. Therefore, as asset specificity increases, the incentive to vertically integrate increases; as the uncertainty surrounding the transaction increases, the incentive to vertically integrate increases; as winery size increases, the incentive to vertically integrate decreases; and, as the quality of the product becomes more critical to the success of the

winery, the incentive to vertically integrate increases (Fernández-Olmos *et al*., 2010, 2009a, 2009b and 2008).

In addition to the basic TCE and RBV theories examined in Fernández-Olmos *et al.* (2009a, 2009b and 2008), Fernández-Olmos (2010) investigates "how wineries' decisions to grow or buy their provisions of grape affect their viticultural performance" (Fernández -Olmos, 2010, p. 256). According to Fernández-Olmos (2010), very few individuals have actually examined performance implications utilizing the TCE theory. Furthermore, Fernández-Olmos (2010) notes that the decision to make or buy was not the reason for success of the operation; "rather, a winery's viticultural performance is contingent upon the alignment of [the] winery's governance decisions with the predictions of transaction cost theory" (Fernández-Olmos, 2010, p. 256). Therefore, Fernández-Olmos (2010) recognizes the endogeneity problem that often times exists with vertical integration models. To help correct for endogeneity, she examines the "'discriminating alignment' tenet, … which focuses on the performance implications of the fit between firms' governance choices and a set of specific attributes of the transaction at hand" (Fernández-Olmos*,* 2010, p. 256).

Through this study, Fernández-Olmos (2010) realizes the importance of solving for self-selection. Based on the factors in the viticulture industry, Fernández-Olmos (2010) states that combining the approach of testing the transaction cost economic parameters and investigating the endogeneity problem with a self-selection term allows for an "integrative model that simultaneously captures firms' vertical boundary decisions as well as the observed and unobserved determinants of these decisions and their performance implications" (Fernández-Olmos, 2010, p. 262).

Two hypotheses were tested in this study: 1) "Unobserved attributes influencing firms' governance mode decisions have performance consequences"; and 2) "The fit between governance mode decisions and relevant transactional attributes, highlighted by TCE, influences performance" (Fernández-Olmos, 2010, pp. 257-258). Although the same questionnaire was used for this study as for the previous work done by Fernández-Olmos *et al.* (e.g., 2009a, 2009b and 2008), there were stricter guidelines set for this study, which took the number of useful survey observations from 187 to 175.

The methods Fernández-Olmos (2010) uses consist of "a two-step approach to resolving the endogeneity problem underlying on the performance model specification," which was proposed by Heckman's work in 1976 and 1979 (Fernández-Olmos, 2010, p. 260). The first step uses a probit model for "estimation of the selection equation parameters … by the method of maximum likelihood" (Fernández-Olmos, 2010, p. 260). The second step involves "adding the inverse mills ratio to the response equation (i.e., performance equation) to obtain consistent estimates using OLS method" (Fernández - Olmos, 2010, p. 260).

From her study, Fernández-Olmos (2010) finds that "unobserved characteristics affect the make or buy decisions and performance" of wineries (Fernández-Olmos, 2010, p. 262). From this conclusion Fernández-Olmos (2010) notes that the self-selection process is a main driver of "governance mode choice on viticultural performance … and that wineries' governance choice for their needs of grape are appropriately treated as endogenous" (Fernández-Olmos, 2010, p. 262). In addition, her findings align with the TCE theory, and through solving the endogeneity problem, the study finds that "other factors, distinct from transaction cost factors, influence governance choice and are also

influencing performance" (Fernández-Olmos, 2010, p.262). Furthermore, Fernández-Olmos (2010) also discovers "the greater the firm's propensity to vertically integrate based on its unobserved characteristics, the higher its viticultural performance" (Fernández-Olmos, 2010, p.262).

Before Fernández-Olmos (2010) and Fernández-Olmos *et al.* (2009a, 2009b, 2008) studied vertical integration within the wine industry through transaction cost economics, Rachael E. Goodhue, Dale M. Heien, Hyunok Lee and Daniel A. Summer explored vertical coordination in the wine industry, by using a survey of grape growers in California, to understand the association between product quality and contracting choices, through transaction cost economics (Goodhue *et al.,* 2003). The survey was sent to 12,000 grape growers in the state of California and 2,000 responses were returned, and of those responses, 1362 were usable. Goodhue *et al.* (2003) were the first to shed light on the winegrape industry from the aspect of "empirical analysis of contract usage" (Goodhue *et al.*, 2003, p. 281).

This study was comparable to previous studies on vertical coordination in the respect that the industry studied, in this case the grape production industry, has a multitude of relationships that were "observed simultaneously" (Goodhue *et al.*, 2003, p. 268). However, this study differs from previous studies because it examines the relationship between product quality and vertical coordination and the influence of producer characteristics (Goodhue *et al.*, 2003). There are two components that are the focus of Goodhue *et al.* (2003) study.

> "The first examines the choice among spot market sales, oral contracts, and formal written contracts as a vertical coordination measure. The second

> [component] examines the choice of contractual provisions for the subsample of growers choosing written contracts" (Goodhue *et al.*, 2003, p. 268).

The two concepts of TCE that Goodhue *et al.* (2003) identify on as determinants of contract use and vertical coordination in the winegrape industry are "the small numbers problem" and limiting "the scope for ex post opportunism" (Goodhue *et al.*, 2003, p. 270).

Goodhue *et al.* (2003) use three logistic (logit) regression models. The first models "the probability that a grower contracts as a function of grower characteristics, including the number of years the grower has dealt with the same buyer, the years the grower has been in business, farm size in acres, and the regional price of the grape variety for that grower" (Goodhue *et al.*, 2003, p. 272). The second and third models "estimate the probability that production practice monitoring/control provisions and price incentives for quality attributes, respectively, are included in a written contract as a function of contract and grower characteristics" (Goodhue *et al.*, 2003, pp. 272-273).

Through their study, Goodhue *et al.* (2003) find that as a grower produces higher quality grapes, it is more likely that he or she will utilize formal written contracts; thus, the growers who produce lower quality grapes do not feel the need to enter into formal written contracts. This holds only if "contracting costs are fixed and identical across growers" (Goodhue *et al.*, 2003, p. 270). Furthermore, there are more likely to be provisions in formal written contracts, which "specify production practices that affect subtle wine attributes" (p. 281), for growers of high-quality grapes, while low-quality grape producers usually have incentives for product attributes, such as sugar, to be included in explicit contracts (Goodhue *et al.*, 2003).

Franken (2012) follows Goodhue *et al.* (2003) in his analysis of organizational structures in the wine industry by examining vertical coordination strategies of 98 wine grape handlers of wine grapes in California. Franken (2012) goes beyond Goodhue *et al.* (2003) as both formal and informal contracts between wineries and winery customers are investigated. Franken (2012, p. 3) argues, "Wineries, like other businesses, seek to grow sales via product differentiation, which leads to heterogeneity of input needs across wineries." Therefore, the quality attributes of grapes differ from one winery to another. Thus, the implementation of unique grading standards, contract stipulations, and specific varietals help assure quality inputs (grapes) that allow the winery to differentiate their product. According to Franken (2012, p. 1),

> "Quality is a key competitive factor in the wine industry, and numerous approaches for organizing and managing the supply chain for wine grapes and wines are employed, ranging from simple oral agreements, to formal written contracts, to common ownership and management of neighboring states in the supply chain."

The methods used to examine these varying contractual agreements are Tobit, probit, and truncated ordinary least squares, and several of the results correspond with what previous studies have found.

First, when looking at grape procurement methods in the relationship between a grape grower and a buyer (e.g., downstream), Franken (2012) finds that the variable years in business has a significant impact on the use of formal contracts and hierarchal procurement strategies, which translates to greater vertical integration. Nevertheless, it was found that the more important the variable sales (percent sales of grapes and wine) became to the operation, the "proportional use of formal written contracts decrease significantly" (Franken, 2012, p. 10).

Furthermore, when exploring regional dummies, Franken (2012) finds that as the small numbers problem, originally explored by Williamson (1975), becomes more prevalent (e.g., fewer wineries in a specific region) the use of formal written contracts increases. He argues, "with fewer buyers of perishable grapes, a winery could potentially renege on an informal agreement with a grower or accept delivery only at a lower price than previously agreed upon" (Franken, 2012, p. 10). Furthermore, grape growers with buyers from the food service industry or a supermarket are seen to proportionally increase the utilization of formal written contracts and decrease the use of informal contracts.

Switching the focus to upstream vertical integration, Franken (2012) finds that "grape handlers that ascertain the quality of growers' grape themselves are 54% more likely to also produce their own grapes and rely 84% more on their own production" (Franken, 2012, p. 11). In addition, as measurement difficulty increases, the probability of informal contract use fell by 28 percent and the use of formal contracts was seen to have a proportional increase of 13 percent (Franken, 2012). Furthermore, as growth inputs (e.g., fertilizer, sprays, etc.) increase in number and complexity, Franken (2012) finds that there is an increase in the probability of using formal contracts and of estate-grown grapes.

When Franken (2012) examines grape procurement contracts, he finds that stipulations that impact growth inputs in contracts have a significant impact on the complexity of the contracts and types of provisions included. In addition, it was found that the duration of the relationship shows a significant decrease on contract complexity. Furthermore, firm size had a significant impact on complexity of the contract, "which

may reflect greater use of contractual safeguard among large firms and those that rely heavily on formal contracts" (Franken, 2012, p. 13).

Elissaveta Zaharieva, Matthew Gorton, and John Lingard (2003) examine the Bulgarian wine industry to better understand best options for wineries after a large change in landscape of the agriculture industry. To understand small-, medium- and large-sized cool-climate wineries, Zaharieva *et al*. (2003) study 10 wineries over a two-year period (2000-2001), through interviews with managers and owners complemented with performance and accounting information to fulfill the data requirements. Using the transaction cost theory, Zaharieva *et al*. (2003) seek to understand "(a) why spot markets fail and (b) the choice of alternative institutional arrangements to procure raw materials" (Zaharieva *et al*., 2003, p. 236).

Through their study Zaharieva *et al*. (2003) discover the best option for Bulgarian wineries was complete integration into grape production. Due to the agriculture reform in Bulgaria, there was a large reduction in output, withdrawing of capital from many suppliers, and less defined legal rights, which creates incentives to explore other options besides the spot market or contracts (Zaharieva *et al*., 2003).

There are two main reasons found as to why vertical integration was the most appropriate governance mode for Bulgarian wine producers. "First, vertical integration appears attractive to deal with the problems of opportunistic behavior by supplier and vineyard deterioration. Second, the costs of own production are substantially lower" (Zaharieva *et al*., 2003, p. 241). Nevertheless, the optimal outcome of complete upstream vertical integration was complicated due to "fragmented land ownership, underdeveloped land market, neglected massifs, and imperfect information and quality uncertainty"

(Zaharieva *et al.,* 2003, p. 238-239). Therefore, even though the most optimal outcome is recognized, the ability to take advantage of it is not always feasible for players in an industry.

Although the majority of the vertical coordination literature on wineries concentrate on upstream vertical integration (e.g., Fernández-Olmos, 2010; Fernández-Olmos *et al*., 2009a, 2009b, 2008; Goodhue *et al*., 2003; and Zaharieva *et al*., 2003) it is important to recognize the potential benefits and challenges of downstream vertical integration. Richard Mitchell and Christine Schreiber (2006) and Richard Mitchell (2004) examine the "barriers to formal vertical integration between the wine and tourism industries" (Mitchell and Schreiber, 2006, p. 2). Using case study techniques, Mitchell and Schreiber (2006) surveyed and interviewed eight stakeholders in the Central Otaga, New Zealand wine and tourism industries and one stakeholder from a business development agency. From these interviews, they identify several perceived barriers to both vertical and horizontal integration within the Central Otaga wine tourism industry (Mitchell and Schreiber, 2006).

The first perceived barrier to vertical integration identified by Mitchell and Schreiber (2006) is that most wineries in the Central Otaga region do not identify themselves as members of the wine tourism industry, while members of the tourism industry view wineries as a crucial part of the industry (Mitchell & Schreiber 2006). Another challenge of downstream vertical integration is the "lack of cohesion within the tourism sector" (Mitchell and Schreiber, 2006, p. 12). The next perceived challenge of downstream vertical integration identified by Mitchell and Schreiber (2006) is the issue of parochialism within particular wine regions and neighboring towns. This means that

specific regions and/or towns believe that those whom they would partner with are thought of as narrow in scope, and producers are hesitant to partner with others because of work ethic (Mitchell and Schreiber, 2006). The final perceived barrier is the lack of "agreement on who should lead/direct development of a wine tourism strategy that might be catalyst for more formal integration" (Mitchell and Schreiber, 2006, p. 15).

2.6 – SUMMARY OF VERTICAL BOUNDARY LITERATURE REVIEW

Through cross-examining the research of TCE performed in the realm of wineries, all articles cited in this literature review fail to reject the TCE theory. The three primary variables of TCE used across most papers cited were asset specificity, uncertainty and frequency, which were originally developed by Williamson (1979). Therefore, from the existing research on the subject of vertical boundary of wineries, we can infer that owners of the wineries make the decision to vertically integrate, partially, based on the three parameters of transaction cost economics. Furthermore, wineries' decision to move from a market procurement structure to a more hierarchical governance form was explored beyond the realm of TCE, to include other theories, such as MC, RBV and KB, which had an impact on the decision to vertically integrate. Moreover, the work done by Fernández-Olmos (2010) discovers that unobserved transaction hazards also impact the decision to vertically integrate, which allows for the opportunity of further research to be conducted to help add significance to and further extend the parameters of the TCE theory and other competing vertical boundary theories.

Through examining the articles that focus on contractual relationships, it was discovered that growers who grow higher-quality grapes are more likely to enter into contracts than growers who produce lower quality grapes. In addition, the barriers to entry of downstream vertical integration were addressed and examined within this literature review. What was found is that the perceived barriers to entry outweigh the actual barriers to entry. However, in order for the downstream vertical integration to work for wineries, action must be taken not only on an individual winery level but also a regional level with many wineries.

CHAPTER 3 – RESEARCH DESIGN AND MODEL

This chapter is broken into three sections. Section 3.1 discusses the data used in this thesis. Section 3.2 explains the dependent and independent variables used for this study and their relevance to the vertical boundary choice. Section 3.3 describes the model and methods used for examining the variables.

3.1 – DATA AND VARIABLES

The data for this project is primary data collected from a survey sent to 88 wineries in Michigan, 116 wineries in Missouri, and 114 wineries in New York. Of the surveys sent to Michigan, Missouri and New York Wineries, there were 40, 32 and 32 surveys returned, respectively. This calculates to a final response rate of 33 percent from the three target states. Furthermore, 20 surveys were completed by winery owners from states other than Missouri, Michigan or New York at the Midwest Wine and Grape Conference in February 2012. Therefore, a total of 124 surveys were returned; however, due to missing data and filtering the data, only 83 surveys were used in the final model.

The data was collected in a survey method, and the survey was administered via email to wineries in the states of Michigan, Missouri, and New York. The wineries had multiple options to respond to the survey. First, the wineries could follow a link to SurveyMonkey® and submit the survey online. Another option to submit the survey was to download the survey in hard copy form, fill it out, scan it, and then return via email or mail. The winery owners who attended the Midwest Grape and Wine Conference were administered the survey in a face-to-face setting, where they had the opportunity to ask

any questions they had about the questions of the survey. Although this data collection procedure differed from the data collection method of the three focus states, the collection was still random from the population of wineries at the conference. Furthermore, the extra surveys collected at the Midwest Wine and Grape Conference increased the number of surveys returned, which allowed for more data points to be used in the quantitative analysis.

The survey questions for this thesis were written with what Klein (2005) identified as the main problem of TCE – the difficulty of measuring asset specificity – in mind. To better understand the proxies that have been used to measure asset specificity in the past, Tables 1-8 (Appendix B) identify the varying methods and questions of measurement for the determinants of vertical integration (e.g., asset specificity) from past empirical studies. The tables were modified from Lafontaine and Slade's (2007) literature review of TCE to include other competing theories of vertical boundaries of firms. Furthermore, a complete list of the survey questions used to explore the vertical boundaries of wineries can be found in Appendix C, Table 1. The survey questions were pre-tested with a subset of wineries in the three states and were revised before the final survey instrument was mailed to the wineries in the sample.

3.2– DETERMINANTS AND HYPOTHESES

As discussed above in the literature review, Williamson (1991) introduces and discusses the importance of the hybrid form of governance. Thus, for this thesis, I originally intended to follow Fernández-Olmos *et al.* (2009b and 2008) and use a discrete

dependent variable with three levels of governance mode choice (Y=0,1 or 2). However, after that model was run, the results showed that due to the low number of market wineries throughout the data (only four wineries fell under the market category) that a multi-level, discrete dependent variable did not fit this data well. Therefore, due to the poorness of fit of the multi-level dependent variable, I decided to follow Fernández-Olmos *et al.* (2009a), and use a binary depend variable with two levels of governance mode choice (Y= 0 or 1).

The assignment of independent variables is as follows. A winery will be assigned a governance form of 1 (one) if that winery procures 70 percent or more of its grapes from estate grown grapes, as that winery falls into the hierarchy category. Wineries that do not procure 70 percent of their grapes from estate grown grapes, were assigned 0 (zero). The same is model is run for an 80% cutoff and 90% cutoff, as other studies (e.g., Fernández-Olmos *et al.,* 2009a, 2009b, and 2009; Franken *et al.*, 2009; and Poppo and Zenger, 1998) use multiple cutoff points to examine how alternative measures of the dependent variables impact the results.

For this thesis, there are 13 independent determinants of governance mode choice. Below is a brief description of the importance of each determinant and how the determinant was measured for this study. A complete summary list of the variables used in this study, how each variable was measured, and the hypothesized impact on the vertical integration decision can be found in Table 2, Appendix C.

Experience (Exp): Winery production experience is an important determinant of the decision to vertically integrate. Since grape vines take at least two to three years after planting to bear a fruit that meets the standards to produce wine, the production

experience of the winery may have an impact on its decision to vertically integrate. Furthermore, as a winery's experience increases, it has the ability to adapt and learn how to produce a higher quality wine due to greater knowledge of the task (Fernandez-Olmos, 2010). Therefore, this variable correlates with the RBV of vertical boundary theory. Other studies that have used age to measure experience are noted in Appendix B, Table 1. This variable is measured as the individual winery's age from the year it received its license.

Hypothesis 1: As the winery's experience increases, it will have a positive impact on the decision to vertically integrate towards a more hierarchal form of governance.

Experience^2 (Exp^2): Even though wineries have the opportunity to vertically integrate, a winery is not able to increase vertical integration continuously forever. Therefore, the independent variable "Experience^2" captures the fact that the relationship between winery experience and vertical integration is not linear (Brouthers *et al.,* 2003). This variable is measured as the individual winery's age^2 from the year it received its license (Brouthers *et al.,* 2003).

Hypothesis 2: As the winery's experience increases, it will have a decreasing marginal impact on the decision to vertically integrate towards a more hierarchal form of governance.

Size (ProdGal): As the size of the firm grows larger, there is a threat of diseconomies of scale, which limits vertical integration. This variable correlates with RBV of vertical boundary theory. Furthermore, if a firm decides to continue vertical integration as it gets larger, there are added bureaucracy costs, as Williamson (1978 and

1991) describes. According to Fernández-Olmos *et al.* (2009a, 2009b, and 2008), several proxies have been used to measure the size of the firm, and these measures are further described in Appendix B, Table 1. For this study, the size of the winery is measured by its 2011 production of wine, in gallons.

Hypothesis 3: As the size of the winery increases, the winery is less likely to choose a more hierarchal form of governance.

Measuring Grape Quality (MsrQlty): As mentioned above, an important determinant of wine quality comes from the quality of the input, in this case grapes. Furthermore, as the quality and the variability of the quality of the input become harder to judge, the real costs of contracting increase, leading to the possibility of vertical integration (Klein *et al.,* 1978). According to Barzel (1982) and the measurement cost theory of vertical boundaries, as the difficulty in measuring the quality of an input increases, vertical integration is more likely. The determinants and empirical evidence of the measurement cost theory can be found in Appendix B, Table 2.

For this study, this determinant is measured on a seven-point Likert scale. Wineries were asked if they can easily and accurately measure all quality attributes of grapes used in winemaking, with one strongly agreeing it is easy to measure quality attributes and seven strongly disagreeing it is easy to measure grape quality attributes.

Hypothesis 4: As it becomes more difficult to measure the quality and variability of the inputs (grapes), the more likely a winery will choose a more hierarchal form of governance.

Procure Quality Grapes (QltyGrapes): Barzel (1982) argues if an input is a good proxy for the quality of the final output, vertical integration can help reduce

measurement costs that occur when examining the input. Therefore, as the difficulty of finding quality grapes increases, a winery would more likely vertically integrate production away from the spot market and more towards a hierarchal form of governance (Goodhue *et al,* 2003). The determinants and empirical evidence of the measurement cost theory can be found in Appendix B, Table 2.

This variable is measured by a seven-point Likert scale regarding the ease of procuring quality grapes from the spot market in the winery's region, with one strongly agreeing that it is easy to procure quality grapes and seven strongly disagreeing that is it easy to procure quality grapes from the market.

Hypothesis 5: As the difficulty of finding quality grapes in a region increases, the probability of a winery moving towards a hierarchal form of governance will increase.

Physical Asset Specificity (PASW and PASG): This variable captures the specific physical assets that are invested in to support a relationship, which are not easily redeployed for other uses without sacrificing asset value. For this study, there will be two measures of physical asset specificity: winery output and grape production. Further empirical evidence of this type of asset specificity is explained in Appendix B, Table 3.

Winery Physical Asset Specificity is measured by the degree to which physical investments in the winery (property, plant, and equipment) cannot be redeployed to other uses. Grape Production Physical Asset Specificity is measured by the degree to which physical investments made to produce grapes (vineyard, equipment, and machinery) cannot easily be redeployed to other uses. Both of these measures of physical asset

specificity are measured on a seven point Likert scale, with one being easily redeployed without cost and seven being not easily redeployed without cost.

Hypothesis 6: As the degree of physical asset specificity increases, a winery will more likely choose a more hierarchal form of governance.

Dedicated Asset Specificity (DAS): According to Fernández-Olmos *et al.* (2009a), dedicated asset specificity has received little attention in empirical studies, especially when compared to physical asset specificity. This variable captures the degree to which grapes are grown specifically for one winery by a grape grower. According to Goodhue *et al.* (2003), since grapes are highly perishable, a winery could appropriate rents and take advantage of a grape grower who produces grapes specific to that winery, as there is only a short window to harvest the grapes. Therefore, grape producers may be less willing to grow grapes that are tailored specifically for just one winery. Nevertheless, a grape grower could hold up the winery of grapes grown specifically for one winery if they grower believes the winery is not offering them a fair price for their product. The empirical evidence of dedicated asset specificity is shown in Appendix B, Table 4.

Dedicated Asset Specificity is measured by the following question: if the transaction between your winery and your main grape supplier ceased prematurely, to what degree could the assets specific to that transaction be easily redeployed to other uses? A seven-point Likert scale was used for the response levels, with one representing easily redeployed without cost and seven representing not easily redeployed without cost.

Hypothesis 7: The greater the degree of dedicated asset specificity, the more likely a winery will choose a more hierarchal form of governance structure.

Temporal Asset Specificity (Timing): According to Masten *et al.* (1991), when producing a quality product, the timely delivery of a critical input is essential to the firm's success. Therefore, this variable seeks to capture the importance of timeliness in the delivery of grapes to each winery in the sample. The empirical evidence and measurement that support this variable are shown in Appendix B, Table 5.

For this study, Temporal Asset Specificity is measured by the degree that timing of grape deliveries (i.e., having access to grapes on a certain schedule) is important to the efficiency of the winemaking process. A seven-point Likert scale is used for the response levels, with one meaning not important to profitability and seven meaning very important to profitability.

Hypothesis 8: As the degree of temporal asset specificity increases, a winery will more likely choose a hierarchal form of governance.

Human Asset Specificity (HAS): Masters and Miles (2002) note that as the complexity of production increases, more idiosyncratic firm-specific skills will be needed to be developed in order to perform the task efficiently. This variable measures the degree to which human asset specificity is important to the relationship between a winery and its main grape supplier. Existing empirical evidence for and measures of human asset specificity are shown in Appendix B, Table 6.

Human Asset Specificity is measured as the degree that a winery's relationship with the main grape supplier has become important, in terms of experience, knowledge, and viticultural practices to the efficiency of the winemaking process. A seven-point Likert scale is used to answer this question, with one corresponding to not important at all and seven corresponding to extremely important.

Hypothesis 9: As the degree of human asset specificity between a winery and its main grape supplier increases, that winery will more likely choose a more hierarchal for of governance.

Now that the variables of asset specificity have been addressed, I will now switch to another determinant of vertical boundaries introduced by TCE – uncertainty. Due to bounded rationality under the TCE theory, there is uncertainty surrounding each transaction. This uncertainty, thus, leads to imperfect information in every transaction. Therefore, imperfect information is essentially a transaction cost because it is costly to those involved within the transaction to reduce the uncertainty surrounding the transaction. To address this uncertainty, I examine environmental uncertainty regarding both grape yields and grape quality. This translates to the difficulty a winery has when measuring both the quality uncertainty and quantity uncertainty taking all of the production factors into consideration (Fernández-Olmos *et al.,* 2009a).

Environmental Uncertainty (EUQuant and EUQual): Fernández-Olmos *et al.* (2009a, p. 234) states, "Environmental uncertainty appears when the circumstances surrounding the exchange cannot be specified in advance." This type of uncertainty is particularly important in viticulture, as there is a large amount of exogenous forces (e.g., Mother Nature) that have a large impact on both the amount of grape production and the quality of the grapes produced. Empirical evidence for and measures of environmental uncertainty are shown in Table 7 of Appendix B.

There are two measures of Environmental Uncertainty used in this study – Production and Quality. First, Environmental Uncertainty of Production examines the degree of uncertainty about grape production and yields, considering the effects of

Mother Nature (weather, pests, etc.) during the production cycle of the vineyard. Second, Environmental Uncertainty of Quality examines the degree of uncertainty about grape quality considering the effects of nature, during the production cycle of the vineyard. Both variables are measured using a seven-point Likert scale, with one corresponding to no uncertainty at all and seven corresponding to extremely high uncertainty. However, Williamson (1991) notes that environmental uncertainty is only a relevant factor in the presence of asset specificity. Therefore, following Fernández-Olmos *et al.* (2009a and 2009b), this study also utilizes an interaction between environmental uncertainty and asset specificity to measure this effect. This interaction follows Coles and Hesterly (1998a), and takes a value of 1 if all values of asset specificity (measured above) are above the value of 1, or takes a value 0 if asset specificity takes a value 1.

Hypothesis 10: As the degree of environmental uncertainty increases, in the presence of asset specificity, a winery will more likely choose a more hierarchal form of governance.

Wine Quality (Qlty): There is a growing trend around the world of individuals demanding differentiation in and higher quality of food products (Mondelli, 2011 and Fernández-Olmos *et al.,* 2009a, 2009b, and 2008). According to Fernández-Olmos *et al.* (2009b, p. 284), "In the wine grape supply industry, differentiation is a critical issue, and one that is important in distinguishing competitors." Furthermore, from this differentiation, wineries gain a competitive advantage over their competitors, as they are seen by consumers to have a positive reputation for production of high quality wine (Fernández-Olmos *et al.* 2009b). Moreover, the quality of inputs, in this case grapes, has a large impact on and is a large determinant of the quality of the final product (Goodhue

et al., 2003). Therefore, since quality of the final product determines competitive advantage and reputation, and the quality of wine is highly related to the quality of the inputs, it is important for wineries to have some control over the inputs that are used to produce their final product – wine (Fernández-Olmos *et al.,* 2008b). Therefore, the variable "Quality" falls under the RBV vertical boundary theory.

Other studies measure differentiation in quality as a dummy variable, with 1 coded for a highly differentiated, high quality product and 0 coded for a product that is not very differentiated and possibly of a lower quality. Furthermore, Fernández-Olmos (2010) and Fernández-Olmos *et al.* (2009a, 2009b and 2008) utilize the Coles and Hesterly (1998b) model of measuring quality, by dividing their sample into three categories and coding with dummy variables. For this study, wine quality is measured based on number of awards a winery has received. The winery could select three categories which it had received awards from, and these categories were summed (upper bound of three) and then divided by three to average the awards won.

Hypothesis 11: As the quality of wine produced at the winery increases, the more likely a winery will seek to vertically integrate towards a more hierarchal form of governance.

As stated above, the model in this thesis is intended to replicate the Fernández-Olmos *et al.* (2009a, 2009b, and 2008) model and study. This study has several questions that are similar to the Fernández-Olmos *et al.* (2009a, 2009b, and 2008) survey questions from the TCE and RBV vertical boundary theories; however, modifications were made and additional questions were developed to help improve the model. For example, MC theory was expanded upon in this model, as questions were added to capture the impact

that measurement cost theory has on the vertical boundaries of wineries. This was not examined in Fernández-Olmos *et al.* (2009a, 2009b, and 2008), but has the potential to add relevance to studies that explore vertical boundary theories. The quality measure in this study was significantly different than Fernández-Olmos *et al.* (2009a, 2009b, and 2008), as the states examined in this study do not have a ranking system for wine quality in place; therefore, the quality variables was not exactly replicated in this study.

3.3 – EMPIRICAL MODEL

Fernández-Olmos *et al.* (2009a, 2009b, and 2008) use alternative specifications of the logit model to examine the vertical boundary determinants of wineries and their decision to vertically integrate. Similarly, this thesis also adopts a form of logit model for the empirical analysis of winery vertical coordination choices. The logit model is an often used method to empirically investigate the determinants of the make or buy decision of a firm, which is the case in this thesis.

Examples of research that utilize a type of logit model for empirical analysis of the make or buy decision are Franken *et al.* (2009), Anderson (1985), Lieberman (1991), Coles and Hesterly (1998a and 1998b) and Fernández-Olmos *et al.* (2009a, 2009b, 2008), just to name a few. In addition, a logit method is appropriate when using what Maddala (1983) recognizes as a discrete dependent variable (Y=0 or Y=1), which is the case in this thesis. Furthermore, since the dependent variable is binary, and there are instances when it is zero (e.g., Y=0), Amemiya (1984, p. 5) states, "This feature destroys the linearity assumption so that the least squares method is clearly inappropriate." Moreover,

according to Fernández-Olmos *et al.* (2009a, p. 241), a logit "model assumes that the error term is logistically distributed, whereas a binomial probit model is the result of assuming that the error term is normally distributed. Except at its tails, both distributions are similar."

Klein (2005, p. 5) states, "Organizational form is often modeled as a discrete variable – 'make,' 'buy,' or 'hybrid,' for example – though it can sometimes be represented by a continuous variable." Fernández-Olmos *et al.* (2009a) use a tobit model, which measures the organizational form as a continuous variable, to test the credibility of the binomial logit method they use. Another empirical example of using a tobit model to test the robustness of findings in the binomial logit model is Franken *et al.* (2009).

The tobit model is useful when examining the degree of vertical integration as a continuous variable (0%-100%). According to Fernández-Olmos *et al.* (2009a), this continuous variable is truncated at 0% (no vertical integration) and 100% (no market procurement). The tobit method, "combines probability techniques (probit/logit) with least squares methods" (Fernández-Olmos *et al.,* 2009a, p. 244). Overall, both Fernández-Olmos *et al.* (2009a) and Franken *et al.* (2009) find results that support their respective binomial logit method.

According to Fernández-Olmos *et al.* (2009b) and Franken *et al.* (2009), since a logit model is used, the coefficients from the model are not sufficient to be interpreted directly from the output; however, the signs and significance of the coefficients can be trusted as shown. Therefore, one must calculate the marginal/partial effects of these coefficients for each dependent variable – hierarchy or market (Sykuta, 2005). Greene (2011, p. 690) states, "For computing marginal effects, one can evaluate the expressions

at the same means of the data or evaluate the marginal effects at every observation and use the sample average of the individual marginal effects – this produces the average partial effects." For this paper, I will use the latter of the two options outlined by Greene, and calculate the average partial effects from the binary logit model.

This leads to Greene's equation below, which is used to estimate the probability of each winery falling into each form of governance (1 or 0), given its responses to the independent variables.

$$P[Y_j = j|X_j] = \frac{\exp(x_i'\alpha_j)}{1+\exp(x_i'\alpha_k)} \quad (1)$$

The probabilities for Y=1 were calculated using equation 1, and then Y=0 was simply calculated by $1 - P_1$.

Now that the probabilities of every governance structure have been calculated for each winery, the partial effects of the characteristics on the probabilities will be calculated. This is done by calculating the change in probability of being in a certain state of governance for a winery with the same independent variables. To do this Greene's equation below is utilized:

$$\frac{\partial P_{ij}}{\partial X_i} = P_{ij}[\alpha_i - \sum_{k=i}^{j} P_{ik}\alpha_k] \quad (2)$$

Furthermore, $\sum_{k=0}^{j} P_{ik}\alpha_k = P_{io}\alpha_0 + P_{i1}\alpha_1$ is the summation of the probabilities of a given form of governance multiplied by the coefficient for that given response. After calculating the partial effects for each winery in the study, the partial effects were averaged across the respondents. Therefore, the average partial effects are the numbers of interest and will be explained in the Chapter 4.

CHAPTER 4 – LOGIT MODEL RESULTS AND DISCUSSION

This chapter is organized into four sections. Section 4.1 presents the descriptive statistics of the sample. Section 4.2 discusses the results from the binary logit model. Section 4.3 states the results of the average partial effects of the characteristics on the probabilities for each governance form. Section 4.4 is a summary and discussion of the logit model results.

4.1 – DESCRIPTIVE STATISTICS

Now that the variables and the model have been explained, Appendix C, Table 3 shows the descriptive statistics and a Pearson correlation matrix of the independent variables. Table 3 shows the mean, median and standard deviation of each variable used in the binary logit model. Furthermore, the correlation matrix in Table 3 of Appendix C has a null hypothesis that the correlation, which is interpreted as the Rho, is zero. For these variables, with 83 observations, a two-tailed test is used. The significance cutoff points are as follows: for 10 percent is +/- .183; for five 5 percent the cutoff is +/- .217; and for 1 percent the cutoff is +/- .284. The asterisks show the significance of these correlations (* is significant at the 10% level, ** is significant at the 5% level, and *** is significant at the 1% level).

In addition to the descriptive statistics, Appendix C, Figure 1 shows the map of Missouri Wineries and Figure 2 is the continuum of the Missouri wineries that responded to the qualitative survey. Appendix C, Figure 1 shows pins with two different colors: the light color is a winery that responded to the survey and a dark color is a winery that did

not respond to the survey. Appendix C, Figure 2 places each Missouri winery that responded along a continuum of governance structure from market to hierarchy, with the hybrid forms of governance structure that exist between the two polar opposites. In Figure 2 of Appendix C, each box represents a Missouri Winery that responded to the survey. Within each box is the percentage of each procurement strategy the respective winery utilizes.

4.2 – BINARY LOGIT RESULTS

The goodness of fit of all binary logit models (with different cutoff points for the dependent variable, i.e. 70%, 80%, and 90%) were first examined through three Chi-Square tests. The null hypothesis in these tests is that each predictor's coefficient is equal to zero. All three tests (Likelihood Ratio test, Score, and Wald) for all three models had varying results. For the 70 percent model, the Likelihood Ratio had a Chi-Square probability of .0659, Score Chi-Square Probability of .2960 and a Wald Chi-Square Probability of .4121. Therefore, the model did not pass all three tests; however, statistical significance was still found in some variables. The 80 percent model shows Likelihood Ratio had a Chi-Square probability of .20, Score Chi-Square Probability of .4788 and a Wald Chi-Square Probability of .6906. For the 90 percent model, the Likelihood Ratio had a Chi-Square probability was .1605, the Score Chi-Square Probability was .4263 and the Wald Chi-Square Probability was .6248. Therefore, the model with the best fit is the 70 percent model, while the 90 percent model is the next best model and the 80 percent model has the least goodness of fit.

One limitation of this analysis is the presence of missing data, which has an impact on the results of the logit model. As the number of regressors in the model was reduced, the goodness of fit of the models did improve, which was due to an increase in the number of observations used, thus reducing the impact of the missing data. However, the original full model will be examined in this section, as the most significance within the variables is found with the full model, although some goodness of fit is sacrificed.

From the binary logit results, the signs (positive or negative impact on vertical integration) and significance of each regressor can be interpreted directly from the output; however, the actual coefficient estimates cannot be directly interpreted (Greene, 2011). The asterisks on the coefficients are interpreted as follows: * is significant at the 10% level, ** is significant at the 5% level, and *** is significant at the 1% level. The results for all three of the binary logit models are shown in Appendix C, Table 4. Each model will be discussed below.

The variable "Experience" will be examined for all three cutoff points. First, for the 70 percent model, "Experience" was found to have a positive and significant impact on vertical integration at the 10 percent level. The 80 and 90 percent models show a positive coefficient for "Experience"; however, neither the 80 nor 90 percent cutoff models show statistically significant coefficients for "Experience". Therefore, based on the logit results, the RBV theory and the original hypothesis sign (hypothesis 1) were supported, but only statistically significant at the 70 percent cutoff value for vertical integration. The results fail to reject hypothesis 1 for the 70 percent cutoff model; however, it was rejected in the 80 and 90 percent cutoff models.

"Experience^2" was found to a have decreasing (negative) marginal impact on vertical integration in all three models. However, "Experience^2" was only found to be statistically significant in the 70 percent cutoff model at the 10 percent level. The results show weak support for the RBV theory and the original hypothesis sign (hypothesis 2). Therefore, the results fail to reject hypothesis 2 at the 70 percent cutoff level; however, it was rejected at the 80 and 90 percent cutoff levels.

The variable "Size of the Winery," measured by production of wine in gallons, was negative in all three models. This finding supports the original hypothesis sign (hypothesis 3); however, this variable was only statistically significant at the 10 percent level in the 70 percent cutoff model. Therefore, the results fail to reject hypothesis 3 in the 70 percent cutoff model but it was rejected in the 80 and 90 percent cutoff models.

The logit coefficients for the variable "Measuring Grape Quality" were found to be positive in all three model specifications, which supports the original hypothesis sign (Hypothesis 4) and the MC theory. However, "Measuring Grape Quality" was not significant at any level, thus rejecting hypothesis 4 at all levels of the three models. Conversely, the estimated coefficient for the variable "Procuring Quality Grapes" from the market was found to be negative in all models, which does not support the MC theory or the original hypothesis sign, but this variable was not significant at any level; therefore hypothesis 5 was once again rejected.

Turning to the determinants of vertical integration according to TCE, the first variable measured was "Physical Asset Specificity of the Winery" and it was found to be positive and significant at the five percent level in all three models. This result corroborates the TCE theory and the original hypothesis. Therefore, the results fail to

reject hypothesis 6 for the variable "Physical Asset Specificity of the Winery". Conversely, the Variable "Physical Asset Specificity of Grapes" was found to be negative in all three models, which does not support the TCE theory or the original hypothesis sign. However, "Physical Asset Specificity of the Winery" was statistically significant at the 5 percent level in the 90 percent cutoff model and at the 10 percent level in the 70 percent cutoff model; therefore, the results reject hypothesis 6 at the 70 percent and the 90 percent cutoff models with significance but was rejected in the 80 percent cutoff model with no significance.

Both the variables "Dedicated Asset Specificity" and "Timing of Deliveries" were found to be positive and support the hypotheses and the TCE theory in all three models. However, neither of these variables were significant at any level in any of the three models, therefore, hypotheses 7 and 8 were both rejected. Furthermore, "Human Asset Specificity" was found to be negative in all three models, and, does not support the original hypothesis sign or the TCE theory, but it was not significant at any level, which rejects hypothesis 9.

The binary logit results for the variable "Environmental Uncertainty of Quantity" are positive in all three cutoff models, which supports the TCE theory and hypothesis sign, but the variable is not statistically significant at any level; therefore hypothesis 10 for "Environmental Uncertainty of Quantity" is rejected at all three levels. The results for the variable "Environment Uncertainty of Quality" are negative, not statistically significant at any level, and do not uphold the original hypothesis sign or the TCE theory in any of the three models, thus rejecting hypothesis 10.

Finally, the estimated coefficients for "Quality of Wine" are negative in the 70 percent and 80 percent cutoff models; therefore, the results do not validate the original hypothesis sign for these models. Conversely, for the 90 percent cutoff model, "Quality" is found to be positive, which supports the original sign of hypothesis 11. However, "Quality" is not statistically significant at any level in any of the three models, therefore rejecting hypothesis 11.

4.3 – AVERAGE PARTIAL EFFECTS RESULTS

The average partial effects of the characteristics on the probabilities were calculated, as logit coefficients cannot be directly interpreted from the output (Greene, 2011). The results of the average partial effects are shown in Table 5 of Appendix C for each dependent variable (Y=1 or 0). First, the probabilities of each winery falling into each given form of governance (Y=1 or 0) were calculated using equation 1 (above). After the probabilities were calculated, then the average partial effects were calculated using equation 2 (above) from Greene (2011). By calculating the average partial effects, which were calculated at the sample means, across the wineries, this study shows how a one unit change in a regressor impacts the probability of an average winery, under its current form of ownership (Hierarchy, 1 or Market, 0), moving towards a different form of ownership, holding all other regressors constant.

When the average partial effects of the variable "Experience" were calculated, it was found to show a positive increase in the probability of an average winery moving towards a more hierarchal form of governance, as the winery increases its experience by one year. Therefore, the average winery would experience a decrease in the probability of

staying under the market form of governance, given a one-unit increase in the winery's age. The average partial effects for the 70, 80 and 90 percent cutoff models resulted in an increase of 0.0170, 0.0113, and 0.0110, respectively, towards a more hierarchal form of governance. Furthermore, in the 70 percent cutoff model, "Experience" was statistically significant at the 10 percent level, failing to reject hypothesis 1.

The average partial effects for the variable "Experience^2" proved to be negative, which corroborates with the hypothesized sign on the impact of vertical integration. The average partial effects for the 70, 80 and 90 percent cutoff models are -0.000092, 0.0000062 and -0.0000060, respectively. However, "Experience^2" was only significant at the 10 percent level for the 70 percent cutoff model, failing to reject hypothesis 2 at that level and rejecting hypothesis 2 at the 80 and 90 percent cutoff levels. Based on the average partial effects, the average winery would experience a negative marginal impact on its probability of vertical integration for every one-unit increase in "Experience^2", holding all other variables constant. Therefore, the average winery would experience an increase in the probability of moving towards market form of governance that would offset the decrease in probability of moving towards a hierarchal form of governance, holding all other variables constant. Nevertheless, it is important to note that when plotted, this quadratic function has a domain over which it is increasing; therefore, although the sign is in fact negative, it does not have to be interpreted as negative. However, this variable captures that the relationship between experience and vertical integration is not linear.

The size of the winery, measured with the variable "Production in Gallons", was negative in all three models, which supports the direction of vertical integration in

hypothesis 3. However, “Production in Gallons” was only significant in the 70 percent cutoff model. For the 70 percent, 80 percent and 90 percent cutoff models, the average partial effects for “Production in Gallons” on the probability were -0.0000151, -0.0000190, and -0.0000185, respectively. Therefore, as the average winery increases its “Production in Gallons” by one unit, there is a decrease in the probability of the winery moving toward the hierarchal form of governance, holding all other variables constant. However, there is an increase in the probability of the average winery moving towards the market form of governance that offsets the decrease in the hierarchal form of governance probability, holding all other variables constant.

The average partial effects for the variable difficulty “Measuring the Quality of Grapes” for the 70, 80 and 90 percent cutoff models were 0.0087, 0.00097, and 0.0137, respectively. For the three models, the average partial effects show that there would be a positive marginal impact on the probability of an average winery moving more towards the hierarchal form of governance and a negative marginal impact of a winery moving towards a market form of governance, given an one-unit change in variable, holding all other variables constant. Therefore the average partial effects support the hypothesized sign for hypothesis 4 and the MC theory; however, the variable was not statistically significant at any level, thus rejecting hypothesis 4.

The variable difficulty procuring “Quality Grapes” form the market was negative in all three models, which did not support the direction of vertical integration for hypothesis 5 and does not support the MC theory; nevertheless, the variable was not statistically significant in any of the three models, consequently rejecting hypothesis 5. The average partial effects on this variable for the 70, 80, and 90 percent cutoff models

were -0.03995, -0.00676, and -0.008336, respectively. Therefore, based on the average partial effects, the average winery would experience a negative impact on the probability of moving towards a more hierarchal form of governance and a positive impact on the probability of moving toward a more market form of governance, given a one-unit change in the difficulty of procuring "Quality Grapes" from the market.

The average partial effects of the variable "Physical Asset Specificity of the Winery" were found to be positive, which corroborates with hypothesis 6 and the TCE theory. Moreover, this variable was statistically significant at the 5 percent level in the 70, 80, and 90 percent cutoff models, thus showing strong support the TCE theory and failing to reject hypothesis 6. The average partial effects calculated for the 70, 80, and 90 percent cutoff models were 0.10287, 0.08736, and 0.08299, respectively. Therefore, based on the average partial effects, the average winery would experience an increase in the probability of moving towards a more hierarchal governance structure for every one-unit increase in the "Physical Asset Specificity of the Winery", holding all other variables constant. Conversely, the average winery would experience an offsetting decrease in the probability of moving towards a market form of governance, holding all other variables constant.

The variable "Physical Asset Specificity of the Grapes" was found to be negative, which does not support the hypothesized sign for hypothesis 6 or the TCE theory. However, the variable is statistically significant at the 10 percent level in the 70 percent cutoff model and at the 5 percent level in the 90 percent cutoff model; therefore, showing there is a significant negative impact on the decision to move towards a more hierarchal form of governance. The average partial effects for the 70, 80, and 90 percent cutoff

models are -0.08269, -0.06421, and -0.08450, respectively. Therefore, for every one-unit increase in the "Physical Asset Specificity of Grapes", there is a negative partial effect on the probability of the average winey moving towards a more hierarchal form of governance and a positive partial effect on the probability of the average winery moving towards a more market-based form of governance, holding all other variables constant.

The average partial effects for the variable "Dedicated Asset Specificity" are positive, which agrees with the vertical integration direction for hypothesis 7. For this variable, the average partial effects for the 70, 80, and 90 percent cutoff models are 0.03831, 0.01144, and 0.01843, respectively. Therefore, the average winery would experience a positive partial effect on its probability of moving towards a more hierarchal form of governance and a negative partial effect on the probability of moving towards a market form of governance, holding all other variables constant. Nevertheless, although this variable is positive, is not statistically significant at any level, thus rejecting hypothesis 7.

The variable "Timing" is positive based on the results, which corroborates with the TCE theory and the hypothesized direction of vertical integration in hypothesis 8. However, "Timing" is not statistically significant at any level; therefore, hypothesis 8 must be rejected. Nevertheless, the average partial effects for 70, 80, and 90 percent models for the variable "Timing" are 0.01284, 0.00856, and 0.01019, respectively. Based on the average partial effects, the average winery would experience a positive partial effect on the probability of moving toward a more hierarchal form of governance and a decrease in the probability of moving toward a more market form of governance, given a one-unit change in the "Timing" of deliveries and holding all other variables constant.

The results for "Human Asset Specificity" prove to be negative, which does not support the TCE theory or the hypothesized sign of vertical integration in hypothesis 9. Furthermore, the variable was not significant at any level, in any of the three models; therefore, hypothesis 9 should be rejected. Still, even though there was no significance, the partial effects for the 70, 80, and 90 percent cutoff models are -.04085, -0.03491, and -0.03793, respectively. Thus, based on the average partial effects results, the average winery would notice a negative partial effect on the probability of moving toward a more hierarchal form of governance and an increase in the probability of moving toward a market form of governance, given a one-unit change in "Human Asset Specificity" and holding all other variables constant.

The variable "Environmental Uncertainty of Quantity" shows positive results, which corroborates with the TCE theory and with the hypothesized sign of vertical integration in hypothesis 10. The average partial effects for the 70, 80, and 90 percent cutoff models are 0.0379, 0.00609, and 0.00851, respectively. Therefore, as the results show, the average winery should see a positive average partial effect on the probability of moving toward a more hierarchal form of ownership and conversely see a negative average partial effect on the probability of moving toward a more market-based form of governance, given an one unit change in the "Environmental Uncertainty of Quantity" and holding all other variables constant. However, although the positive result corresponds with hypothesis 10, this variable was not statistically significant at any level; therefore, hypothesis 10 should be rejected.

The average partial effects for the variable "Environmental Uncertainty of Quality" for the 70, 80, and 90 percent cutoff models are -0.03891, -0.01342, and -

0.01501, respectively. The results of the average partial effects show the average winery should experience a negative partial impact on the probability of vertical integration and a positive impact on the probability of moving toward a market form of ownership given a one-unit change in the "Environment Uncertainty of Quantity" and holding all other variables constant. Therefore, this variable does not support the direction vertical integration in hypothesis 10 or the TCE theory. Furthermore, this variable was not significant at any level in any of the three models; thus, hypothesis 10 should be rejected.

The variable "Quality" did not show support for the direction of vertical integration in hypothesis 11 or the RBV theory in the 70 or 80 percent cutoff model but it did show support hypothesis 11 and the RBV theory in the 90 percent cutoff model. The average partial effects for the 70, 80, and 90 percent models are -0.04869, -0.001422, and 0.012630, respectively. Therefore, for the 70 and 80 percent cutoff models, the average winery should see a negative impact on the probability of moving toward a more hierarchal form of governance and a positive impact on the probability of moving toward a more market-based form of ownership, given a one unit change in "Quality" and holding all other variables constant. Conversely, for the 90 percent cutoff model, the average winery would experience a positive average partial effect on the probability of moving toward a more hierarchal form of governance and a negative average partial effect on the probability of moving toward a market form of governance, given a one-unit change in "Quality". Nevertheless, the variable "Quality" was not significant at any level in any of the three models; therefore, hypothesis 11 should be rejected.

4.4 – SUMMARY AND DISCUSSION OF LOGIT MODEL RESULTS

The theoretical literature on the vertical boundaries of the firm suggests that many factors impact the decision to vertically integrate. This thesis focuses on integrating multiple vertical boundary theories to better explain the vertical boundary determinants of wineries in emerging regions. The theories used in this study include TCE, MC and RBV. The determinants used to examine the decision to vertically integrate in this study were Experience, Experience^2, Size, Measuring Grape Quality, Procuring Quality Grapes, Physical Asset Specificity (Winery level and Vineyard level), Dedicated Asset Specificity, Temporal Asset Specificity, Human Asset Specificity, Environmental Uncertainty of Quantity of grapes, Environmental Uncertainty of Quality of grapes and Quality of wine.

The first model tested for this study focused on three dependent variables – market, hybrid or hierarchy. For this model, the dependent variables were assigned "0" for a market winery, "1" for a hybrid winery, and "2" for a hierarchy winery in order to better explain three separate forms of governance. However, after the cumulative ordered logit model was run, it was found that this type of logit was not a good fit for this data for many reasons. First, although the model converged, it did not pass the proportional odds assumption test, which is also known as the parallel regression assumption, which rules out the use of an ordered logit. Second, none of the goodness of fit tests were passed, further strengthening the argument that this type of logit model did not fit the data well. Finally, when looking at the number of wineries that fell into each category, 19 wineries fell under the hierarchy form of ownership; 54 wineries fell under the hybrid form of

ownership; and only 4 wineries fell under the market form of ownership. Therefore, due to the low number of wineries in the market form of ownership compared to the other two forms of ownership and failing to pass the proportional odds assumption, this type of model was not a good fit for the data.

Since the proportional odds assumption test was not passed in the original model, a less parsimonious model was then needed to fit the data in addition to a model that tested only dichotomous (Y=1 or 0) dependent variables, in order to have a more equal balance of the dependent variable. Thus, in order to correct these issues, a more flexible model was needed. Through continuous testing, it was found that a binary logit model, primarily used when choosing between two ordered dependent variables, was the best fit for the data, even though it is less parsimonious than other options, such as the generalized ordered logit or the cumulative ordered logit.

Based on the output from the binary logit model and the calculated average partial effects, the vertical boundary theories explored in this thesis will now be examined. First, the binary logit model results show weak support for the RBV theory of vertical boundaries. The variables "Experience", "Experience^2" and "Production in Gallons", which fall under the RBV theory, expressed the hypothesized direction (+/-) of vertical integration from the logit results. However, these variables were only statistically significant in the 70 percent cutoff model.

Furthermore, when the variable "Quality" was examined, the logit results showed a negative impact on the direction of vertical integration in the 70 percent and 80 percent cutoff models, while the 90 percent cutoff model showed a positive impact of quality on

the decision to vertically integrate. Nevertheless, "Quality" was not statistically significant at any level. Therefore, based on the results from the variables that fall under the RBV theory of vertical boundaries, the results show weak support for this theory, overall.

The MC theory of vertical boundaries was explored through the variables of difficulty "Measuring Grape Quality" and "Procuring Quality Grapes" from the market. Based on the binary logistic results, it was found that the difficulty in "Measuring Grape Quality" has a positive effect on vertical integration, which corroborates the MC theory and the hypothesized direction of vertical integration in hypothesis 4. Conversely, the logit results show that as "Procuring Quality Grapes" form the market becomes more difficult, there is a negative impact on the direction of vertical integration. This result does not support the MC theory or the direction of vertical integration in hypothesis 5. However, neither variable was significant at any level across any of the three models. Therefore, there was very weak support found for the MC theory of vertical boundaries in this model.

Transaction Cost Economics theory of vertical boundaries proved to show the most support of any theory in the model. The variable "Physical Asset Specificity of the Winery" was the most significant variable in the entire model, as it presented a positive impact on vertical integration and was statistically significant at the five percent level across all three models. "Physical Asset Specificity of Grape Production" was found to be significant in the 70 percent and 90 percent cutoff models, but it had a negative impact on vertical integration in all three models, which did not corroborate with the direction of vertical integration in hypothesis 6. Nevertheless, these findings provide further empirical

support to the TCE theory of vertical boundaries, as they best explained the reasons for or against vertical integration across the three models tested.

The additional variables examined that contribute to the TCE theory of vertical boundaries were "Dedicated Asset Specificity" (positive impact), "Timing" (positive impact), "Human Asset Specificity" (negative impact), "Environmental Uncertainty Quantity" (positive impact) and "Environmental Uncertainty of Quality" (negative impact). Although these variables were not statistically significant, the signs were consistent across all three models. Furthermore, when asked the asset specificity questions these owners may not have realized the transaction costs that exist because they were comparing asset redeployment within the wine industry. However, if the winery owners would have compared the assets used to produce wines across other industries, it may have been possible that more asset specificity variables would have shown statistical significance.

Overall, the results of the binary logit and the average partial effects show that TCE theory has the most explanatory power of vertical boundary determinants, especially the variables "Physical Asset Specificity of the Winery" and "Physical Asset Specificity of Grapes". Furthermore, weak support was shown for the RBV theory of vertical boundaries, with statistical significance only in the 70 percent cutoff model. However, the results provide very weak support for the MC theory, which was not expected *a priori*, as the importance of input quality is critical in the winemaking process.

CHAPTER 5 – QUALITATIVE EXAMINATION OF VERTICAL BOUNDARIES

This chapter of this thesis is made up of 10 mini case studies. The case studies were performed through in depth, personal interviews with owners/managers of wineries throughout the state of Missouri. The wineries interviewed were chosen based on organizational form, size, geography, age, and willingness to participate. On average, the interviews lasted approximately 45 minutes. Please refer to Table 1, Appendix D for a list of the wineries interviewed, winery location, year founded, winery size, governance structure, winery representative interviewed, and date of interview.

The objectives of this chapter are to use case study techniques to better understand the determinants wineries use to choose their current form of governance, what form of governance these wineries utilized in the past, why the wineries moved away from previous governance strategies, what form of governance these wineries plan to use in the future, and what steps will be taken to get there. The multiple case studies allow for a broad range of wineries under multiple forms of governance to answer questions. The answers are then compared to wineries that fall under the same governance structure and then compared to the wineries under other forms of governance. This is done to find commonalities of determinants between governance structures and overall reasons for governance form and procurement strategy determinants.

As mentioned earlier in this thesis, there is a third, intermediate form of governance structure, which was introduced by Williamson (1991). This third form of governance, known as the hybrid form, differs from the polar forms of market and

hierarchy, in that it displays characteristics of both the market and the hierarchy at varying levels (Menard, 2004). The hybrid form of governance requires a more in depth discussion than the two polar forms of market and hierarchy, as each winery classified under the hybrid form of governance differs substantially from one another. Furthermore, it is important to also recognize that even the wineries that fall under the market or hierarchy forms of governance differ from one another. For these reasons, qualitative case study techniques are utilized in this chapter for an in depth explanation of governance forms and to complement the quantitative analysis performed in Chapter 4.

Henry (2012) presented many reasons that qualitative research is important to research and how it can complement quantitative research. First, Henry (2012) cites that there are multiple realities in qualitative research, and that they cannot always be explained through quantitative research alone. For this study, multiple realities means not one winery governance form is exactly the same, even though it might fall under the same form of ownership as another winery. This is especially true when studying hybrid forms of governance.

Another example Henry (2012) cites is that qualitative research looks to minimize the distance between the researcher and the participants, which allows for the interviewer to better understand what the interviewee knows through in depth, open-ended questions. This allows the interviewer to discover and capture additional information that could not be captured through a quantitative approach. Furthermore, the qualitative approach allows the interviewer to explain how each subject differs on an individual level, rather than just how each governance form differs overall.

The remainder of this chapter is organized in five sections: 5.1 Introduction; 5.2 Market Winery Examination; 5.3 Hybrid Winery Examination; 5.4 Hierarchy Winery Explanation; and 5.5 Analysis of Case Study Evidence.

5.1 – INTRODUCTION

The complexity in the hybrid form of governance comes from multiple reasons, and hybrids may choose to use several different types of contracts, which will be explained later in this section. According to the MacDonald and Korb (2005, p. iii), "Contracts are widely used to guide the production of differentiated agricultural products." Since grapes are a differentiated agricultural product, grape procurement is seen to have a large amount of contract usage.

MacDonald and Korb (2005) cite that contract usage has grown in United States agriculture and will continue to grow for three main reasons: 1) shifts in production to larger farms; 2) greater product differentiation; and 3) more on-farm specialization. One example of changing procurement strategies is Jang and Sykuta's (2008) examination of the United States hog industry. In 1993, 82 percent of hogs were sold via the spot market, while 11 percent of hogs were sold via marketing contracts in 1993. However, the structure of hog procurement strategies changed by 2005, as only 11 percent of hogs were sold via the spot market, while 67 percent were sold through marketing contracts, and 20 percent of hogs were sold under production contracts or vertical integration (Jang and Sykuta, 2008). This shift in procurement strategies can be attributed to product differentiation to meet consumer preferences, among other factors (Jang and Sykuta,

2008). From this, I hypothesize that grape procurement is under a large amount of contract procurement or is vertically integrated mainly as a result of product differentiation and on-farm (winery) specialization. Furthermore, MacDonald and Korb (2005) show that contracts can reduce the risk to both the grower and the buyer, especially with a perishable commodity, such as grapes.

Further examining contracts, MacDonald and Korb (2005) find that because of contracts, there is a closer connection between suppliers and buyers, which cannot be provided by the spot market. Moreover, contracts can allow the buyer to have greater control over farm production decisions and inputs (MacDonald and Korb, 2005). MacDonald and Korb (2005) explain two different types of contracts: 1) production contracts and 2) marketing contracts.

Production contracts, also known as lease contracts, are contracts in which the winery, in this case, specifies, provides, and controls several aspects of the production process, such as scheduling of spraying, pruning, clustering, and other viticulture practices. The grape grower, thus, provides the labor and equipment to spray and harvest the grapes. Therefore, lease/production contracts are very formal and require a great deal of communication between the grower and the buyer (winery). Since quality attributes of grapes are difficult to measure, quality can be ensured in other ways, such as controlling inputs and production practices, which is the case in lease/production contracts (MacDonald and Korb, 2005). According to Jang and Sykuta (2008), production contracts can be viewed as a quasi-integrated form of procurement. Production/lease contracts are often seen as more formal agreements and are written out and signed by both parties. Production contracts can vary greatly from winery to winery and even

between a winery and the vineyards it contracts with, which makes examining the hybrid forms of governance more complex.

The second type of contract MacDonald and Korb (2005) describe is the marketing contract. The focus of the marketing contract is not dependent on services the vineyard provides and the overall control of the winery over the vineyard but rather on the mechanism that determines the price, such as tonnage, sugar content, or acres, just to name a few (MacDonald and Korb, 2005). Furthermore, with marketing contracts, the grower "retains substantial control over major management decisions, with limited direction from the contractor" (MacDonald and Korb, 2005, p. 2). Therefore, this type of contract is usually seen as a verbal, handshake agreement between producer and buyer, with limited stipulations or a written formal contract, without complete control over production decisions from the winery. Jang and Sykuta (2008, p. 1) state that marketing contracts are utilized in "the presence of buyer-specific quality attributes in an otherwise commoditized industry." Nevertheless, although marketing contracts are mostly viewed to be less complex than production/lease contracts, they can vary greatly from one winery to the next and even between the winery and the vineyards it contracts with. Furthermore, Jang and Sykuta (2008) recognize marketing contracts as the dominant contract form in the hog industry and the agricultural industry, as a whole.

Although some risks are reduced with contract use, all contracts are incomplete, due to asymmetric information and bounded rationality. Therefore, contract usage "depends not only on contract design, but also on the performance of the primary alternatives – spot markets and vertical integration" (MacDonald and Korb, 2005, p. 5). In addition, the risks of the market or hierarchy have to be greater than the costs of the

contract in order for a winery to choose to use contracts instead of the other procurement forms (MacDonald and Korb, 2005).

In examining the continuum of organizational forms adopted by the wineries in the state of Missouri, it was found that, although some wineries do fall under the market and hierarchal forms of governance, the majority of the wineries in the state choose a hybrid governance structure. These hybrid forms use either 100 percent contracts to procure their grape provisions, a combination of contracts and market, a combination of contracts and hierarchy, or a combination of all three forms of governance. A diagram showing the continuum of Missouri wineries can be found in Appendix C, Figure 2.

Due to the diversity and complexity of organizational forms of wineries in the state of Missouri, I will now explore the basis and reasons why wineries in the state of Missouri choose the governance form they are currently under. In addition, I look to better understand the pros and cons of the given governance structure and determine if other procurement strategies will be sought after in the future. For a complete list of the qualitative questions used to examine the wineries interviewed in this chapter, please refer to Appendix D. The questions are categorized by governance structure – Market, Hybrid, and Hierarchy.

5.2 – MARKET WINERY EXAMINATION

In this section of the qualitative analysis, two wineries that are currently structured as market wineries will be examined. The two wineries in this section fall under the market form of governance strategy because they procure more than 80 percent

of their grape provisions from the open market. Each winery will be examined individually and then the wineries will be compared at the end of this section.

Ladoga Ridge Winery Mini Case Study

Ladoga Ridge Winery History

Ladoga Ridge Winery opened for business in September 2011, because the owners', Galen and Leinda Haddock, had a goal of owning and operating a winery. According to Galen Haddock, it all began with a dream that eventually turned into a plan and now an established winery. Now that the winery is established, the owners look forward to expanding in the future.

Ladoga Ridge Winery appreciates the history of its home area of Smithville, Missouri. Thus, the first wine produced by the winery, released August 5, 2011, "was named 'Yankee' Smith, in honor of Smithville's first settler, Humphrey 'Yankee' Smith," according to Galen Haddock. Furthermore, Galen and Leinda Haddock pride themselves in providing their customers an escape from the business of the everyday world by the surroundings they have created at their vineyard. Moreover, Ladoga Ridge Winery wants to provide their customers with "high-quality, affordable, hand-crafted wines … and unsurpassed service of our staff," according to Galen Haddock. In 2011, Ladoga Ridge Winery produced approximately 395 gallons of wine; however, Galen Haddock expects the production of wine to grow substantially in the future.

Ladoga Ridge Winery Case Study

Of the wine produced by Ladoga Ridge Winery, 50 percent is made from grapes, 10 percent from grape juice, 10 percent from bulk wine and 30 percent is made from

fruits and vegetables. Since the winery opened until this year, 100% of the grape provisions used in the winemaking process have come directly from the spot market.

Ladoga Ridge Winery has used this method of procurement since it opened because the owner is relatively new to the industry and does not have enough information about growers in the area to know if they are good or bad growers. In addition, the winery does not want to get locked into contracts with a grower in case changes on tonnage requirements need to be made. Moreover, according to Galen Haddock, having contracts can really only help you ensure you will have a crop. Furthermore, Galen Haddock sees lower market prices, when compared to contract prices, as a plus for his beginning winery.

Even thought Ladoga Ridge Winery produces quality wine, proved through awards from wine competitions, Galen Haddock still finds many faults in the grapes he procures from the market, which impacts the quality of the wine produced. First, when it comes to the uncertainty surrounding the quality of the grapes procured from the market, Galen Haddock cites that this has a major impact on his operation. Galen Haddock stated that the reason the quality is lost in the market is because the winery has no control over what is bought, which is a major downfall and hurts the quality of wine produced. Furthermore, Galen Haddock cites that an imbalance of information (e.g., asymmetric information problem) exists because of the lack of control over stipulations, such as viticultural practices, spraying, and pruning. However, Galen Haddock feels as though the asymmetric information problem can be solved through other procurement strategies in the future.

This year, Ladoga Ridge Winery will harvest grapes off of their own estate grown grapes for the first time. The four and a half acres of estate grown grapes will provide Ladoga Ridge Winery with approximately 50 percent of its grape needs for the upcoming year and the other 50 percent will be procured from the market. Galen Haddock feels as though the quality of the grapes used this upcoming year will be of much higher quality, due to the fact that he has been able to control the production process of the grapes. Galen Haddock oversees all vineyard management and does all of the work himself. Galen Haddock claims that he is very particular and because of the fact that he controls every aspect, the estate grown grapes will be of high quality. The benefits that Galen Haddock believes will be realized from moving to a more hierarchal form of governance is higher quality wine, producing grapes cheaper than buying, and better marketing to customers.

In the future, Ladoga Ridge Winery plans to move completely away from the spot market procurement strategy and utilize its own estate grown grapes and contracts with growers Galen Haddock has developed a relationship with.

According to Galen Haddock, from the four and a half acres of estate grown grapes, the winery will be able to produce about 10,000 bottles of wine, which he does not feel will be enough supply to fulfill the demand his customers have for his wine. Therefore, in order to produce the amount of wine desired, Galen Haddock has been promoting the practice of grape growing to friends and farmers in the area in order to get them to produce grapes for Ladoga Ridge Winery in the future. Furthermore, Galen Haddock has already talked with a few established growers in the area, in order to let them know what he is looking for as far as varietal, quality and delivery methods. In the

future, Galen Haddock expects to grow his own vineyard acres, too, but he does not currently know how many acres will need to be added.

Galen Haddock does not feel as though there will be any delivery issues with the contracted growers, as there will be an established relationship with them. Furthermore, they will understand the goals of the winery and the winery will understand the goals of the grower. This will help with decrease transaction costs between the growers and the winery.

According to Galen Haddock, he does not feel there is a relationship that exists between the size of his winery and the quality wine produced. Galen Haddock explains that management and winemaking practices are the two main reasons why wineries either produce good wine or bad wine. Therefore, Galen Haddock says that he tries to continuously improve his knowledge of winemaking and management practices, so the quality of wine he produces continues to increase.

Riverwood Winery Mini Case Study

Riverwood Winery History

David Naatz and his wife moved from the city to their farm, north of Weston, Missouri, about 15 years ago. When they first moved to the farm, there were already Cynthiana/Norton grapes growing on the land. They tried to increase the quality of the vines through viticultural practices, but their efforts did not amount to any substantial production at first. However after years of enjoying visiting wineries and wine tasting, the couple decided to start Riverwood Winery, which opened six years ago.

In the first year, Riverwood Winery's wine was produced by another winery, but since then, they have produced all of their own wine. In 2009, David Naatz and his wife planted the first grape varietals of Foche and Cayuga. According to David Naatz, the grape vines planted in 2009 should be ready to harvest for the first time this year. Furthermore, varietals of Traminette and Frontenac were planted last March, and an acre of St. Vincent and an acre of Vidal Blanc vines were planted this spring. In addition to these varietals, the grapes that were found growing on the farm have been managed well and are producing some grape provisions for the winery.

David Naatz says his winery has seen growth in his wine production over the past few years. In 2011, Riverwood Winery produced 728 gallons of wine, and David Naatz expects that his winery will continue to see growth in the future.

Riverwood Winery Case Study

Of the wine produced at Riverwood Winery, 90 percent is produced from grapes, while the remaining 10 percent comes from grape juice and other fruit juices, such as apple and blackberry. Currently, Riverwood Winery only produces about 14 percent of its wine from estate grown grapes, while the remaining 86 percent of the grape procurement comes from the spot market.

Currently, Riverwood Winery still relies on the market to supply the vast majority of its grapes for the simple reason that its own estate vineyards do not currently produce enough tonnage to supply the grape needs of the winery. Furthermore, grapes are procured from the spot market due to the fact that David Naatz does not feel comfortable entering into contracts with growers. According to David Naatz, he does not want to be contractually obligated to take grapes that he does not need, which could cost his

operation dearly. Moreover, David Naatz states, “I like the ease of going into the market and finding what I need when I need it.”

David Naatz does not have delivery issues or scheduling conflicts with the market form of procurement. However, according to David Naatz, the winery has to be ready when the grapes are harvested. Nevertheless, David Naatz states, “It really doesn’t impact the winery because the wines are made a year or so in advance.” Therefore, scheduling is not seen as a problem for Riverwood Winery.

When it comes to the uncertainty and asymmetric information surrounding quality of grapes procured from the market, David Naatz cites that since his winery has only been producing wine for five years, he does not feel as though he is qualified to say whether the grapes he procures from the market are of good quality or not. He is just glad to get grapes that are sweet, so he can make sweet wines, which appeal to his customers. David states, “Give me another 10 years and I can tell you whether it’s a good grape or not.” However, David Naatz still feels as though there is some asymmetric information that exists from the aspect of damage during transportation and even how long the grapes sit out in hot temperatures.

Although David Naatz enjoys the ease of spot market procurement, he still feels as though there are disadvantages. First, there is great uncertainty surrounding the quantity of grapes that are available to purchase on the spot market. David Naatz states, “You just never know how much a grower is going to have and neither does that grower.” David Naatz admits that he is in the same situation with his grapes, as he explains, “You can look at your grapes and assume you’re going to have this much, but you never know until harvest time.”

Another downfall that David Naataz sees from spot market procurement is that grape availability in the market dictates the type of wines he can produce. According to David Naatz, this is due to the varietals, such as Chamberson, Chardonel, and Cayuga white, that are offered in the market. Therefore, the market greatly impacts the decisions of the winery.

In order to mitigate the downfalls of market procurement, David Naatz plans to shift toward using estate grown grapes in the future. Even though, as cited earlier, David Naatz doesn't feel comfortable judging the quality of the grapes procured from the market, he feels as though the estate grown grapes will be of better quality than the grapes he currenlty procures from the market. According to David Naatz, the quality of estate grown grapes will be better because he will have more control over all aspects of the production process, by controlling all management and production decisions. This will help to assure the quantity and quality of the grapes. Furthermore, he feels estate grown grapes allows fresher grapes to be used as an input, which will have an impact on wine quality, as the grapes will not have to be transported long distances. Moreover, David Naatz alludes to the fact that he will not have to worry about the grapes being damaged from sitting out in the sun for too long or being damaged in other ways, which reduces asymmetric information and uncertainty.

Estate grown grapes will allow Riverwood Winery to save costs, both transaction costs and on the price of the grapes. In addition, David Naatz states that there is a mystique and good feeling customers get from seeing estate grown grapes when they are at the winery, which translates to a marketing advantage. Finally, David Naatz cites that

he will be able to use the types of grapes he wants to produce the types of wine he wants, which allows him to make the best wines and most practical decisions for the winery.

When it comes to winery size that affords minimum quality standards of the wine produced, David Naatz does not think there is a relationship. According to David Naatz, the quality of wine is related to experience and knowledge that is attained over years in business. Therefore, experience and knowledge will allow the winery to grow and will lead to better wine.

Market Winery Summary

From the interviews with the two market wineries, it appears that the wineries that currently utilize the market form of procurement are young wineries that do not have established vineyards that will generate enough tonnage to produce the amount of wine needed. These wineries currently use the market form of procurement, as they are not familiar with quality growers in the area and do not want to enter into contracts, as they are not completely sure of the exact tonnage needed to produce wine. In addition, the two market wineries interviewed stated that they plan to move towards a more hierarchal form of governance in the future, in order to better control the quality of grapes procured and to produce wines from grapes that are not grown in their local area. Overall, both market wineries interviewed cited that their wine quality should increase as they move towards more hierarchal forms of governance and have more control of the grapes produced in the future.

5.3 – HYBRID WINERY EXAMINATION

This section examines five wineries that utilize a hybrid form of governance strategy to procure their grape provisions. These wineries are within the hybrid form of governance because each winery uses multiple procurement strategies that could include the spot market and estate grown grapes, the market and contracts, estate grown grapes and contracts, or a mix of all three procurement strategies. Furthermore, the contracts used by these wineries to procure grapes can include verbal, written and lease contracts. Therefore, the hybrid form of governance strategy differs significantly from spot market or hierarchal forms of governance and is more complex.

Les Bourgeois Mini Case Study

Les Bourgeois History

In 1982 the first grapes were planted on the Les Bourgeois property. The original intention was not necessarily to evolve into a well-established winery from those grapes but rather to add beauty to their property and make wine as a hobby. However, after a five-ton favorable harvest, Les Bourgeois' first vintage off of those grapes occurred in 1985 and was made into red wine by a winery in Rolla, MO. The year after that, Les Bourgeois sold its entire vintage in just two months, and by 1987, they tripled production to 1500 gallons.

Cory Bomgaars, Head Winemaker, came to Les Bourgeois in 1992 and added great knowledge to the winery operation. Les Bourgeois continued to flourish through the years and expanded rapidly, by purchasing more land, buildings and winemaking

equipment. Around 1993, Les Bourgeois began working with a local distributor and its wines appeared in grocery stores and restaurants in the Columbia, Missouri area.

In 1996, Les Bourgeois opened its Bistro to complement its wine business. Vineyard acres grew for Les Bourgeois throughout this time in order to have better control over the grapes and help continue to increase the quality of their wine. Furthermore, throughout the 1990s and early 2000s, Les Bourgeois continued to expand its distribution network throughout Missouri and into other states, such as Louisiana and Kansas.

Currently, Les Bourgeois is the third largest winery in the state of Missouri. Its production in 2011 was 105,000 cases of wine. Of the production, approximately 50% of the wine was sold at Les Bourgeois' retail outlets, and the residual supply was sold through wholesale distribution.

Les Bourgeois Case Study

Of the 105,000 cases of wine produced in 2011 by Les Bourgeois, approximately 60-70 percent was produced from grapes, while the remaining 30-40 percent was produced from bulk liquid (e.g., juice or wine). The reason for this combination of production inputs is due to the lack of grape supply in Missouri and the cost effectiveness of bulk. Furthermore, of the two bulk liquids, juice is cheaper but bulk wine has higher quality standards, which is important in the winemaking process.

Of the 500 tons of grapes used by Les Bourgeois to produce wine in 2011, 20 percent were estate grown, 30 percent were acquired from the spot market, and the remaining 50 percent were procured from verbal (handshake) contracts with growers.

Therefore, due to the multiple procurement strategies utilized, Les Bourgeois falls under the hybrid form of governance.

The 30 percent of grapes acquired from the cash market were purchased as residual, to help meet input supply needs. Les Bourgeois does not like leaving Missouri grape growers stuck with grapes, as the growers are important to the Missouri wine industry. Furthermore, Les Bourgeois uses multiple procurement strategies other than just the market because the quality of the input is directly correlated to the quality of the final product. Therefore, ultimate control of input quality and a marketing advantage are two main reasons for using procurement strategies other than the market.

The contracts used by Les Bourgeois are 100 percent verbal contracts with written supplements (e.g., price, quality control, etc.). However, these contracts and the supplements of these contracts vary greatly from grower to grower. In addition, contract types and supplements of contracts can even vary across specific acres of a vineyard and grape variety. A few reasons contracts vary across growers include variety, effort, and inputs used, just to name a few. Pricing, according to Cory Bomgaars, "Depends on if it's going into a 20 dollar bottle or a 5-7 dollar bottle." Furthermore, Les Bourgeois recognizes the risk to the grower on this pricing strategy. Cory Bomgaars stated, "That's a lot of trust on the grower's side." But that trust is gained through long-term relationships with the growers the winery utilizes the most. In addition, Les Bourgeois adopts this type of scaled pricing more often than other wineries, according to Cory Bomgaars.

The verbal contracts used by Les Bourgeois with their main (5-6) growers basically means that they have assured their main growers that they will purchase their

grapes; however, if the winery does not need the grower's grapes, the grower would get plenty of notice, so he/she may find other buyers. Likewise, the growers let Les Bourgeois know ahead of time if they will not sell them their grapes. According to Cory Bomgaars, "Both parties have the flexibility to discontinue. They have complete flexibility to do what they want, and I have complete flexibility to not pay them if stipulations have not been met."

Les Bourgeois works closely with its five or six main growers, as winery employees are in the growers' vineyards several times a year. This helps better control the quality and Les Bourgeois sees it as just a step down from actual estate grown grapes. Furthermore, the multiple visits help establish and strengthen the supplements (e.g., price, spraying, quality control) that go along with the verbal contracts.

Growers who Les Bourgeois does not have a long-term relationship with are not as assured that their grapes will be purchased. Nevertheless, most years Les Bourgeois does take the grapes, as they need the supply. Furthermore, the winery does not use any long-term contracts, as it does not fit its business model well and does not work in the winery's favor.

As Cory Bomgaars states, another important factor to the quality of the grapes and wine quality is scheduling of delivery during harvest, as grapes start being delivered to the winery in early August. During harvest, Les Bourgeois usually runs between 12-18 hours a day and in some cases, 24 hours a day if needed. According to Cory Bomgaars, "[Scheduling] is a major issue, especially with novice grape growers." A lot of growers do not understand the importance of on-time delivery, as it pertains to the quality of the grapes and, thus, the quality of the wine. In addition, delayed delivery by just one grower

impacts the delivery of other growers and throws the schedule completely off. In order to mitigate delayed deliveries or damaged crop, Les Bourgeois states in their contracts that they have the right to refuse the grapes if the crop has been compromised for any reason at the vineyard level.

As stated above, Les Bourgeois has verbal contracts with vineyards all over the state; however, over the past 10 years, they have focused on growing their grower network closer to the winery. The objective is to procure grapes grown within 45 minutes to an hour from the winery. One reason for this is fresher grapes, due to less travel time. But, most importantly, multiple visits to the vineyards are more feasible when they are closer, which, in turn, leads to higher quality grapes. Of the vineyards that are far away, minimal visits are made and the grapes acquired are just high volume. In addition, if the volume isn't there, those grapes are easily substituted for with filler products, such as bulk juice or bulk wine.

In order to help control these outside factors and delivery issues, Les Bourgeois decided to vertically integrate a portion of the grapes they use in the production process. Estate grown grapes are still relatively new to Les Bourgeois. It was not until 1998 that estate grown grapes (other than the beginning five acres) were a main strategy of grape procurement for Les Bourgeois. The limiting factor of vineyard development, in the early years, was capital constraints. Furthermore, expanding the acres of estate grown grapes was considered risky by Mr. Bourgeois. Overtime the winery has developed 30 acres of its own vineyards, which has proved paid off, as the highest quality wine produced at the winery is from estate grown grapes.

When asked how the quality of grapes procured from contracts compared to the quality of estate grown grapes, Cory Bomgaars stated, “I think, typically, year after year, our higher quality wines come from the grapes we grow.” Les Bourgeois feels as though estate grown grapes are of higher quality because they have better knowledge in vineyard management and are able to harvest at the point of highest quality.

Another way that Les Bourgeois is controlling for quality is by moving towards lease contracts. This year, Les Bourgeois is controlling 15 acres of vineyard under a lease contract with a local grower. Under this new lease agreement, Les Bourgeois will perform all of the hand labor and pay for all of the spray, and the vineyard owner will perform all of the tractor work and spraying. In order for this lease contract to work, both parties will keep track of the labor and input expenses. When harvest takes place, both parties will agree on the price and take the expenses out of the price and split the residual fifty-fifty. This type of agreement translates to basic sharecropping.

According to Cory Bomgaars, lease contracts actually create more risk than procuring grapes in the open market or under verbal contracts, as the winery would normally have zero money invested at this point in the year. However, it is projected that Les Bourgeois will have between $15,000 and $20,000 invested in the lease contract. Based on past history with the lease contract vineyard, there is production risk, as yields have varied over the years. However, these issues should be ameliorated, since Les Bourgeois has complete production control over the vineyard. Therefore, the quality of the grapes from this lease contract should be of the same quality of the estate grown grapes. In addition, since Les Bourgeois has complete control of the vineyard in the lease

contract agreement, they can market these grapes as estate grown, which will take their estate grown acres from 30 acres to 45 acres.

By controlling quality of the grapes, Les Bourgeois is better able to run their business. The way the winery is structured allows Les Bourgeois to have their most knowledgeable staff focus on managing the grape procurement process and vineyards. This, in turn, makes it easier on the winemaker to produce quality wine from the quality input.

In the future, Les Bourgeois plans to shift toward sharecropping methods of production, if the current aforementioned method of sharecropping system proves successful. Sharecropping allows more control over the grapes and equates to higher quality wine without having to invest in land acquisition and vineyard development. For sharecropping, the focus will be on key vineyards located within 45 minutes of the winery. An increased combination of true estate grown grapes and lease contract grapes will allow Les Bourgeois to reduce the risks of procuring grapes from the spot market and contracts. In turn, by moving more towards a hierarchal form of governance, Les Bourgeois will be able to procure higher quality inputs, which will equate to higher quality wine, decrease the scheduling and delivery conflicts with growers, gain a larger marketing advantage, and reduce the overall risk of the winery.

Cory Bomgaars feels as though there are minimum quality standards that will be realized as Les Bourgeois continues to expand its vineyard acres. He sites the importance of the economics of the labor that a winery can afford as the key factor. As the vineyard grows, the critical activities become more time consuming and require more labor and more people per acre to get the job done. On a small vineyard (fewer than five acres),

usually two people can do the job efficiently. However, the vineyards is between 7-15 acres, it is difficult hire outside labor, as the vineyard is not making enough money. According to Cory Bomgaars, a vineyard would have to break the 20-acre threshold in order for it to be economically feasible to hire outside labor.

Conversely, Cory Bomgaars, does not feel there are quality standards of the wine produced that can be realized from the size of the winery. Cory Bomgaars sites the main factor that limits wine quality is the initial investment in quality equipment. Underinvestment in quality equipment in order to attain all of the equipment necessary can have a large impact on the quality of the wine being produced. Cory Bomgaars explains, "People should spend some capital on some component of quality and let somebody else do the other components." This would allow for quality equipment on a certain aspect, so the winery could concentrate on quality and then the other part could be handled by outsourcing, without sacrificing quality. Therefore, there appears to be not a threshold of quality or size, but rather, a threshold of knowledge or equipment or a combination of both that limits the quality of wine produced.

Based on the above case study of Les Bourgeois, it appears there are multiple reasons the winery falls under the hybrid form of ownership. The market is used as a residual form of procurement of grapes, as estate grown grapes and contact grapes do not create enough supply to sufficiently support the winery's needs. Verbal contracts are used in place of spot market procurement, as the winery is better able to set supplements within the contract to help assure a quality input. This alleviates some risk, but also creates other problems and challenges through damaged crop, delivery issues and lingering quality control issues. Finally, Les Bourgeois reduces the problems and risks of

the market and contracts through estate grown grapes, as the winery is better able to have complete control over the production process. However, more risk from Mother Nature would be is imposed on estate grown grapes, which is something Les Bourgeois would not necessarily have with the spot market, as the winery could procure grapes from sources in different geographical areas.

When the winery first began, capital constraints kept Les Bourgeois from utilizing estate grown grapes; however, as the winery has expanded its estate grown acreage over the past 14 years, they and their customers have seen an increase in the quality of their wine. Furthermore, lease contracts are increasingly utilized to allow for the procurement of high quality grapes that could not be procured through the market or contracts.

Windy Wine Company Mini Case Study

Windy Wine Company History

According to Kraig Keesaman, Windy Wine Company started many years ago when he developed his love for homebrewing. Kraig Keesaman originally started with brewing craft beer and it was not until his wife, Becky, requested something sweet that he ever thought about producing wine. The first wine produced by Kraig Keesaman was a Burgundy style wine, which his wife enjoyed and he received many compliments on from his friends. Due to the outpouring of praise, Kraig Keesaman decided to expand his production to other varietals.

Before opening Windy Wine Company, Kraig Keesman worked several years at an already established winery in northwest Missouri. There he learned about vinology, vineyard maintenance, and sales floor management. In order to increase his knowledge

beyond a single winery level, Kraig Keesaman enrolled in classes at the University of Missouri and additional classes instructed by wine professionals.

Windy Wine Company was officially established in 2011 on the Keesaman Missouri Century Farm near Osborn, Missouri. Windy Wine Company is currently producing 2500 gallons of wine in an old swine farrowing barn; however, a new location with a tasting room near their vineyard is under construction and will be opened in May 2012.

Windy Wine Company Case Study

Windy Wine Company currently produces approximately 25 percent of its wine from grape, while the remaining 75 percent of wine is made from honey and other fruits. In addition, Windy Wine Company does not use any bulk juices or concentrates to produce grape wine. The reason the grape wine production is only a quarter of total production is because it is important to Windy Wine Company that they use only grape inputs and they want to use as much of their estate grown grapes as possible.

Of the grapes used by Windy Wine Company to produce wine in 2011, the vast majority of the supply was procured via verbal contracts. Minimal supply came from estate grown grapes, and no grapes were procured from the market or from written contracts. Therefore, due to the use of contracts and minimal hierarchal procurement, Windy Wine Company fall under the hybrid form of governance structure.

Minimal estate grown grapes were used last year because most of the vines were not producing at maximum production, due to still being young. However, the grapes that were taken from the estate were blended with the grapes procured via verbal contracts or with other fruits to produce wine. Kriag Keesamen was excited to have enough estate

grown grapes harvested last year just to blend with other grapes. In fact, Kraig Keesaman relays his enthusiasm about estate grown grapes by saying, "You know it's one of those things that you're always excited about because they're my grapes, and I can say they are in my wine."

Windy Wine Company has a verbal contract with one grower that supplies the winery with the needed grape provisions. Windy Wine Company prefers to use the verbal contracts because of the relationship the winery has with the grower and also because of the flexibility the verbal contract creates for both the winery and the grape supplier in case of bad year, due to weather or other uncontrollable circumstances. Windy Wine Company keeps in contact with their supplier year round and the supplier lets the winery know what he will have available for the upcoming year, based on the past yields. After reviewing what the supplier has available, Windy Wine Company sends the grower an email stating how many tons they want of each varietal.

According to Kraig Keesaman, the quality of the grapes produced by his supplier greatly impacts his decision to work with him. If the supplier did not produce quality grapes, Windy Wine Company would not use the supplier and would find other suppliers in the area. Furthermore, according to Kraig Keesaman, his supplier has a great reputation in the area and is a good businessman who wants his buyers to succeed in their operation. Therefore, Windy Wine Company knows they will receive a quality product from their supplier.

Currently, Kraig Keesaman does not spend very much time in his supplier's vineyards. One reason is because of the relationship and trust he has with the supplier. Another reason is lack of time, as Kraig Keesaman and his family have been busy

opening the winery and getting the site established. However, Kraig Keesaman believes that he will spend more time in his supplier's vineyards in the future, as it will allow him to get a feel for what he will be working with when he produces his wine.

The open market is not utilized by Windy Wine Company as a form of procurement strategy because of the uncertainty surrounding the quality of the product. Kraig Keesaman believes a quality wine begins with quality fruit; therefore, knowing the winery will receive quality grape inputs greatly impacts the decisions and success of the winery. Windy Wine Company does not use formal written contracts because they are too inflexible. Kraig Keesaman sees the formalness of the written contracts as a downfall because there is not flexibility in case of a bad year for either party involved.

In the future, Windy Wine Company plans to increasingly move towards more of a hierarchal form of governance by utilizing more estate grown grapes in the winemaking process. Kraig Keesaman believes that this year he will be able to produce about 65 percent of his grape provisions from estate grown grapes and he will continue to purchase the remaining 35 percent from his supplier through a verbal contract. Currently, Windy Wine Company has seven acres of vines planted. The varietals currently planted on the seven acres are Vignoles, Delaware, Concord, and Chambourcin; however, more acres and varietals will be added in the future as the winery grows.

A main reason Windy Wine Company plans to use more estate grown grapes is because Kraig Keesaman believes that grape quality associated with control over the production process. Kraig Keesaman referred to the importance of being able to see and walk the plants, and he sites the absence of doing that as a downfall of using other forms of procurement. Furthermore, Kraig Keesaman states, "It's not a necessity [to be in the

vineyards] but it adds that extra bit of craftsmanship to it." Kraig Keesaman believes the control over the grape production process and the extra craftsmanship will help increase the quality of the grapes and, therefore, the quality of his wine.

The second reason Windy Wine Company is moving more toward a hierarchal form of governance is because Kraig Keesaman sees his winery eventually growing beyond the capabilities of his supplier to continue supplying him with the needed grape provisions. Kraig Keesaman believes that his supplier will always have a good product every year because he puts a lot of time and research into growing grapes; however, he does not believe the supplier will increase the size of his vineyard in the future. Furthermore, Kraig Keesaman mentions the fact that more wineries will probably be established in the region, and he would like to see them be able to work with his supplier in order to get quality grapes, which will decrease the amount available to Windy Wine Company.

Another reason Windy Wine Company plans to use more estate grown grapes in the future is because of the increased importance of the local food movement, which allows for a marketing advantage. According to Kraig Keesaman, "The more local the better, and that's the trend of things. That's the way things are adjusting, and I don't see that going away." As a result, Kraig Keesaman feels Windy Wine Company gain a competitive advantage by promoting estate grown grapes to its customers, and this will help the winery grow its business.

When referring to the relationship between vineyard size and minimum quality standards of grape production, Kraig Keesaman discusses the fact that as the vineyard acreage grows, so do the management challenges. Currently, with just the seven acres,

Kraig Keesaman says he is very busy, as he performs all duties at the winery – from grape production, to winemaking and from sales management to marketing. Therefore, in the future, Kraig Keesaman says he will have to hire help. Kraig Keesaman states, "As you get bigger, it becomes more of a challenge because you have to rely on another person." Kraig Keesaman agrees this will impact the way the winery operates, as he will have to monitor his employees and he will no longer be able to have complete control over every aspect of the winery.

Kraig Keesaman feels as though the minimum quality standards of wine is related to experience and quality equipment than on the size of the winery. Currently, Windy Wine Company is using older winemaking equipment that is not automated and completely manual. The old equipment proves difficult to use, as everything has to be adjusted by hand, is hard to clean, and is time consuming. For example, Kraig Keesaman's current bottling system takes about 6 hours to bottle 100 gallons of wine, plus 2 to 3 hours of washing and cleaning the equipment. Karig Keesaman claims that with new equipment, he will be able to bottle approximately 100 gallons of wine in 3 hours, with only 45 minutes of cleaning and washing. The time saved by the new equipment will allow his operation to run efficiently and grant him more time to spend on other aspects of the winery. Furthermore, training employees to run the new, automated equipment will be easier than training them to run the old, outdated equipment.

Beyond the efficiency and time gained, the new equipment will also allow Kraig Keesaman to produce better wine. Kraig Keesaman states, "New equipment is easier to clean and you have to have clean equipment to produce good wine." Furthermore, from a grape processing perspective, Kraig Keesaman has already purchased a new crusher and

new de-stemmer. According to Kraig Keesaman, the new grape processing equipment has decreased the time of crushing from 4 hours to approximately 35 minutes. This new equipment also helps lead to better efficiency and higher quality wine.

Although Windy Wine Company currently falls under the hybrid form governance structure, Kraig Keesaman plans to move toward a more hierarchal form of governance in the future. Kraig Keesaman cited several reasons that he wants to move toward a hierarchal governance structure in the future; however, the main reason is to have better over control the quality of the input, which will allow him to produce higher quality wine.

St. James Winery Mini Case Study

St. James Winery History

Jim and Pat Hofherr founded St. James Winery in 1970, in an effort to bring Missouri winemaking back to its level of production attained before prohibition. In just its first year, St. James Winery produced approximately 8,000 gallons of wine. Furthermore, two of the wines produced that year were Velvet Red and Velvet White, which are, to this day, the flagship wines of St. James winery.

The winery experienced tremendous growth from the first year, and this is due to quality of wine produced. St. James has consistently won awards at wine competitions. A few examples include St. James Norton, best of show at the International Eastern Wine Competition (1994) and the St. James Seyval "was named one of the Top 50 Wines in the World by Bon Appettit." (St. James Winery website).

The fastest growth rate St. James Winery experienced was from 1995 to 2000. During that time period, St. James Winery's annual production increased from 10,000 cases to 100,000 cases. In order sustain this growth, St. James Winery had to grow its vineyard acreage along with increasing its storage capacity and new bottling techniques. These changes and technology enhancements allowed St. James to increase wine quality and to be recognized as a top winery in the nation.

St. James Winery has continued to grow over the years, as its annual production surpassed 200,000 cases in 2011. Furthermore, St. James Winery utilizes its distributor network to distribute its wines throughout the Midwest and the southern region of the United States.

St. James Winery Case Study

Of the wine produced at St. James Winery, 75 percent is made from grapes, while the remaining 25 percent is produced from fruits (e.g., blueberry, raspberry, peach, blackberry, and cherry). The grapes used to produce wine are procured from several different sources: 50 percent of the grapes are estate grown grapes; 2 percent are procured from the spot market; 25 percent of the grapes are procured via verbal contracts; and the remaining 23 percent are procured from formal, written contracts. According to Peter Hofherr, "We can manage our supply volatility with our current strategy."

St. James Winery uses its current combination of procurement strategies because that is what the winery has done for years. First, St. James Winery utilizes estate grown grapes in order to have complete control over the production process, which leads to higher quality grapes produced. According to Peter Hofherr, St. James Winery's utilization of the spot market spot market is two-fold: 1) to achieve high quality grapes

from growers who have excess supply and 2) low quality grapes used for filler. Therefore, spot market is not used as a large procurement strategy due to quality concerns; however, the products purchased from the market are based on the reputation growers have earned over years of producing grapes.

St. James Winery uses verbal contracts because they have been used for years; therefore, verbal contacts have been the norm for the winery since it was founded. Verbal contracts are executed through talking with the growers many times and by a series of emails, throughout the growing year. The stipulations of the verbal contracts include practices from crop load to pruning and from spraying to harvest. However, according to Peter Hofherr, verbal contracts still lead to misunderstandings and difficulties in the relationship between St. James Winery and its supplier-growers.

Written contracts have been utilized to a greater extent in the past few years, as St. James Winery is continuously looking for more control over the grapes they use in the wine production process and to reduce transaction costs of the market and verbal contracts. According to Peter Hofherr, “Contracts help manage who has the decision rights, who’s assuming the risk, and who’s getting the value.” Furthermore, written contracts allow St. James Winery to have a stronger relationship with grape growers on what the winery feels are the key quality points compared to verbal contracts. Moreover, Peter Hofherr believes that written contracts allow for a more clear understanding of decision rights between the winery and the growers than just the verbal contracts.

Currently, many growers have verbal and written contracts with St. James Winery, and the type of contract is determined based on the varietal of grape being grown and how it is used in the wine production process. St. James Winery currently chooses

between verbal and written contracts based on the quality they expect to get and how well the grower does at producing grapes. Furthermore, verbal and written contracts also differ from grower to grower. The contracts differ based on growing conditions, grape varietal, and how it fits into the production process. St. James Winery also bases the price paid to suppliers on the level of margins the winery will make from the specific grapes.

St. James Winery employees do not spend much time in supplier vineyards. The winery employees only spend enough time in the vineyards so that the growers know what the winery expects from them and so they can assure the growers are utilizing management practices. Furthermore, St. James employees visit the vineyards during critical times of the year in the growing cycle. Moreover, visiting the vineyards at key times during the year serves as insurance so that nothing drastic happens to the vineyards. According to Peter Hofherr, "We have better control when we are on the ground and it helps the relationship between the grower and us."

Having more control over the production process of the grapes procured by St. James Winery allows for higher quality inputs. According to Peter Hofherr, "The quality of the inputs used it a critical factor that impacts the quality of the wine produced." This is a reason why St. James Winery procures 50 percent of its grapes from estate grown vineyards, as complete control correlates with higher quality inputs, which results in higher quality wines. Peter Hofherr states, "I would say the majority of our grapes are used for our highest quality wines."

In the past, St. James winery experimented with lease contracts; however, the winery discontinued them. The reason the winery shifted away from lease contracts is due to difficulties in the relationships between vineyard owners and St. James Winery.

According to Peter Hofherr, “Transaction costs were too high with the leased vineyard contracts.” However, St. James Winery would be interested in adopting lease contracts again if there were more professionalism in the grape growing industry. So, as the grape growing industry matures and growers become more professional, it is likely that St. James Winery will utilize lease contracts again.

As mentioned above, verbal contracts have historically been the main form of contracts used by St. James Winery. However, the winery has been, and plans to continue, moving away from verbal contracts and more towards formal, written contracts. The benefits of written contracts over verbal contracts include reductions in asymmetric information, decreases in quality concerns and a reduction in transaction costs, as decision rights and grape growing methods are critical for the quality of grapes produced. “The advances of grape growing quality are advancing quickly, so it is driving increases in wine production and quality,” relays Peter Hofherr. St. James Winery can tell this through awards and success of the wines and from commercial success.

The decision to vertically integrate more grape production in the future depends on the professionalism of the grape growers. If the competence and skills of the growers continue to increase, St. James Winery will contract out a larger percentage of its grape procurement needs. According to Peter Hofherr, being able to utilize more contracts in the future will allow for less capital to be tied up in vineyards and allows to it to be used for other aspects of the winery. However, if the professionalism and skill of the growers do not continue to increase, St. James Winery will utilize more estate grown grapes, as the quality of the grapes is crucial to the winery’s success. Furthermore, geographic diversification is a concern for St. James Winery, too. Peter Hofherr states, “Due to

Missouri weather, variability makes us have to diversify our sources," which is another reason St. James Winery does not vertically integrate more of its grape needs.

According to Peter Hofherr, he believes there is a relationship between the size of the vineyard and the minimum quality standards of the grapes. The larger vineyards can support equipment and mechanization and have increased control over the vineyard. This is important from the fact of weather variability, "as you get large amounts of rain, you have to get your harvest done in a very small amount of time," says Peter Hofherr. Furthermore, Peter Hofherr compares the Missouri weather to California, where the weather patterns can be better managed. Therefore, mechanization and equipment can help ensure the success of a vineyard. However, the vineyard must reach a certain size before it is economical to purchase the equipment that allows for better control. Moreover, the equipment and mechanization leads to better quality grapes, which translates into premiums for the grape growers.

When it comes to winery size that affords minimum quality standards of wine, Peter Hofherr feels there is a relationship. According to Peter Hofherr, "Wineries have high fixed costs, high working capital needs, and expensive equipment. You need to have the volume in order to be able to afford the expensive equipment." Therefore, wineries must be large enough to afford the equipment and mechanization that helps in producing higher quality wine.

St. James Winery has utilized the same procurement strategies for many years; however, Peter Hofherr recognizes the importance of input quality as winery continuously seeks to improve the quality of its wine. For this reason, St. James Winery is considering looking for alternative methods of procurement. The preferred method of

procurement would be an increase in written contracts with Missouri grape growers. However, Peter Hofherr does not feel the professionalism and skill of Missouri grape growers are developed enough to depend on. Therefore, St. James Winery will look to a more hierarchal form of governance structure, and expand its vineyards to utilize more estate grown grapes in the winemaking process, even though this method of procurement would be more capital intensive.

Cooper's Oak Winery Mini Case Study

Cooper's Oak Winery History

Coopers Oak Winery originally began as a cooperage more than 40 years ago, producing barrels for wineries and distilleries throughout the nation. As time went on the owner, found a passion for producing wine. He originally began production in his basement and gave the wine as presents to his family and friends. A few years after wine production began in his basement, he decided to expand to a bonded winery in 2008, distributing the wine locally and eventually spreading throughout the state and into other states. Cooper's Oak Winery increased has increased its production of wine since 2008, and produced approximately 1,900 gallons of wine in 2011.

Currently Cooper's Oak Winery is the only winery and cooperage on the same ground in the United States. Bringing these two processes together has allowed the winery to have better control over the barrels used and the aging process of its wine. Charlie Hargis, sales manager for Cooper's Oak Winery, joked, "Do you know how long it takes to produce a good red wine? It takes 102 years – 100 years for the tree and two

years to age." This statement shows how Cooper's Oak prides itself in both aspects of its work.

Cooper's Oak Case Study

All wine produced at the Cooper's Oak Winery is produced from grapes. Of the approximately 33 tons of grapes used to supply the needs of the winery, 10 percent come from estate-grown grapes, while 90 percent come from verbal contracts with three local suppliers and one supplier from California.

According to Charlie Hargis, The Coopers' Oak Winery does not currently procure any grapes from the spot market, as it would not supply high quality grapes because the winery does not have a relationship with the growers in that setting. Furthermore, the winery would not be able to express what it wanted quality wise, and would, in turn, most likely receive low quality grapes. Quality is better controlled through verbal contracts and estate grown grapes.

The hybrid type of grape procurement strategy is utilized by the Cooper's Oak Winery because of the relationships the winery has with its suppliers. Cooper's Oak Winery communicates their grape provision needs and stipulations to their contract growers at beginning of each year, so the growers can make production and management changes. According to Charlie Hargis, contracts do not differ significantly across the growers because of the relationships they have with them. Moreover, quality control standards do not differ across growers because if the grapes were not of adequate quality, the winery would refuse to use them. Furthermore, the winery managers and growers have an agreement with one another that the winery has the right to refuse the grapes if they are not of adequate quality, and the supplier has the right to deny the winery grapes.

The three local grape growers utilized by Cooper's Oak Winery are within an hour and a half of the winery, which further helps control the quality of the grapes. Due to the relationship with the growers and the close proximity, the winery does not experience scheduling issues or conflicts. Furthermore, the grower from California supplies the winery with vinifera grapes, which are not easy to find in Missouri. Like the local growers, there are no scheduling conflicts with this supplier, either.

In the beginning years with the growers, the winery made a few trips to growers' vineyards to make sure management and viticultural practices were adequate. However, due to strengthening relationships between the winery and growers, the winery currently does not spend any time monitoring the growers' vineyards. According to Charlie Hargis, the relationship they have with each grower allows the winery to trust that the growers are making the correct management decisions.

The basis of quality grapes starts with farming practices, according to Charlie Hargis. He firmly believes that his growers know this, and the winery expects nothing but the best product from its growers. Furthermore, Charlie Hargis stated that the basis of a good wine starts with a quality grape; therefore, everything stems back to solid farming and viticultural practices.

As the winery has grown, it has changed its procurement strategies. In the beginning, the winery used only contracts to procure grapes. However, due to winery growth, the suppliers were not able to meet the demand of the winery. Therefore, the winery decided to grow some of its own grape provisions. However, the grapes produced by the winery are used as a residual, as the suppliers cannot meet all of winery's needs.

Unlike many other wineries, the estate grown grapes at the Cooper's Oak Winery are not the highest quality grapes and are not an input for the highest quality wine. Charlie Hargis stated that the estate grown grapes are concord, which go into making their top selling wine, not the top quality. The winery needed more volume of these grapes, so that is what they currently produce. The growers are trusted to produce the top quality grapes because, according to Charlie Hargis, if they were not trusted, they would no longer be a supplier.

In the future, the winery plans to procure more of its grape provisions from estate grown grapes. However, it does not plan on decreasing its current grape supplies from its growers. The winery plans to grow vinifera grapes in its vineyards, as the addition of estate grown grapes will help with marketing and allow them to have more of a Missouri influence on the vinifera varietal.

Regarding at the relationship between size of the vineyard and minimum quality standards, according to Charlie Hargis, he does not believe there is positive relationship. When commenting on this question, he alluded back to how quality grapes begin with farming practices, and he said that growers must be hands-on in order to grow quality grapes. As the size of the vineyard increases, it is harder for the grower to be hands-on; therefore, as a result, quality may suffer and decrease, according to Charlie. Furthermore, when taking the size of the winery that affords minimum quality standards, Charlie Hargis says there is no relationship there, as he has had good and bad wine from all wineries he has been at, whether they are large or small.

Cooper's Oak Winery uses its current procurement strategy in order to assure the quality of grapes. This is assurance comes from the relationships the winery has with the

contracted growers. However, since the growers cannot supply all varietals of grapes the winery needs, Cooper Oak Winery plans to expand its vineyard acres to grow other varietals, such as vinifera and to fulfill the quantity needs of other grapes varietals. Therefore, Cooper's Oak Winery plans to shift toward a more hierarchal form of governance in the future.

Stone Hill Winery Mini Case Study

Stone Hill Winery History

John Held's father began growing four acres of Catawba grapes, in the 1960s, as he was looking to increase the odds in life, as many agriculturalists were doing in the hills of the Hermann, Missouri, area. The state of Missouri was looking for implementing alternative crops, especially Catawba grapes, since it grew so well in the state. When John's father began growing grapes, the goal of the state of Missouri was to grow enough Catawba grapes collectively to ship to Ohio wineries.

The original four acres of the Held family vineyard was 18 miles from where Stone Hill Winery is located now. The proprietor of the location during the 1960's was growing mushrooms and due to rising costs, he was looking to revert the property back to a winery, which is what the property was originally used for. The owner talked with several individuals from Germany and Napa Valley, and John Held's father was the fourth person he talked to about taking on the challenge. Therefore, according to John Held, "Because he had that little vineyard, he was asked to start the winery."

John Held's father opened the winery in 1965 and mushrooms were still being produced on the property. The Held family bought the winery in 1968 and made

primarily Catawba wine and produced a small amount of Norton wine from a half-acre vineyard they managed for an older couple. John Held states, "When my dad started the winery, his net worth was only $1500."

From the beginning, Stone Hill Winery has seen growth and today is one of the most prominent wineries in the state of Missouri, producing approximately 214,000 gallons of wine in 2011. Stone Hill Winery looks to continue growth of both the winery and its vineyard acres in the future.

Stone Hill Winery Mini Case Study

Stone Hill Winery currently produces 100 percent of its wine from grapes; however, in the past, the winery has had to use grape juice, due to extreme weather conditions. Of the grapes used by Stone Hill Winery to produce its wine, approximately 65 percent are vertically integrated and produced in their own vineyards and the remaining 35 percent are procured through verbal contracts. Furthermore, no grapes are procured from the market or from written contracts. Based on this strategy breakdown, Stone Hill Winey falls into the hybrid category of governance structure.

However, on long crop years, Stone Hill Winery occasionally procures some grapes from growers they do not have verbal contracts with. Nevertheless, the winery knows these growers, so it is not simply procuring grapes from the spot market.

Verbal contracts are seen as the only source of grape procurement outside the estate grown grapes because of the relationships Stone Hill Winery has with their growers. According to John Held, no grapes are procured from the market because there is no way to assure quality, which could lead to undesired grapes and, in turn, lower quality wine. Furthermore, grapes are not procured via written contracts because of the

strong relationships with growers and due to the fact that written contracts are not common practice in the area.

Currently, Stone Hill Winery has verbal contracts with approximately seven growers, and the length of relationship with those growers range from 5 years to 30 years. Stone Hill Winery does not experience many disagreements with their growers because they understand what the winery expects with respect to quality. According to John Held, "Our contracts do not need to be anymore complicated than that because we know our growers so well." However, if the disagreements arise, Stone Hill Winery tries to work with the problem grower to get the quality back to where it should be before they stop taking grapes from them completely. Nevertheless, if quality does not improve, the verbal contract will not be renewed with the problem grower, as grape quality is crucial in the winemaking process.

The verbal contracts Stone Hill Winery uses vary from grower to grower; however, according to John Held, the contracts are very loose. Stone Hill Winery and their growers like the looseness of the contracts, as they can be modified, as needed, depending on extreme and uncontrollable conditions. This allows growers to focus on quality of the product rather than quantity produced. Moreover, John Held believes set contracts do not have this flexibility. In addition to the verbal contracts, Stone Hill Winery has a lease contract with one vineyard; however, this vineyard is just two and a half acres, which amounts to only 4 out of the 1400 tons of grapes processed at Stone Hill Winery each year.

Furthermore due the looseness of the contracts, Stone Hill Winery will often take extra crop from their growers on long years, which was not specified in the contract. This

allows Stone Hill Winery to protect against short years because of carryover and allows growers to have a secure place for their quality product. According to John Held, "It is a cyclical market of production. It usually works out that a long year is followed by a short year, so you're always better off buying extra grapes when you can."

Stone Hill Winery looks to its growers to produce grapes that were not originally grown within the Stone Hill Winery vineyards. For example, growers primarily grow concord and Catawba grapes, as they are easier to grow and quality is more easily controlled. This helps Stone Hill Winery assure the quality of grapes procured from their contract growers.

Scheduling conflicts are not seen as a challenge to Stone Hill Winery. The harvest timeframe of the grapes being grown by contract growers is spread out so that Stone Hill Winery can be flexible in receiving the grapes. In fact, according to John Held, the largest scheduling conflict comes from the Vignole variety, which is grown in Stone Hill Winery's own vineyards, because it must be harvested as soon as it is ripe.

John Held or other Stone Hill Winery employees typically visit the vineyards of each grower two times a year. The vineyards are visited to reassure crop management techniques are being implemented to guarantee grape quality and to take samples prior to harvest. According to John Held, some of the growers run their own grape analyses; however, it is important that the quality tests are the same across all vineyards.

Due to the contract growers producing specific grape varieties, Stone Hill Winery is able to concentrate on growing other grape varieties that are more difficult to grow, such as Vignole and Norton. This allows Stone Hill Winery to control the production aspects of the grapes that are more difficult to grow, which, in turn, assures a high quality

final product that goes into producing wine. John Held believes the estate grown grapes are used to produce the highest quality wine in his winery.

In the past, Stone Hill Winery used to be closer to 70 percent verbal contracts and 30 percent estate grown grapes. However, over the past 10 to 15 years, the winery size has doubled; therefore, the need for grapes has at least doubled. As Stone Hill Winery grew, it shifted its focus more towards estate grown grapes, while still procuring the same amount of grapes from its verbal contract growers. As the contract growers and their vineyards age and due to the rapid growth of the winery, Stone Hill Winery has begun planting concord, Catawba, and other varieties their verbal contract growers grow to help transition to the expansion of estate grown grapes in the future.

According to John Held, "Our emphasis over the past few years has been on increasing our own vineyard size." This allows Stone Hill Winery to have more control over the production process, which leads to higher quality grapes. Since 2007, Stone Hill Winery has been working on converting existing vineyards to a more mechanical farming approach, and implementing the same approach with new vines. John Held says the mechanical approach allows the winery to "increase and stabilize yields because we are farming to minimize environmental risk." Furthermore, switching to a more mechanized approach allows Stone Hill Winery to efficiently vertically integrate grape production and have better control over the quality of inputs used in the winemaking process.

When examining the vineyard, John Held believes there is a relationship between the size and quality standards. John Held states, "You have to get to a point where you are large enough to be able to afford the mechanization necessary to harvest quality fruit." Furthermore, John Held believes a grower would have to have at least 20 vineyard

acres in order to afford a mechanical harvester. However, according to John Held, a conscientious grower with a small vineyard can grow high quality grapes, but the challenge is being able to harvest the grapes rapidly and carefully enough to assure the quality of the fruit. This is where small growers typically have challenges. Furthermore, if growers are relying on a third party harvester, then the quality depends on the harvester, and if they are hand harvested there is a challenge due to minimal migrant labor in the area. John Held States, "There is a disconnect because the smaller growers cannot get their crop harvested quickly with good quality to be able to supply larger wineries with what they need." Therefore, smaller growers are often times limited to the smaller wineries that are more flexible with small, multiple deliveries.

When looking at quality standards of wine due to the size of the winery, John Held does not necessarily believe there is a strong relationship. According to John Held, a winery must have the right equipment for its size, "as there are economies of scale in wine production." Furthermore, John Held explains, "Tiny wineries, for the most part, see problems with fermentation because you increase the probability of oxidation because they are tougher to control" with tanks that are not digitally controlled. Nevertheless, the main driving force behind the success of a winey, according to John Held, is matching quality equipment, knowledge, and quality grapes.

In the future, Stone Hill Winery plans to shift toward a more hierarchal form of governance, as its current suppliers are growing older and so are their growers' vineyards. According to John Held, this move will allow Stone Hill Winery to better control the quality of the grapes produced, as the winery will be able to have complete

control over the production process. This will, in turn, allow the winery to increase the quality of wine it produces.

Hybrid Winery Examination Summary

When examining and comparing the responses of wineries that fall under the hybrid form of ownership, it was found that these wineries utilize multiple forms of procurement strategies in order to attain their grape provisions. Furthermore, the hybrid wineries examined prefer to use contracts and estate grown grapes over the spot market, in order to assure grape quality standards, which has a large impact on the quality of the final product.

In the future, each winery interviewed in the hybrid section of this case study plans to increasingly shift more toward a hierarchal form of ownership and utilize more estate grown grapes. Les Bourgeois Winery, Windy Wine Company, St. James Winery and Stone Hill Winery plan to utilize estate grown grapes more in the future due to difficulty of procuring quality grapes, reducing uncertainty of quality of grapes being delivered, timing of delivery, growth of the winery beyond the supply capabilities of contracted growers, and marketing advantages. Cooper's Oak Winery plans to move more toward estate grown grapes in order to use grape varietals that contract growers do not produce in the area and to gain a marketing advantage. Furthermore, all wineries interviewed in the hybrid section feel as though the quality of their wines will increase as they move more towards a hierarchal form of ownership and have more control over the grapes produced.

5.4 – HIERARCHY WINERY EXAMINATION

This section of the qualitative case study analysis will examine three wineries that utilize hierarchal form of governance structure. The wineries in this section procure at least 80 percent of their grape provisions from estate grown grapes. The wineries will be examined individually and then will be compared at the end of this section.

Baltimore Bend Mini Case Study

Baltimore Bend Winery History

Baltimore Bend Winery originally got its start in grape production by growing about five acres of grapes and selling them to local wineries via verbal contracts. As grape producers in their respective region, Baltimore Bend Winery saw the pros and cons of grape production and the relationships and contracts with the wineries they supplied. About six years into grape growing, Baltimore Bend Winery owner, Sarah Schmidt, wanted tighter control over what was happening downstream with the grapes they were selling. Sarah Schmidt assessed the transactions between their buyers and realized the cons far outweighed the benefits. The main conflict that was mentioned by Sarah Schmidt was asymmetric information that existed between the grape producer and the buyers, such as terms of quality and other standards of the grapes. Therefore, due to the cons of transacting with the wineries they were supplying, Baltimore Bend decided to vertically integrate downstream and start producing its own wine from the grapes they grew.

In the beginning stages, Baltimore Bend Winery partnered with another winery in their area, in order to have access to facilities to make the wine. However, the wine was

produced from Baltimore Bend Winery grapes, their own winemaker and their own barrels. Baltimore Bend Winery started small, by producing only four types of wine – two dries, a semi-sweet and a sweet. In 2003, their first year of production, Baltimore Bend Winery ran out of their own sweet wine, and had to purchase a sweet wine from another winery in order to have enough supply.

Due to their success, after the first year Baltimore Bend Winery quickly began looking for their own facility. In 2006, Baltimore Bend Winery moved into its own location, which used to be an apple juice production facility off of Highway 24 in rural Missouri. The winery currently produces approximately 4500 cases of wine per year and still sells grapes to other wineries that seek for quality inputs.

Baltimore Bend Case Study

Currently, of the 4500 cases of wine produced by Baltimore Bend Winery, 35 percent is produced from grapes, 60 percent is produced from grape juice, and 5 percent is produced from bulk wine. Of the wine produced from grapes, 90 percent of the grapes procured are vertically integrated, estate grown grapes; 5 percent are acquired from the spot market; and 5 percent are procured via verbal contracts.

According to Sarah Schmidt, her winery utilizes its current combination of procurement strategies for a multitude of reasons. However, the main reason is having better control over the production process. Sarah Schmidt explains, “We know what’s happened in our vineyards, and we know the care that we take in our vineyards.” Having control over the production process leads to a higher quality input, which translates to being able to produce higher quality wine. Therefore, 90 percent of their grape inputs are vertically integrated for that reason. Sarah Schmidt further communicates that if they

were larger, the percent of estate grown grapes would increase, as the winery currently has an excess supply from what they use, and it is sold off to other wineries in the area.

The spot market procurement strategy for Baltimore Bend Winery is only utilized to acquire late season grapes. According to Sarah Schmidt, "These grapes are in case we've gotten into some issues with our own grapes, such as rot, which causes us to be short on our own supply." Furthermore, Baltimore Bend Winery acquires some of the spot market grapes from other local grape growers who haven't sold all of their supply. However, even though these grapes are from the spot market, they are "still good quality because quality is our main concern here," Sarah Schmidt states. But, Baltimore Bend Winery still limits the market form of procurement, because there is no way to measure all attributes of the grape that are important to the winemaking process.

Baltimore Bend uses verbal contracts with small growers who are looking for a place to sell their grapes. The grapes they buy from these smaller growers are grapes that Baltimore Bend Winery does not grow in their own vineyards. According to Sarah Schmidt, "The grapes from these growers fit well into our wines, and that's why we use verbal contracts to procure them."

Baltimore Bend Winery usually has verbal contracts with three to five growers per year. According to Sarah Schmidt, the verbal contracts are standard, as they are looking for quantity amount and/or specifics, such as brix, TA, pH. Of the specifics, TA, which stands for titratable acidity, is most important to Baltimore Bend. As Sarah explains it, "The grape needs to hang on the vine a long time to get the TA as low as we want it." Nevertheless, as being grape producers themselves, Baltimore Bend Winery

understands the challenges Mother Nature poses, and the winery does everything in its power to work with the growers under extreme circumstances.

According to Sarah Schmidt, Baltimore Bend Winery does not utilize written contracts for the simple fact that they have never used them. Verbal contracts have always worked well for the winery and they have never seen a reason to switch. In addition, Sarah Schmidt states, "Our smaller growers get a little antsy around legal written documents, so it is if we just use verbal contracts." Furthermore, Sarah Schmidt and her growers view the verbal contracts as being more flexible when it comes to extenuating circumstances. Nevertheless, in the future, Sarah Schmidt believes she can see things moving more toward written contracts. For example, "if we get burned by a grower, I could see us moving more towards a formal, written contract" in order to prevent conflicts in the future. However, if Baltimore Bend Winery began using formal, written contracts, Sarah Schmidt explains the contracts would still be flexible when it comes to weather and other uncontrollable factors. However, thus far in their experience with verbal contracts, Sarah Schmidt and her winery has not had an unpleasant experience.

According to Sarah Schmidt, there is a noticeable variance in quality of the grapes received from the three to five growers Baltimore Winery works with every year. The winery tries to work with each grower to let them know what they are seeing in the end product they receive from them, so the growers can understand management and viticultural practices to solve the issue for next year. Most of the growers take the recommendations and make the changes; however, according to Sarah Schmidt, "We have had instances where we have had to stop buying because there have been no

changes in practices to help improve quality." Furthermore, the growers know that if they do not fix the problems and continue to deliver subpar products, Baltimore Bend Winery will not purchase their grapes in the future.

Currently, Baltimore Bend Winery does not spend time in the vineyards of their main growers. Since the winery grows 90 percent of its grape provisions, Sarah Schmidt does not see a reason to worry about the five percent of vineyards that are under verbal contracts. Furthermore, the growers know that they must deliver quality products or Baltimore Bend Winery will not purchase from them in the future. Nevertheless, Sarah Schmidt mentions that if the winery gets to a point where it outgrows its own vineyards quickly and has to rely more on other growers, then they will spend time with growers in their vineyards. They would then focus on training the growers on viticultural practices, management practices and vineyard maintenance.

Baltimore Bend Winery does not have many delivery issues with growers, but some growers are better at delivering products on time than others. Most of the growers are within 60 milers of the winery. However, in the past, they went further away to purchase grapes, as another grower had high quality products. Sarah Schmidt states that her winery is flexible because it is small and can easily adjust delivery schedules. Nevertheless, according to Sarah Schmidt, "If we have a certain variety we are picking and harvesting, we would love for the grower who grows that same variety or grows a blend for that variety to be also picking and to deliver during the same time frame." This helps with crushing, fermentation, and to assure the quality of the wine.

The current procurement strategy has not always been the same for Baltimore Bend Winery, as it has changed over the years depending on the maturity of the estate

vineyards. According to Sarah Schmidt, the procurement strategy has "depended on the maturity of our whites and our reds. We were kind of shy on our whites, so we had to buy more whites from other growers." Therefore, in the past, Baltimore Bend Winery used verbal contracts in place of the estate grown grapes. The growers were people Sarah Schmidt knew, so she was assured her winery was receiving a quality input for wine production. However, over the past two or three years, the winery has moved more towards estate grown grapes.

Even though Baltimore Bend Winery does not currently utilize lease contracts, Sarah Schmidt communicates they may be open to it in the future, especially as the winery continues to grow. She explains, "It may make more sense as we grow. Instead of investing in more vineyards, we can help manage other growers' vineyards, which will help assure the quality we want."

Sarah Schmidt believes that the estate grown grapes are used as the inputs for the highest quality wine the winery produces. According to Sarah Schmidt, they know exactly how the grapes have been managed, which helps assure the attributes of the gape they want without having to incur additional costs. Having this control over the input is critical to the success of Baltimore Bend Winery.

In addition to the quality aspect of the estate grown grapes, Sarah Schmidt believes there is a marketing advantage to the estate grown grapes. According to Sarah Schmidt, "About 75 to 80 percent of people who walk through the door ask 'Do you grow your own grapes, and do you make your own wine?'" Baltimore Bend Winery does not currently have an estate bottled wine because it is not located in an American

Viticultural Area. However, once one is established, Sarah Schmidt looks forward to promoting an estate bottled Norton.

In the future, Baltimore Bend Winery plans to consider more estate grown grapes. More vines were planted this year, but Sarah only wants to grow the vineyard to a maximum of 15 acres. Therefore, if the winery's grape needs grow beyond the 15 acres, then it will rely more on the verbal contracts with growers in the area.

Sarah Schmidt does not see a relationship between the size of the vineyard that affords minimum quality standards of grape production. Sarah Schmidt states, "I don't think the size of the vineyard should impact the quality of the grapes and the inputs you put into it." However, Sarah Schmidt admits she can see how a small vineyard with just a few employees can get behind on keeping up on the duties to help assure quality. She notes that since Baltimore Bend Winery does everything by hand, the winery sometimes runs into some challenges with labor that vineyards with mechanization might not experience. Sarah Schmidt states that they are able to manage the issues because of the vineyard manager, who has a passion for operating their vineyard. Moreover, Baltimore Bend Winery has already started transitioning its vineyards to be more trellis style, so they can utilize mechanization in the future. Sarah Schmidt notes that they won't be large enough to buy their own equipment, so they may have to work cooperatively with other vineyards in the area in order to take advantage of the equipment.

When answering the question pertaining to the relationship between the size of the winery and the minimum quality standards of the wine, Sarah Schmidt says there are some basic practices and protocols that all wineries have to follow, no matter the size. However, Sarah Schmidt does believe there is some equipment that a winery cannot

afford unless the winery produces the volume to do so economically. Moreover, Sarah Schmidt believes that in a winery knowledge is most important for a successful winery.

Baltimore Bend Winery is a case of forward, downstream vertical integration, as it was originally a vineyard and then began producing wine from its own grapes. Baltimore Bend Winery utilizes its current grape procurement method in order to control grape quality, as it is difficult to procure quality grapes from other sources and it reduces the uncertainty of quality, and to attain specific varietals of grapes. The winery has planted additional grape vines, in order to grow more varietals and to have more control over the production process. In the future, Baltimore Bend Winery does not want to expand its vineyard beyond 15 acres; therefore, it will look to control quality of its grape provisions through contracts or lease contracts.

Cave Vineyard and Winery Mini Case Study

Cave Vineyard and Winery History

Marty and Marry Jo Strussion started cave Vineyard when they planted their first seven acres of grapes in 2001. The following year, an additional seven acres of grapes were planted. Grape production was originally intended to be a hobby for Marty and Marry Jo Strussion. However, due to the acreage increase, caring for all 14 acres of vines by hand became something the entire family participated in.

A few years after harvesting his first grapes, Marty Strussion was influenced by other winery owners in the area to open his own winery, which was founded in 2004. So, Marty Strussion decided to vertically integrate downstream and begin producing wine from the grapes he grew in his own vineyards. The goal for the wineries in his area was

to have enough wineries to create a wine trail and draw people from metropolitan areas, such as St. Louis.

To this day, Cave Vineyard and Winery has seen a steady increase in its production and sales since it began, and produced approximately 1,600 cases of wine in 2011. Cave Vineyard and Winery has earned several rewards for its premium wines that are made from quality grapes.

Cave Vineyard and Winery Case Study

Currently, Cave Vineyard and Winery produces all of its wine from grapes. Moreover, the grapes used in the wine production process are estate grown grapes, which allows Marty Strussion to have maximum control over the production process of the fruit. Furthermore, Cave Vineyard and Winery offers custom crush services at their facilities for other wineries in the area, and Marty Strussion says that he wishes he could increase the volume of custom crush services, since he has additional available capacity.

Marty Strussion says he utilizes his current procurement strategy because having complete control over the production process is critical to the quality of the fruit, which is crucial to producing high quality wine. Another aspect that Marty Strussion sees as a benefit of estate grown grapes is a timely harvest and delivery schedule of the grapes because this impacts the quality of the grapes and ultimately the quality of the wine produced. In addition, another benefit of estate grown grapes, according to Marty Strussion, is clean fruit, as the labor and time costs of cleaning the fruit delivered by contract growers are high. In fact, according to Marty Strussion, "It is many times easier to make high quality wine with quality fruit, and that is why I grow my own grapes, so the crop is delivered when I need it and is clean."

Marty Strussion currently manages the vineyard and the winery; however, he has hired three individuals to work in the vineyards on a daily basis, so he can concentrate on winemaking. Nevertheless, even with these employees, Marty Strussion still hires a custom harvester to harvest his grapes, as harvest labor is expensive and difficult to find. Marty Strussion admits this does arrangement does not guarantee a timely harvest of his grapes, as his harvest schedule does not always match his harvester's. However, he still feels it is more cost effective and he gets more clean fruit from the mechanical harvester than from procuring the grapes via verbal contracts or manual harvesting.

Therefore, due to the lost quality from a custom harvester, Marty Strussion continues to seek ways to improve the harvesting process of his grapes. An example of improving the timeliness and quality of harvest that Marty Strussion is considering is purchasing his own mechanical harvester, so he can harvest his grapes at their peak, and custom harvest other vineyards in the area to help pay for the machine. However, Marty Strussion recognizes that he must have other vineyards committed to hiring him to harvest their vineyards, or it would not be cost efficient to purchase the harvester.

In the past, Marty Strussion purchased grapes via verbal handshake contracts, while his vineyards were still developing and when he wanted to produce wines from grapes that are not grown in his vineyards. However, the verbal contracts only specified the amount delivered and promised the grower that he/she would have a place to deliver his/her grapes. Therefore, there were no quality specifications or stipulations, so it was much like procuring grapes from the open market. To Marty Strussion, procuring grapes this way is a gamble and much like going to the open market, as he had no idea of the quality of fruit being delivered. In fact, the quality Marty Strussion received from

suppliers in the past was subpar, and he says it impacted the quality of wine he produced, which negatively impacted his winery.

When asked about a more binding verbal contract or even a written contract with growers, Marty Strussion says binding contracts are not customary in his area. Furthermore, Marty Strussion believes the growers in his area do not have enough experience to enter an agreement with several stipulations and quality standards. According to Marty Strussion, "The growers are hesitant to enter into these contracts because they do have the confidence that they can attain the quality standards stipulated in the contract." Furthermore, the growers may be afraid of entering into litigation with larger wineries if the contract is violated, as they would not have the money to pay for the legal fees, says Marty Strussion.

In the future, Marty Strussion would like to see binding, written contracts that force each party to deliver on their part of the contract, as this would help improve the quality of grapes received from contract growers. This is important to Marty Strussion because his winery is growing at a significant pace and he has the capacity at his winery to expand, but his vineyards cannot keep up. Marty Strussion states, "In the future, if the winery grows, I would be willing to buy grapes for a year or so to make sure the growth is sustainable, then I would grow the vineyard." Therefore, in order to assure quality grapes and maintain the quality of his wine, even as the winery grows, Marty Strussion sees it pertinent that he has at least binding verbal contracts with his growers but would much rather prefer written contracts.

When examining the relationship between vineyard size and minimum quality standards, Marty Strussion believes that a grower needs either a very small vineyard, so it

can be personally managed, or a large vineyard, to be able to afford the equipment necessary to increase the quality over multiple acres. Marty Strussion states that he would like to mechanize his vineyard. But even with 15 acres, his vineyard is still too small to afford the mechanization, which is why he is currently looking at purchasing a harvesting machine and custom harvesting other vineyards in his area. Marty Strussion relays that if he could do it over again, he would start the winery first and invest his money in equipment to produce quality wine and procure his grapes from contracts or the market, as he believes his winery is now carrying his vineyard. He understands he would have to give up some quality of his wine to purchase grapes rather than produce; however, Marty Strussion says his winery is carrying his vineyard from a profit standpoint, and the only reason he keeps his vineyard is because of the quality of the grapes.

Marty Strussion does not believe there is a relationship between winery size and the quality of wine, because every size of winery can produce good wine. There are things, according to Marty Strussion, that a small winery can do, such as spending more time to concentrate on the manual processes of producing wine. Marty Strussion states, "The small guy needs to be acceptable to the concept of making less money because they will have to use equipment that is not totally justifiable in their winery." However, the quality of the wine will improve due to better resources, which is the ultimate goal of a winery, says Marty Strussion. Furthermore, Marty Strussion recognizes that it is easier for larger wineries to produce higher quality wine because they can afford mechanized bottling systems, digital fermentation tanks and other equipment, which makes the winemaking process more consistent.

Cave Vineyard and Winery is a case of downstream, forward integration, where a vineyard vertically integrated and began producing wine. Cave Vineyard and Winery utilizes its current form of procurement strategy in order to control the quality of the grapes in the winemaking process because of the difficulty of procuring quality grapes from other sources and from the uncertainty surrounding the quality of the grapes received. Marty Strussions plans to continue to use the hierarchal form of procurement strategy because he feels controlling the quality of the fruit is critical to the success of his winery.

Chaumette Winery Mini Case Study

Chaumette Winery History

Before Hank Johnson began his endeavor into the grape and wine industry, he owned his own business in the commercial insurance industry, along with dabbling in aviation and real estate. However, Hank Johnson has always had a passion for viticulture, so he decided to plant his several acres of grapes in 1992 as a hobby. Hank Johnson began selling these grapes to wineries in his region; however, as he got closer to retirement and selling his commercial insurance business, Hank Johnson realized the potential to vertically integrate downstream into the winemaking.

In 2000, Hank Johnson licensed his winery, purchased the equipment and began making wine. However, according to Hank Johnson, “It didn’t take me very long to notice that making wine was a lot of work.” So, since Hank Johnson’s passion was truly in viticulture and the science of grape growing, he hired his first winemaker in 2001. Chaumette tasting room was opened in 2003, and has seen steady growth since its

opening. Chaumette Winery produced approximately 6,900 gallons of wine in 2011. Hank Johnson is very satisfied with his winery, and has grown beyond just the winery and vineyard to diversify his operation.

Chaumette Winery Case Study

Currently, Chaumette Winery uses only grapes as inputs to produce wine. Of the grapes used to produce its award winning wine, Chaumette Winery produces 85 percent of the grapes in estate vineyards. The remaining 15 percent of grapes are procured from verbal contracts (10 percent) and written contracts (5 percent). Hank Johnson does not procure any of the grape inputs from the open market because quality of the grape inputs is important to the quality of wine produced.

Hank Johnson trusts only people he knows very well to produce grapes for his winery. The verbal contract that is the source of 10 percent of Chaumette's grape provisions is produced by a past student and good friend of Hank Johnson. The verbal contract grower visits Hank Johnson's vineyard regularly and can be found working in the tasting room of Chaumette Winery quite regularly. Furthermore, the individual who Hank Johnson has a written contract with is another good friend. The reason for the written contract is because "he just wants to make sure that if I say I'm going to buy grapes from him, I will actually buy the grapes." According to Hank Johnson, there are several notorious stories of wineries refusing grapes from growers, and they just want to protect both parties." Moreover, when Hank Johnson sells grapes, he has written contracts with wineries.

Since Hank Johnson has great relationships with his two contract growers, he can fully trust them to produce high quality grapes for his winery. Furthermore, because both of these growers visit Chaumette Winery regularly, Hank Jonson can show them what management practices they need to follow. When it comes to harvesting the grapes, Hank Johnson tests the grapes of the contract growers, and he has the final say of what date the grapes are harvested, which is another way quality is controlled and scheduling is never an issue.

According to Hank Johnson, "Seventy-five percent of a glass of wine comes from the vineyard." This is why Hank Johnson believes in having as much control over the grape production process as possible. This control helps in implementing the type of vineyard management system that Hank Johnson believes is most effective in producing quality grapes. The system that Hank Johnson utilizes is the Dyson Ballerina Trellis, that allows three things: 1) wind to blow through the vines, so the fruit is not as susceptible to fungus and diseases; 2) leaves and fruit to be fully covered when sprayed; and 3) sunlight is able to strike the clusters. Furthermore, there are five things that Hank Johnson and his growers pay close attention to that impact the quality of the grapes: 1) floor management; 2) irrigation rate and management; 3) canopy management; 4) nutrition management; and 5) pest management. When these five things are controlled and the Dyson Ballerina trellis is utilized, Hank Johnson says you can truly grow grapes that produce high quality wine.

In the future, Hank Johnson does not plan to change his procurement strategies, as the quality of grapes is too important to the success of his winery. However, Hank Johnson admits that he will have to purchase more grapes this year, due to the negative effects of the weather on his vineyard. Nevertheless, Hank Johnson does not believe this

will largely impact his winery if it is just for this year, as he has saved grapes from past years in order to help combat against short years, such as this one.

When talking about his vineyard, Hank Johnson believes that the capitalization of the vineyard has a lot to do with the minimum quality standards and the size of the vineyard. According to Hank Johnson, "If you can afford to buy the equipment you need and hire the number of people necessary, then there is not impact on increasing size." Therefore, if you can afford the inputs and equipment, then you can maintain the high quality fruit. Hank Johnson believes this is the case in his 30-acre vineyard, as he has seen economies of scale as he has grown his operation over the years.

According to Hank Johnson, there are certain things some wineries have that others do not, which impact the ability for the winery to grow and produce quality wine. Hank Johnson believes equipment, such as chillers and tanks and being able to control the temperature over several steps in the production process are critically important to the success of a winery. Therefore, a winery must be able to afford these expensive pieces of equipment in order to truly have complete control over the production process of the wine. Hank Johnson relays that a winery them must more than likely grow its size in order for it to be able to economically afford the high-tech equipment to control all the variables in the wine production process.

Hierarchy Winery Summary

Based on the interviews of the wineries that fall under the hierarchy form of ownership, all wineries grow their grapes for the reason of quality control, as it is difficult to procure quality grapes from other sources, and to reduce the quality uncertainty of grapes procured from the market. The way quality is controlled in the

hierarchy wineries is through maintaining certain viticultural practices across all acres of grapes that are grown. Furthermore, hierarchal structured wineries are able to better control harvest of grapes as well as set a delivery schedule that meets the needs of the winery. In addition, another commonality of the three wineries that fall under the hierarchy form of ownership is that each winery was originally a grape producer and then vertically integrated downstream to produce wine. The reasons for downstream vertical integration include not being offered a fair price for the quality of the grapes, opportunity to make more money and an overall passion for wine.

5.5 – QUALITATIVE ANALYSIS SUMMARY AND CONCLUSION

This section summarizes the findings of the qualitative analysis, compares the findings across all forms of governance structures, and offers new determinants of vertical boundaries from different theories recognized from the qualitative analysis. When examining the wineries through a qualitative analysis, it was found that there were a multitude of reasons that each winery currently falls under certain procurement strategies; however, commonalities were found in between the wineries that fall under respective forms of governance.

First, wineries that fall under the market form of governance are younger wineries that are currently waiting on their vineyards to develop. These wineries are hesitant to enter into contracts with growers, as the winery owners do not know many quality grape growers in the area or exactly how many tons of grapes they will need in the wine production process. Furthermore, due to the fact that these wineries plan to move to estate

grown grapes in the near future, they do not want to enter in a contractual relationship with growers who are looking for a long-term commitment. The wineries currently under the market form of governance plan to shift more toward the hierarchal form of governance in order to control the quality of the product. Therefore, there is strong support for the MC theory from the market wineries, as it is difficult to procure quality grapes from the market. The TCE theory is also supported, as there is uncertainty surrounding the quality of the grapes procured from the market. Finally, the RBV theory has support, as these wineries plan to shift toward a more hierarchal form of governance as their experience increases, in order to increase the quality of the wine produced.

Wineries under the hybrid form of governance range and vary greatly in size and experience, which led to this governance strategy having the most varied responses of any of the three procurement forms examined. Nevertheless, there are still commonalities between the wineries that fall under this governance structure when choosing a grape procurement strategy. The main commonality was the desire to control the quality of the grapes procured, since the grapes have such a large effect on the quality of wine produced. Therefore, these wineries procured less grape provisions from the spot market than any other form of procurement. Furthermore, other reasons mentioned by a few wineries for a more hierarchal form of governance include timing of delivery, marketing advantages and growing grapes contract growers do not currently grow. Nevertheless, even as there were various reasons for their current governance strategies, it is the desire of every winery under the hybrid form of governance to move toward a more hierarchal form of governance structure; however, the strategies these wineries will utilize to attain this goal are varied.

From the hybrid form of governance, it was found that the MC theory was strongly supported from the standpoint of difficulty of procuring quality grapes and measuring the quality of the grapes procured from the market, which lead to a shift toward a more hierarchal governance structure. In addition, weak support was found for the TCE theory determinant of timing of delivery, as a few wineries cited this as a reason for vertical integration. Furthermore, RBV theory was supported, as the wineries plan to shift toward a more hierarchal form of governance as their experience increases, which will increase the quality of the wine produced by the wineries.

The wineries that fall under the hierarchy form of governance want complete control over the grape production process, as the quality of the wine is highly influenced by the quality of the grape inputs used to produce it. The most cited way that these wineries maintain quality is through a uniform production process, where all grape varieties receive the same viticultural and management practices. In addition, these wineries see a benefit from timeliness of deliveries as another reason they produce their own grapes. Therefore, there is strong support found for the MC theory from the standpoint of the difficulty of procuring quality grapes from the market. Weak support was found for the TCE theory, as timing of deliveries was cited as having a small impact on the decision to vertically integrate. Furthermore, there was strong support for the RBV theory, as hierarchal wineries plan to continue to control quality as their experience increases in order the produce a higher quality product.

Based on the results across all forms of governance strategies examined, this qualitative analysis found strong support for the MC theory and the RBV theory, while there was weak support for the TCE theory. The MC theory of vertical boundaries was

strongly supported, as wineries under all three forms of governance described a shift toward a more hierarchal form of governance, due to the difficulty of procuring quality grapes and measuring the quality of the grapes procured form the market. The RBV theory was supported form the reasoning of a dynamic evolution of strategy. Therefore, as the experience of the wineries increase over time, wineries will shift toward a more hierarchal form of governance in order to increase the quality of wine produced. Furthermore, RBV theory is supported in order to increase wine quality, rather than from the asset specificity determinants of the TCE theory, as past studies suggest.

In addition to the findings of vertical boundary determinants, the qualitative analysis also showed support that the direction of vertical integration matters. The three wineries that fall under the hierarchy form of governance structure started as grape producers and eventually vertically integrated downstream for various reasons. Therefore, these wineries have had complete control over the production process of the grapes from when their winery was established. The other wineries examined in the hybrid and market forms of procurement began as wineries and then have either vertically integrated or are going to vertically integrate upstream in order to control quality. This result gives support that the direction of vertical integration impacts the governance strategy that the winery will fall under. Understanding the importance of the direction of vertical integration *ex ante*, before the interviews were conducted, would have allowed for the development of questions that could better explore this facet of vertical integration.

CHAPTER 6 – COMPARISON OF QUANTITAVIE AND QUALITATIVE ANALYSES

This chapter compares the results of the quantitative and qualitative analyses. The focus of this chapter will not be on contrasting the results the two forms of analyses but rather on comparing and discussing how the two research methods complement each other and the difference in explanatory power of integrating both analyses compared to one research method alone. This chapter will examine the theories of TCE, MC, and RBV across both forms of analysis.

Transaction Cost Economics Theory Examination

In the quantitative analysis, strong support for the TCE theory was found across all three models for the variables "Physical Asset Specificity of the Winery", as it was statistically significant at the five percent level across all three cutoff models, and "Physical Asset Specificity of the Grapes", as it was statistically significant at the 10 percent level of the 70 percent cutoff model and at the five percent level of the 90 percent cutoff model. The other variables under the TCE theory examined in the quantitative analysis were "Dedicated Asset Specificity", "Timing of Deliveries", "Human Asset Specificity", "Environmental Uncertainty of Quantity", and "Environment Uncertainty of Quality". However, there was no support found for these variables in the quantitative analysis, as they were not statistically significant at any level in the three models. Nevertheless, the TCE vertical boundary theory was seen to be the theory with the most

explanatory power in the quantitative analysis compared to alternative theories of firm vertical boundaries.

When the TCE theory was examined in the qualitative analysis, there was weak support found. The only TCE theory variable mentioned by the wineries interviewed was the importance of the timing (scheduling) of deliveries, which was measured by "Timing" in the quantitative analysis. However, it was only mentioned by a few wineries as a challenge of their winery, and it was never viewed as a main reason for vertical integration. Therefore, there is essentially weak to no support for this variable or the TCE theory in the qualitative analysis.

Resource Based View Theory Examination

The RBV theory of vertical boundaries was examined by four variables in the quantitative analysis: "Experience", "Experience^2", "Production in Gallons", and "Quality of Wine". From these variables, it was found that "Experience" was the only RBV theory variable statistically significant at any level, and it was only significant at the 10 percent level in the 70 percent cutoff model. Therefore, overall, there was weak support for the RBV theory from the quantitative analysis.

Turning now to the qualitative analysis, it was found, across all three governance forms, that the dynamic evolution of procurement strategy was a strong reason for vertical integration. Based on the results of the qualitative analysis, across all three forms of governance, in the future, as the wineries experience an increase in age (measured as "Experience" in the quantitative analysis), there should be a shift toward a more hierarchal form of governance. The RBV theory qualitative results also suggest the shift

toward a more hierarchal form of governance would increase the quality of the grapes inputs, which should, according to the wineries interviewed, increase the quality of wine produced. Therefore, there is strong support found for the RBV theory of vertical boundaries in the qualitative analysis.

Measurement Cost Theory Examination

The MC theory of vertical boundaries was measured by difficulty of "Measuring Grape Quality" and the difficulty of procuring "Quality Grapes" from the market in the quantitative analysis. However, from the qualitative analysis, there was no support found for the MC theory, as there was no statistical significance at any level across all three models.

When the examining the MC theory from the qualitative analysis, there was strong support found across all three forms of governance strategy. First, wineries from all three procurement strategies cited that the difficulty of procuring quality grapes from the market is a main determinant of vertical integration. Second, another determinant from the MC theory that was found to have strong support in the qualitative analysis across all three forms of procurement was the difficulty of measuring the quality of grapes procured from the market. Therefore, based on the results of the qualitative analysis, the MC theory of vertical boundaries has the most explanatory power of the shift toward a more hierarchal form of governance.

Integration of Research Methods

Based on the results of the quantitative analysis, TCE had the most explanatory power, from the standpoint of Physical Asset Specificity; however, there was no support found for the MC or RBV theories of vertical boundaries. Therefore, only one theory was supported in the quantitative analysis, but it was only supported from one variable, and there were several other variables of the TCE theory examined that were not significant. The lack of support of this theory could be due to the fact that many winery owners compared the different forms of asset specificity directly to the wine industry instead of across other industries, which would have an impact on the results.

Conversely, the results of the qualitative analysis show that the MC theory has the most explanatory, while the RBV theory has strong support, too. However, there is weak support found for the TCE theory of vertical boundaries in the qualitative analysis – focused on the benefits of timely grape deliveries as a determinant of vertical integration. Therefore, two theories were supported from the qualitative analysis.

Recognizing the differences in the two methods of research is important for research in the future. Fernández-Olmos (2010) finds that there were variables beyond the TCE theory that could help better explain the model she used in her empirical analysis. This, too, was the case in this research, as this empirical model did not show significant support across multiple theories. Therefore, another research method was used to better understand the underlying determinants of vertical boundaries that were not captured in the quantitative analysis. However, the results of the qualitative component of this study did not show support for TCE, which is the most widely used vertical boundary theory in empirical analyses. Nevertheless, when the two research methods were

integrated, it was found that there was strong support for all three vertical boundary theories tested.

Overall, the results of this thesis suggest that the integration of theories that concentrate on just one method of research alone (quantitative analysis or qualitative analysis) does not offer the explanatory power that integrating multiple forms of research methods can. Therefore, this study finds that the highest explanatory power is achieved through the integration of different methods of research (quantitative analysis and qualitative analysis) and competing vertical boundary theories.

CHAPTER 7 – SUMMARY AND LIMITATIONS

To this day, there has been little research performed on the subject of vertical boundaries in emerging wine regions, integrating multiple vertical boundary theories, and integrating research methods. This study looks to add relevance to current theories of vertical boundaries through an integration of both competing vertical boundary theories and research methods.

Through the quantitative analysis, it was found that the TCE theory had the most explanatory power of any of the theories – in particular, the variables measuring "Physical Asset Specificity of the Winery" and "Physical Asset Specificity of the Grapes". The RBV theory of vertical boundaries showed weak support for the variable "Experience." The econometric analysis of the winery survey data showed no support for the other variables included in the empirical model. Furthermore, there was no support found for the MC theory of vertical boundaries in the quantitative analysis.

Conversely, the qualitative analysis provides strong support for the MC theory on the decision to vertically integrate based on the difficulty of procuring quality grapes from the market and the difficulty of measuring grape quality procured form the market. There was also support found for the RBV theory when looking at the dynamic evolution of grape procurement decisions, suggesting that as the winery ages, there is a shift toward more hierarchal forms of governance based on the importance of product quality. According to the wineries interviewed in the qualitative analysis, increased control of input (grape) quality resulting from vertical integration should lead to producing a higher

quality product (wine). However, there was no support found for the TCE vertical boundary theory in the qualitative analysis.

Based on the results of this study, there is strong support for integrating not only multiple, competing vertical boundary theories but also integrating multiple research methods – qualitative and quantitative. By integrating theories and research methods, this study found support for three competing theories of vertical boundaries – TCE, RBV, and MC theories. However, without integrating the theories or the research methods, there is less explanatory power in each standalone model.

There were several limitations of this study. First, there was a small sample size due to missing variables in the quantitative analysis. This might have impacted the results of the qualitative analysis, as the model was tested with certain variables removed and the sample size increased as a result. Another limitation of the quantitative analysis was the use of a less parsimonious model; however, this was done to better fit the data. . In addition, there are variables that are collinear by nature, which causes collinearity within the model. However, referring to Table 3 in Appendix C, the variables that are the most collinear are within the TCE theory. Therefore, there is an opportunity for future econometric work to test the model by removing the collinear variables; however, this was already done to an extent through step-wise integration of the variables in the model. Another limitation of this model is possible endogeneity. As Fernández-Olmos (2010) recognizes, there are often times endogeneity issues with cross-section data. An example of endogeneity within this specific model comes from the variable the quality of wine and the dependent variable governance structure, as both variables impact on one another. However, there was no other measure for quality within the data.

A key assumption of the vertical boundary theories used in the quantitative analysis state that when the firms are examined, each firm is in the optimum governance state at that time; however, because this study concentrates on wineries in emerging regions, these wineries are continuously changing governance structures. This adds another limitation to the study, as the theories are structured to explore firms that are not emerging; therefore, possible the results may not truly reflect what the theories look to capture. In addition, it was apparent that there might have been some misunderstandings regarding a few questions included in the winery survey instrument. These misunderstandings from the respondents might have introduced measurement errors in some of the explanatory variables of the quantitative analysis.

From the qualitative analysis, the limitations include the relatively small sample size and a bias from only interviewing wineries in Missouri, as the results from the qualitative analysis are only applicable to particular to the state of Missouri. However, the descriptive statistics of the wineries from the states of Michigan and New York are very similar those of the wineries in the state of Missouri when looking at the average age and the production of wine. In addition, there is a possible bias of the wineries interviewed, as they were not completely random; nevertheless, the interviews were done on the willingness to participate. Furthermore, there were other avenues to explore vertical boundary determinants through the qualitative analysis that were realized *ex post*, such as the importance of the path dependency and direction of vertical integration.

Beyond this study, there are several opportunities for further research on the subject of vertical boundary determinants of wineries in emerging regions. As the number of wineries in emerging regions continues to grow, this study can be of assistance to other

scholars studying the vertical boundary determinants of wineries. First, further research can be conducted as the experience of the wineries continues, which will help with the limitation of the continuous changing governance structures. Second, through the qualitative analysis, it was found that a large factor in the governance structure of firms was the path and direction of vertical integration; therefore, opportunity for further research exists. The findings of this study might be of interest to state winery boards in emerging regions as a learning tool and serve as a base for research of their own. Another contribution this study makes is showing how integrating multiple theories and research methods have more explanatory power than one theory or research method alone.

VITA

Jeromie Allen received his master's degree in agricultural economics from the University of Missouri in December 2012. Prior to his master's program, he completed his undergraduate degree with a major in agribusiness management, from the University of Missouri, graduating *Magna Cum Laude*. His research interests are in the areas of organizational structures of firms, managerial decision making, and entrepreneurship.

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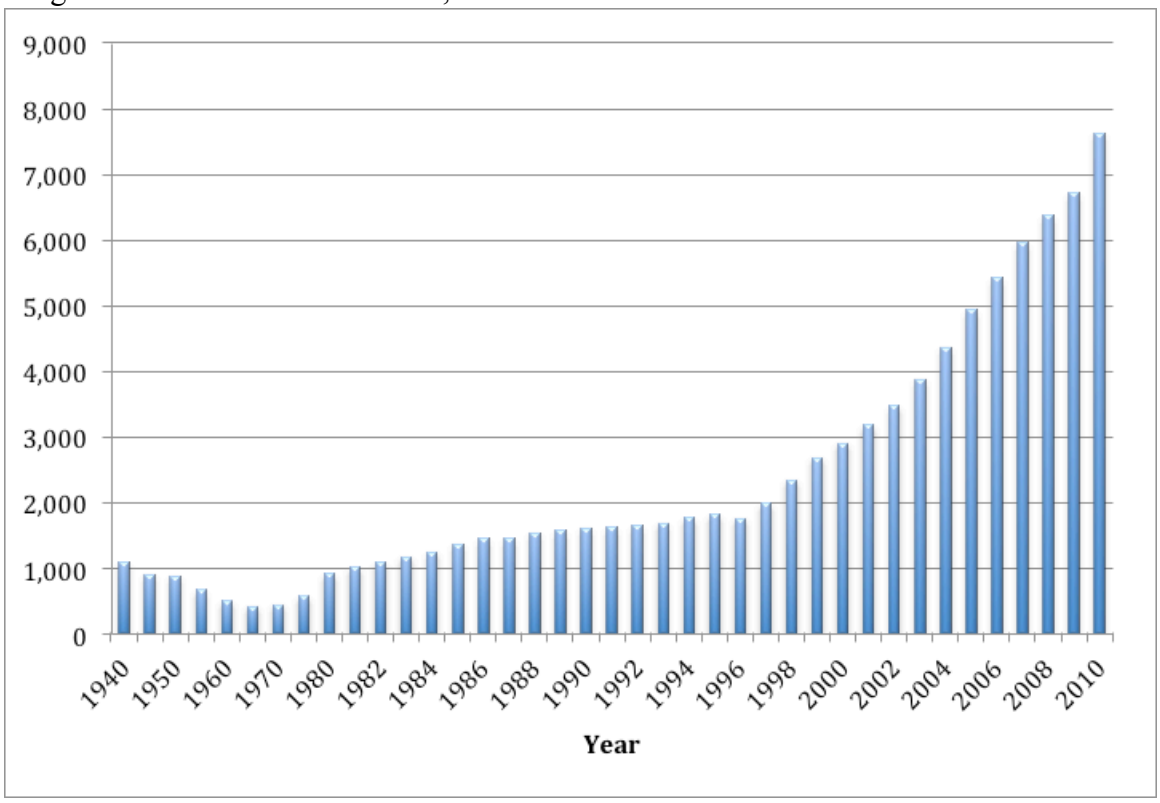
APPENDIX A

Appendix A contains a graph of the number of wineries in the United States (Figure 1) and a table listing the challenges of wineries in emerging regions (Table 1)

Figure 1. United States Wineries, 1940-2010



Source: US Tax and Trade Bureau

Figure 1 is a graphical representative of the number of wineries in the United States from 1940 to 2010.

Table 1. Challenges of Wineries in Emerging Regions			
Challenge	**Sample**	**Frequency**	**Weighted Total**
Marketing	Combined	46	103
	Missouri	16	39
Grape Production	Combined	32	77
	Missouri	12	27
Regulatory Issues	Combined	28	59
	Missouri	8	17
Finance	Combined	25	57
	Missouri	8	17
Winemaking	Combined	24	52
	Missouri	13	27
Managing the Winery	Combined	24	52
	Missouri	12	27
Labor Related Issues	Combined	18	31
	Missouri	7	11
Quality	Combined	11	16
	Missouri	6	7
Access to Resources	Combined	9	15
	Missouri	3	6
Other	Combined	5	9
	Missouri	0	0
Competition	Combined	6	8
	Missouri	4	6
Environmental Issues	Combined	2	3
	Missouri	1	2

Source: NCRCRD Survey Results

Table 1 shows the challenges wineries in emerging regions listed as their main challenges faced. Combined shows the total number of times that challenged was from the three states of Michigan, Missouri, and New York. Missouri shows the number of times the challenge was listed in Missouri alone.

APPENDIX B

Appendix B contains eight tables that show how variables, across several vertical boundary theories, have been measured in past empirical studies.

Table 1.

Determinant	Theory	Ho:	Measurement	Empirical Evidence
Resources, Capabilities and size of firm.	Resource Based View	Firm-Specific	**Poppo and Zenger (1998)**: Skill Set: to what degree does performing this function require personnel with extensive knowledge? (1-7 Likert). And Economies of Scale: to what degree do you have sufficient scale in your operations to perform this function efficiently in-house (1-7 Likert). **Fernández-Olmos *et al.***: Number of years the winery has participated in winemaking. **Fernández-Olmos *et al.***: Log of average capacity from 2002-2004. **Poppo and Zenger (1998)**: Log number of employees. **Anderson (1985):** Assets of the firm. **Leiblein and Miller (2003):** Sales of the firm. **Ohanian (1994):** Logarithm of capacity of the firm.	Poppo and Zenger (1998), Fernández-Olmos (2010), Fernández-Olmos *et al.* (2009a, 2009b, 2008), Anderson (1985), Leiblein and Miller (2003), and Ohanian (1994).

Table 2.

Determinant	Theory	Ho:	Measurement	Empirical Evidence
Difficulty of Measuring Product Quality and Quality Variability	Measurement Costs	+	**Poppo and Zenger (1998)**: To what degree is it difficult to measure the collective performance of those individuals who perform this function? (1-7 Likert). **Anderson and Schimittlein (1984):** Measurement difficulty index. **Fernández-Olmos *et al.***: "Indicates the degree of difficulty to evaluate the grower's effort in growing grape if there no exist supervision" (p. 293) (1-7 Likert). **Masters and Miles (2002)**: Difficulty of measuring the performance of a worker performing a firm-specific task. (1-7 Likert).	Poppo and Zenger (1998), and Anderson, Schmittlein (1984). Fernández-Olmos (2010), Fernández-Olmos *et al.* (2009a, 2009b, 2008), and Masters and Miles (2002).

Table 3.

Determinant	Theory	Ho:	Measurement	Empirical Evidence
Physical Asset Specificity	TCE	+	**Fernández-Olmos *et al.* Winery**: "Degree to which investments realized in the winery to elaborate wine cannot be redeployed to other activities" (p. 293) (1-7 Likert). **Fernández-Olmos *et al.* Grower**: "Degree to which the investments in viticulture realized by the grower (vineyard, machinery…) cannot be redeployed to other activities" (p. 293) (1-7 Likert). **Poppo and Zenger (1998)**: To what degree is approach custom-tailored to the company (1-7). **Monteverde and Teece (1982)**: Measure **complexity** by relative engineering effort needed for each product (1-10 Likert). **Masten (1984)**: Dummy, highly specialized: Three-way ranking system of an item's **complexity** (A-item = highest complexity and C-item = lowest complexity). **Masten *et al.* (1991)**: Ranking of the **complexity** of the component or task (1-10 Likert). **Masten *et al.* (1991)**: Degree to which facilities and equipment used in the production process are specific to this application (1-10 Likert). **Franken *et al.* (2009):** Five questions (p. 304)	Fernández-Olmos (2010), Fernández-Olmos *et al.* (2009a, 2009b, 2008), Monteverde and Teece (1982), Masten (1984), Masten *et al.* (1991), Poppo and Zenger (1998), and Franken *et al.* (2009).

Table 4.

Determinant	Theory	Ho:	Measurement	Empirical Evidence
Dedicated Asset Specificity	TCE	+	**Fernández-Olmos *et al.***: "If the transaction terminated prematurely, indicate the degree to which the assets which were assigned for the purpose of that transaction would result in significant excess capacity" (p. 293) (1-7 Likert). **González-Diaz *et al.* (2000)**: Index that examines products offered by the same firm. **Monteverde and Teece (1982)**: How specific is the part to the firm (Dummy variable). **Masten (1984):** If the item is used just by the aerospace industry (specialized) or used by other firms, too (standard).	Fernández-Olmos (2010), Fernández-Olmos *et al.* (2009a, 2009b, 2008), González-Diaz *et al.* (2000), Monteverde and Teece (1982), and Masten (1984).

Table 5.

Determinants	Theory	Ho:	Measurement	Empirical Evidence
Temporal Asset Specificity	TCE	+	**Masten *et al.* (1991)**: Importance of having the component or performing the task on schedule (1-10 Likert). **Nickerson and Silverman (2003):** Portion of Carrier's annual revenue derived from LTL (specialized) hauls. **Arruñada *et al.* (2004)**: Specialized Dummy for trucking freight.	Masten *et al.* (1991), Nickerson and Silverman (2003), Arruñada *et al.* (2004),
Site-specific Asset Specificity	TCE	+ -	**Franken *et al.* (2009)**: Five questions (p. 304). **Mondelli (2011)**: Greater distance between producer and processor (kilometers) less likely to see vertical integration. **Joskow (1987)**: Mine-Mouth Plant, Dummy Variable. **Masten (1984)**: Based on whether colocation and/or grouping of facilities or processes is important to the production process.	Franken *et al.*, Mondelli (2011), Masten (1984), Joskow (1987),

Table 6.

Determinants	Theory	Ho:	Measurement	Empirical Evidence
Human Asset Specificity	TCE	+ or -	**Poppo and Zenger (1998):** To what degree must one acquire company-specific or division-specific information to perform task? (1-7 Likert) **Masten *et al.* (1991):** Degree to which skills, knowledge or experience of workers is specific to this application (1-10 Likert). **Masten *et al.* (1991):** Ranking amount of engineer effort involved and index of relative labor/capital intensity of production process. (1-10 Likert). **Monteverde and Teece (1982)**: Complexity by ranking amount of engineering skills specific to transaction. (1-10 Likert). **Masters and Miles (2002):** Measure idiosyncratic firm-specific skills that employees must learn to be successful at their position. (1-7 Likert). **Franken *et al.* (2009):** Five questions	Poppo and Zenger (1998), Masten *et al.* (1991), Monteverde and Teece (1982), Masters and Miles (2002), and Franken *et al.* (2009).

Table 7.

Determinants	Theory	Ho:	Measurement	Empirical Evidence
Environmental Uncertainty	TCE	+	**Fernández-Olmos *et al.***: "Perception of environmental volatility, that is, the difficulty to predict the exact production of grape that will be obtained taking into account the numerous contingencies that may arise during the grape productive lifecycle" (p. 293) (1-7 Likert) and interaction between dummy variable coded based on the answers to asset specificity questions. **Poppo and Zenger (1998)**: (Technology) Skills rapidly changing and technology rapidly changing (1-7 Likert).	Fernández-Olmos (2010), Fernández-Olmos *et al.* (2009a, 2009b, 2008) and Poppo and Zenger (1998)
Behavioral Uncertainty	TCE	+	**Fernández-Olmos *et al.***: "Indicates the degree of difficulty to evaluate the grower's effort in growing grape if there no exist supervision" (p. 293) (1-7 Likert). **Masters and Miles (2002)**: Difficulty of measuring the performance of a worker performing a firm-specific task. (1-7 Likert). **Poppo and Zenger (1998)**: To what degree is it difficult to measure the collective performance of those individuals who perform this function? (1-7 Likert).	Fernández-Olmos (2010), Fernández-Olmos *et al.* (2009a, 2009b, 2008), Masters and Miles (2002), and Poppo and Zenger (1998).
Frequency	TCE	+	**Mondelli (2011):** Number of transactions between producer and processor over one-year period. **Masters and Miles (2002)**: Degree of repetition entailed by workers performing a firm specific task (1-7 Likert).	Mondelli (2011), Masters and Miles (2002),

Table 8.

Determinant	Theory	Ho:	Measurement	Empirical Evidence
Differentiation and Quality of Final Product	Resource Based View	+	**Fernández-Olmos *et al.***: Similar to Coles and Hesterly (1998) Rioja DOCa wines were divided into three categories by percent of wines at each winery. Dummy variables were used. **Coles and Hesterly (1988a and 1988b):** Dummy variable on outsourcing hospital services based on importance and differentiation of services.	Fernández-Olmos (2010), Fernández-Olmos *et al.* (2009a, 2009b, 2008), and Coles and Hesterly (1988a and 1988b)

APPENDIX C

Appendix C contains the questions used in the survey of the quantitative analysis (Table 1), variable explanations and expected impact on vertical integration (Table 2), descriptive statistics (Table 3), a map of Missouri respondents (Figure 1), governance continuum of Missouri respondents (Figure 2), binary logit results (Table 4), and average partial effects of the logit model (Table 5).

Table 1. Quantitative Survey Questions

Label	Variable	Question
Exp	Age of Winery	In what year did your winery obtain its winemaking license?
Exp^2	Age of Winery Squared	Square answer to above question.
Size	Gallons Produced	What was your total wine production in 2011?
MsrQlty	Measure Grape Quality	I can easily and accurately measure all quality attributes of grapes used in winemaking. (1-7 Likert Scale)
QltyGrapes	Procure Quality Grapes	It is easy to procure grapes of adequate quality in the market. (1-7 Likert Scale)
PASW	Physical Asset Specificity of Winery	Indicate the degree to which physical investments made in the winery (winemaking facilities and equipment) can be redeployed to other uses. (1-7 Likert Scale)
PASWG	Physical Asset Specificity of Grapes	Indicate the degree to which physical investments made to produce grapes (vineyard, equipment, and machinery) can be redeployed to other uses. (1-7 Likert Scale)
DAS	Dedicated Asset Specificity	If the transaction between your winery and your main grape supplier ceased unexpectedly, to what degree could the assets dedicated to that specific transaction be redeployed to other uses? (1-7 Likert Scale)
Timing	Temporal Asset Specificity	To what degree is timing of grape deliveries (i.e., having access to grapes on a certain schedule) important to the profitability of your winery? (1-7 Likert Scale)
HAS	Human Asset Specificity	To what degree has your relationship with your main grape supplier become important to the profitability of your winery? (1-7 Likert Scale)
EUQuant and EUQual	Environmental Uncertainty of Quantity and Quality	Indicate the degree of uncertainty you face with respect to grape yields (and thus quantity of grapes available to winemaking) from year to year. (1-7 Likert Scale) Indicate the degree of uncertainty you face with respect to grape quality available to winemaking from year to year. (1-7 Likert Scale)
Qual	Quality of Wine	Has your winery received any awards from: 1) Wine Competitions, 2) Trade Press, and 3) Other Sources?

Table 2. Description of Variables			
Label	**Variable**	**Description**	**Expected Sign**
Exp	Age of Winery	This variable correlates with the RBV of vertical boundary theory, and is measured as the individual winery's age from the year it received its license.	+
Exp^2	Age of Winery Squared	This variable is measured by squaring the age of the winery from the year it received its license.	-
Size	Gallons Produced	This variable correlates with RBV of vertical boundary theory, and is measured by its 2011 production of wine, in gallons.	-
MsrQlty	Measure Grape Quality	This variable is a part of the MC vertical boundary theory. This determinant is measured on a seven-point Likert scale. Wineries were asked if they can easily and accurately measure all quality attributes of grapes used in winemaking, with one strongly agreeing it is easy to measure quality attributes and seven strongly disagreeing it is easy to measure quality attributes.	+
QltyGrapes	Procure Quality Grapes	This variable is a part of the MC vertical boundary theory. This variable is measured by a seven-point Likert scale ranking of the ease of procuring quality grapes from the spot market in the winery's region, with one strongly agreeing that it is easy to procure quality grapes and seven strongly disagreeing that is it easy to procure quality grapes from the market.	+
PASW	Physical Asset Specificity of Winery	This variable is a part of the TCE vertical boundary theory. Winery Physical Asset Specificity is measured by the degree to which physical investments in the winery (property, plant, and equipment) cannot be redeployed to other uses. This is measured on a seven point Likert scale, with one being easily redeployed without cost and seven being not easily redeployed without cost.	+
PASWG	Physical Asset Specificity of Grapes	This variable is a part of the TCE vertical boundary theory. Grape Production Physical Asset Specificity is measured by the degree to which physical investments made to produce grapes (vineyard, equipment, and machinery) cannot easily be redeployed to other uses. This is measured on a seven point Likert scale, with one being easily redeployed without cost and seven being not easily redeployed without cost.	+
DAS	Dedicated Asset Specificity	This variable is a part of the TCE vertical boundary theory. This variable is measured by the following question: if the transaction between your winery and your main grape supplier ceased prematurely, to what degree could the assets specific to that transaction be easily redeployed to other uses? A seven-point Likert scale was used for the response levels, with one representing easily redeployed without cost and seven representing not easily redeployed without cost.	+
Timing	Temporal Asset Specificity	This variable is a part of the TCE vertical boundary theory. It is measured by the degree that timing of grape deliveries (i.e., having access to grapes on a certain schedule) is important to the efficiency of the winemaking process. A seven-point Likert scale is used for the response levels, with one meaning not important to profitability and seven meaning very important to profitability.	+

Table 2. Continued Description of Variables			
Label	**Variable**	**Description**	**Expected Sign**
HAS	Human Asset Specificity	This variable is a part of the TCE vertical boundary theory. It is measured as the degree that a winery's relationship with the main grape supplier has become important, in terms of experience, knowledge, and viticultural practices to the efficiency of the winemaking process. A seven-point Likert scale is used to answer this question, with one corresponding to not important at all and seven corresponding with extremely important.	+
EUQuant and EUQual	Environmental Uncertainty of Quantity and Quality	This variable is a part of the TCE vertical boundary theory. There are two measures of Environmental Uncertainty used in this study – Production and Quality. First, Environmental Uncertainty of Production examines the degree of uncertainty about grape production and yields, considering the effects of Mother Nature (weather, pests, etc.) during the production cycle of the vineyard. Second, Environmental Uncertainty of Quality examines the degree of uncertainty about grape quality considering the effects of Mother Nature, during the production cycle of the vineyard. Both variables are measured using a seven-point Likert scale, with one corresponding to no uncertainty at all and seven corresponding to extremely high uncertainty.	+
Qual	Quality of Wine	This variable is a part of the RBV vertical boundary theory. This variable is measured by summing to together the three categories of wine awards asked about in the survey and then dividing by three to get the average of the awards the winery received.	+

Table 3. Descriptive Statistics and Correlation Matrix

	Mean	Median	St. Dev.	Age	Age2	ProdGal	QltyGrapes	MsrQlty	PASW	PASG	DAS	Timing	HAS	eQuant	eQual	Qual
Exp	39.325	6	229.218	1												
Experience2	54099	36	418849	0.999***	1											
ProdGal	15268	3567	44011	-0.002	-0.038	1										
QltyGrapes	3.687	3	1.944	-0.150	-0.151	0.017	1									
MsrQlty	4.009	4	1.656	-0.086	-0.083	-0.027	0.549***	1								
PASW	4.848	5	1.661	-0.103	-0.110	0.140	0.121	-0.003	1							
PASG	4.604	5	1.723	-0.126	-0.125	0.055	0.204**	0.106	0.653***	1						
DAS	3.500	3	1.899	0.080	0.076	0.122	0.177*	0.197	0.253**	0.328***	1					
Timing	4.695	5	2.034	-0.079	-0.085	0.014	0.177*	0.122	0.148	-0.024	0.056	1				
HAS	4.871	6	2.028	-0.095	-0.096	-0.005	0.180*	0.129	0.212**	0.047	0.172*	0.603***	1			
EUQuant	3.435	4	2.470	-0.072	-0.073	0.021	0.110	0.033	0.146	0.140	0.418***	0.347***	0.493***	1		
EUQual	3.194	4	2.412	-0.010	-0.009	-0.050	0.177*	0.038	0.123	0.171*	0.388***	0.373***	0.441***	0.878***	1	
Qual	0.511	0.333	0.397	-0.044	-0.058	0.225**	-0.011	-0.039	0.030	0.031	-0.040	0.029	0.173*	0.028	-0.036	1

Significance: *=10% level, **=5% level, and ***=1% level

Figure 1. Missouri Wineries – Respondents and Non-Respondents

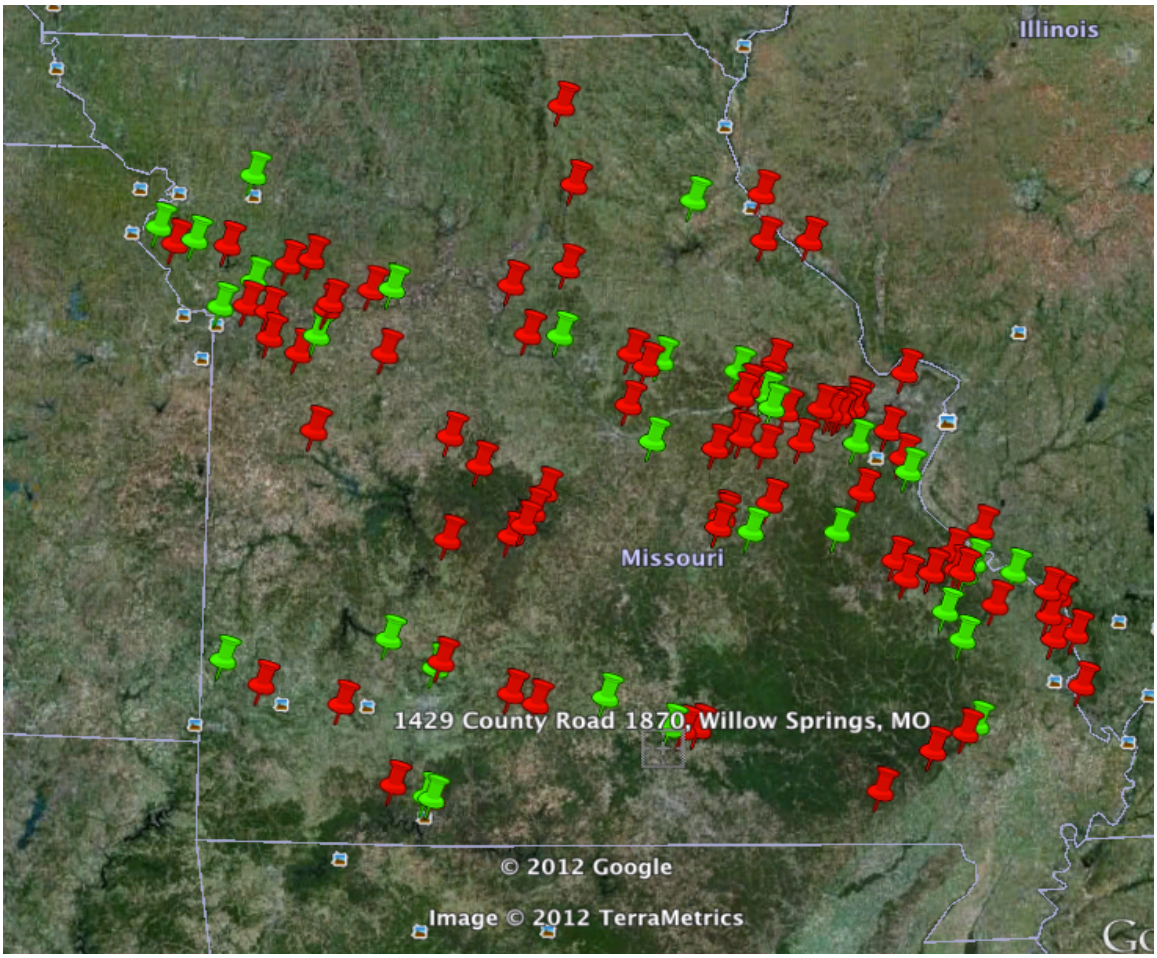


Figure 1 shows a map of Missouri wineries represented by pin across the state of Missouri. The lighter colored pins represent the wineries that responded to the survey and the dark pins represent the wineries that did not respond to the survey.

Figure 2. Missouri Winery Governance Structure Continuum of Respondents

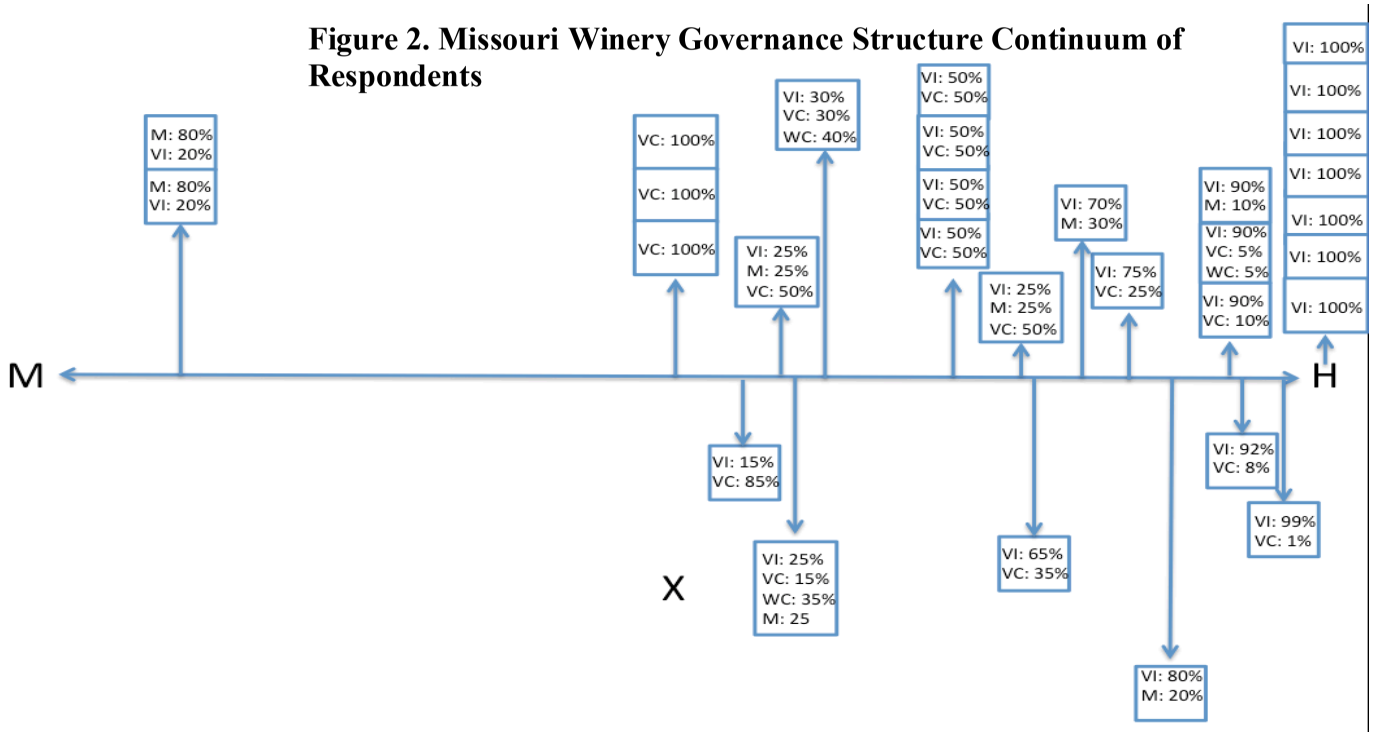


Figure 2, M represents wineries that fail under or near the Market form of governance H represents the wineries that fall under or near the Hierarchy form of governance, and X represents the hybrid forms of governance that exist between the two polar governance structures. Within the boxes, M represents Market; VC represents verbal contracts; WC represents Written contracts; and VI represents Vertical Integration.

Table 4. Binary Logit Results						
	70 % Cutoff Logit Results		80% Cutoff Logit Results		90% Cutoff Logit Results	
Parameter	Estimate	Pr > ChiSq	Estimate	Pr > ChiSq	Estimate	Pr > ChiSq
Intercept	-1.1659	0.4028	-1.2788	0.4262	-1.1875	0.481
Experience	0.1109*	0.0667	0.0856	0.2451	0.0931	0.2423
Experience2	-0.00006*	0.0671	-0.00005	0.2481	-0.00005	0.2449
ProdGal	-0.0001*	0.0916	-0.00014	0.1169	-0.00016	0.1176
QltyGrapes	-0.2654	0.2938	-0.0512	0.8558	-0.0709	0.8184
MsrQlty	0.0577	0.815	0.00732	0.9793	0.1166	0.6981
PASW	0.6835**	0.014	0.6611**	0.0307	0.7063**	0.0301
PASG	-0.5494*	0.0536	-0.4859	0.1014	-0.7192**	0.0336
DAS	0.2546	0.2036	0.0865	0.6879	0.1568	0.5125
Timing	0.0853	0.6556	0.0648	0.7485	0.0868	0.6859
HAS	-0.2714	0.1712	-0.2642	0.2045	-0.3228	0.1363
EUQuantity	0.2519	0.3703	0.0461	0.8895	0.0724	0.8421
EUQuality	-0.2585	0.3274	-0.1016	0.7358	-0.1277	0.6996
Quality	-0.3235	0.7199	-0.0108	0.9915	0.1075	0.9208
Significance: *=10%; **=5%; and ***=1%						

Table 5. Average Partial Effects of the Binary Logit Model							
	Hierarchy Average Partial Effects				Market Average Partial Effects		
Label	70% Cutoff	80% Cutoff	90% Cutoff		70% Cutoff	80% Cutoff	90% Cutoff
Age	0.0170117*	0.0113148	0.0109948		-0.0170117*	-0.0113148	-0.0109948
Age2	-0.0000092*	-0.0000062	-0.00000599		0.0000092*	0.0000062	0.00000599
ProdGal	-0.0000151*	-0.0000190	-0.000018446		0.0000151*	0.0000190	0.000018446
QltyGrapes	-0.0399452	-0.0067671	-0.0083356		0.0399452	0.0067671	0.0083356
MsrQlty	0.0086864	0.000967691	0.0137029		-0.0086864	-0.000967691	-0.0137029
PASW	0.1028756**	0.0873556**	0.0829909**		-0.1028756**	-0.0873556**	-0.0829909**
PASG	-0.0826917*	-0.0642049	-0.0845011**		0.0826917*	0.0642049	0.0845011**
DAS	0.0383152	0.011435	0.0184273		-0.0383152	-0.011435	-0.0184273
Timing	0.0128353	0.0085582	0.0101927		-0.0128353	-0.0085582	-0.0101927
HAS	-0.0408506	-0.0349133	-0.0379285		0.0408506	0.0349133	0.0379285
EQuant	0.0379101	0.0060865	0.0085051		-0.0379101	-0.0060865	-0.0085051
EQual	-0.0389120	-0.0134255	-0.0150072		0.0389120	0.0134255	0.0150072
Quality	-0.0486931	-0.0014217	0.0126304		0.0486931	0.0014217	-0.0126304
Significance: *=10%; **=5%; and ***=1%							

APPENDIX D

Appendix D contains a table describing the wineries interviewed and the questions used to examine the wineries interviewed in the qualitative chapter of this thesis.

Table 1. Qualitative Winery Case Study - Wineries Interviewed

Winery Name	Location	Year Founded	Winery Size	Governance Structure	Interviewee and Position	Date of Interview
Ladoga Ridge Winery	Smithville, MO	2011	395 Gallons	Market	Galen Haddock, Owner	3/28/12
Riverwood Winery	Weston, MO	2009	728 Gallons	Market	David Naatz, Owner	3/28/12
Les Bourgeois Winery	Roachport, MO	1985	105,000 Cases	Hybrid	Cory Bomgaars, Head Winemaker	3/13/12
Windy Wine Company	Osborn, MO	2011	2,500 Gallons	Hybrid	Kraig Keesaman, Owner	3/26/12
St. James Winery	St. James, MO	1970	200,000 Cases	Hybrid	Peter Hofherr, CEO	4/11/12
Cooper's Oak Winery	Higbee, MO	2008	1,900 Gallons	Hybrid	Charlie Hargis, Sales Manager	3/26/12
Stone Hill Winery	Hermann, MO	1965	214,000 Gallons	Hybrid	John Held, CEO	4/27/12
Baltimore Bend Winery	Waiverly, MO	2003	4,500 Cases	Hierarchy	Sarah Schmidt, Owner	4/13/12
Cave Vineyard and Winery	Ste. Genevieve, MO	2004	1,600 Cases	Hierarchy	Marty Strussion	7/12/12
Chaumette Vineyard and Winery	Ste. Genevieve, MO	2000	6,900 Gallons	Hierarchy	Hank Johnson	7/13/12

Qualitative Analysis Questions

Market Governance Structure Questions

	YES	NO	Percentage of total wine volume produced from…
Grapes			%
Grape juice			%
Bulk wine			%
Other: _____ (please specify)			%
Sum of all main inputs used to produce wine (as % of wine volume)			100%

What percentage of grapes do you currently:
Produce in your own vineyards (estate grown)? _____%
Acquire in spot/cash markets as needed? _____%
Procure via verbal (handshake) contract? _____%
Procure via written contract? _____%

Sum: 100%

Why did you decide to procure your grapes from the market instead of utilizing other procurement strategies?

Have you used different procurement strategies in the past? If so, what made you decide to move away from that/those strategy/strategies?

Can you explain how the uncertainty surrounding the quality of the grapes procured from the market impact the decisions you make in your winery?

How does asymmetric information of grape quality between your winery and the market supplier impact your winery?

How does the quality of grapes you use in the winemaking process impact the final quality of the your wine and your winery?

How does asymmetric information of grape quantity between your winery and the market supplier impact your winery?

Do you plan to move toward other forms of procurement strategies in the future (e.g., Contracts, Hierarchy)?

If so, why would you move away from your current strategies?
If so, what steps will you take and what resources do you need to get there?

Do you believe there is any relationship between size of your winery that affords minimum quality standards of your wine?

Hybrid Governance Structure Questions

	YES	NO	Percentage of total wine volume produced from…
Grapes			%
Grape juice			%
Bulk wine			%
Other: _____ (please specify)			%
Sum of all main inputs used to produce wine (as % of wine volume)			100%

What percentage of grapes do you currently:
Produce in your own vineyards (estate grown)? _____%
Acquire in spot/cash markets as needed? _____%
Procure via verbal (handshake) contract? _____%
Procure via written contract? _____%

Sum: 100%

Can you explain why you chose to use a combination of grape procurement strategies instead of utilizing just one form of procurement strategy?
OR (Depending whether they use a combination of strategies or just contracts)
Can you explain why you chose to utilize contracts as your main source of grape procurement strategies instead of other forms of procurement?

Can you explain the different types of contracts you have with your suppliers (Market/ Production)?

How do you choose among different types of contracts (Forma/Informal)?

What factors do you take into consideration when choosing contract types?

How do different contract types impact the quality of the grapes you receive from your different suppliers?

Do you have different quality control standards that differ between growers and by varieties? If yes: Could you please explain each type of quality control standard you have and why they differ across grower?

How much time does your winery spend in the vineyards of your grape suppliers?

How does scheduling delivery times for your contract growers impact your winery?

Have you used different procurement strategies in the past? If so, what made you decide to move away from that/those strategy/strategies?

If you utilize lease contracts with vineyards in your area, how does the quality of the grapes produced from these vineyards differ from the vineyards you have marketing contacts with?

Can you describe how the quality of grapes you use in the winemaking process impact the final quality of the your wine and the success of your winery?

Do you use the grapes you grow in your own property or have most control over in the production process (e.g., leased vineyard) to produce your highest quality wine?

Do you plan to utilize other forms of procurement strategies or move more towards just one certain type of procurement strategy in the future?

If so, why would you move away from your current strategies?

If so, what steps will you take and what resources do you need to get there?

If VI some grape production ask:
Did you originally start as a winery, then VI upstream into grape production? Why?
OR
Did you originally start as a grape producer, then VI downstream into wine production? Why?

Do you believe there is any relationship between size of your vineyard that affords minimum quality standards in grape production? Why?

Do you believe there is any relationship between size of your winery that affords minimum quality standards of your wine?

Hierarchy Governance Structure Questions

	YES	NO	Percentage of total wine volume produced from…
Grapes			%
Grape juice			%
Bulk wine			%
Other: _____ (please specify)			%
Sum of all main inputs used to produce wine (as % of wine volume)			100%

What percentage of grapes do you currently:
Produce in your own vineyards (estate grown)? _____%
Acquire in spot/cash markets as needed? _____%
Procure via verbal (handshake) contract? _____%
Procure via written contract? _____%

Why did you decide to grow your grapes instead of utilizing other procurement strategies?

Have you used different procurement strategies in the past? If so, what made you decide to move away from that/those strategy/strategies?

Can you explain how growing your own grape provisions has impacted your winery compared to other forms of procurement?

Can you describe how the quality of grapes you use in the winemaking process impact the final quality of the your wine and the success of your winery?

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Do you plan to move toward other forms of procurement strategies in the future (e.g., Contracts, Market)?

If so, why would you move away from your current strategies?
If so, what steps will you take and what resources do you need to get there?

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