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What Adds Value in Specialty Coffee? Managerial Implications from Hedonic Price Analysis of Central and South American E-Auctions

M. Laura Donnet[a]ⓘ, Dave D. Weatherspoon[b], and John P. Hoehn[c]

[a] *Ph.D. Candidate, Agricultural Economics, Michigan State University, 108 Cook Hall, East Lansing, MI 48824, USA.*
[b] *Associate Professor, Agricultural Economics, Michigan State University, 213C Agriculture Hall, East Lansing, MI 48824, USA*
[c] *Professor, Agricultural Economics and Natural Resource Economics, Michigan State University, 301A Agriculture Hall, East Lansing, MI 48824, USA.*

Abstract

We analyze price and quality information at the procurement level in the specialty coffee supply chain using data from small and large volume e-auctions. Hedonic price equations reveal that the Cup of Excellence auction is a more differentiated market disclosing more information about coffee values associated with ratings, rankings, quantities available, and country reputations whereas information in the Q auction is more limited and tends to be remunerated to a lesser extent. These results indicate that there are different business models and valuation of product characteristics within the specialty coffee industry. Management implications are drawn for specialty coffee producers and roasters.

Keywords: specialty coffee, e-auctions, hedonic analysis, business models

ⓘCorresponding author: Tel: + 517-355-1070
Email: donnetma@msu.edu
Other contact information: D.Weatherspoon: weathe42@msu.edu
J. Hoehn: hoehn@msu.edu

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Introduction

Specialty coffee is the revitalization of the art of cultivating, roasting, preparing and enjoying a beverage of superior aroma and flavor. Specialty coffees are those made of the highest quality coffee beans, properly roasted and brewed, for the displaying of their greatest flavor[1] potential. Specialty coffee is a growing market segment in an otherwise declining industry (Figure 1). The business model of mainstream coffee firms is partly responsible for the downward spiral of coffee consumption and loss of market share to other beverages from the early 1960s to the early 2000s (Ponte 2001). New ways of consuming coffee that focus on quality, differentiation and value-adding coffee characteristics have created a specialty coffee market segment that has grown dramatically since its formative years in the 1980s (Roseberry, 1996; Ponte, 2001). Consistent with a general trend in food upgrading and an increasing interest in a lifestyle of enjoying and appreciating fine foods and beverages, people are consuming less coffee in terms of physical quantities but more coffee of higher quality and value. The specialty coffee market is becoming the new wine of the food industry, with record prices paid for "Limited Editions" and "Roaster's Reserve" coffees (Davids, 2006). The marketing strategies for this product are based on enhancing the product's appeal to consumers' hedonistic values of aesthetic cognition, traveling through taste and connection with the *terroir*[2] (Roseberry, 1996: Daviron and Ponte, 2005).

A coffee's potential for flavor and aroma resides in the precursor compounds in the green coffee beans (Davids, 2002; Arvidson, 2003; Mabbett, 2006). Therefore, the procurement of high quality coffee beans is a crucial activity in achieving the strategic objectives of specialty coffee firms. To capture the value offered in the specialty market segment, high quality coffees are often associated with and named after their places of origin, such as Jamaican Blue Mountain, Hawaiian Kona and Kenyan AA. The potential for growth in the specialty coffee industry requires increasing quantities of high quality coffee supplies. To achieve the potential for growth, specialty coffee firms are expanding their procurement from the broad diversity of production areas.

[1] This definition is from Don Holly, "The Definition of Specialty Coffee," http://kaffee.netfirms.com/Coffee/ SCAASpecCofDef.html. This definition emphasizes that specialty coffee stands for an outstanding product quality (aroma and flavor) and does not include coffees that focus on process attributes such as organic, fair-trade, and bird-friendly. This definition is increasingly being accepted in the industry.

2 Terroir refers to a group of vineyards (or even vines) from the same region, belonging to a specific appellation, and sharing the same type of soil, weather conditions, grapes and wine making techniques, which contribute to give its specific personality to the wine.

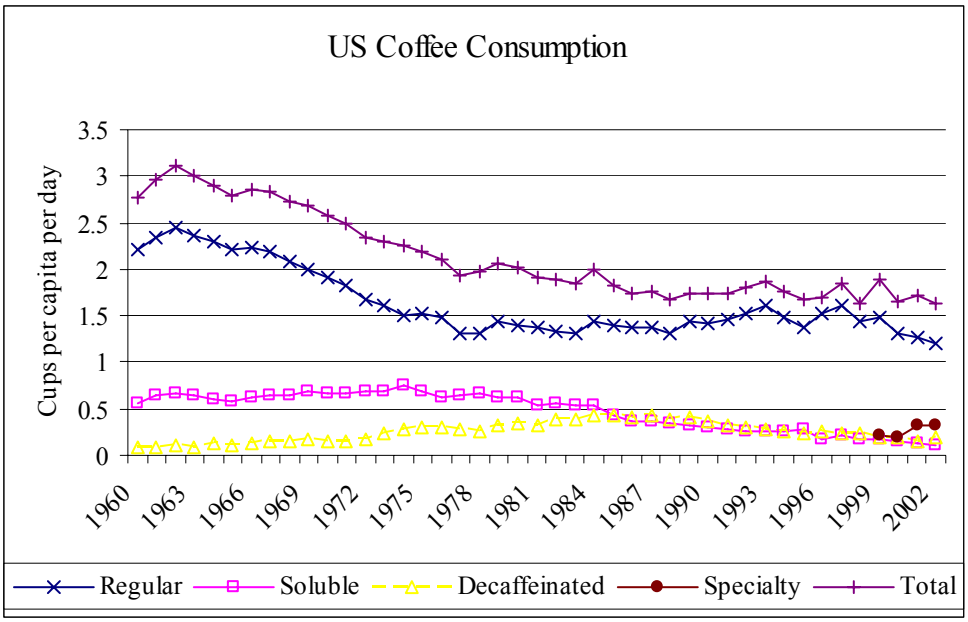

Figure 1: U.S. per Capita Coffee Consumption. Source: Foreign Agricultural Service (2002)

Specialty coffee e-auctions have emerged as an innovative system for discovering, promoting and trading high quality coffee beans from new coffee sources (United Nations, 2003). Competitive e-auctions are market-based systems of trading coffee. E-auctions offer a low cost means for producers and buyers to interact, price, and, more importantly, reveal the values associated with alternative combinations of coffee qualities and coffee attributes (Ponte, 2002). While some industry people argue that the volumes traded in e-auctions are too small to reveal much about values in the broader specialty market (Knox, 2006), competition-auctions provide market exposure to previously unknown coffee origins and producers. Such exposure stimulates traders' interests in other coffees featuring similar characteristics (Ganes-Chase, 2006). Specialty coffee auctions bring together relatively large numbers of producers and buyers and reveal market values and other transaction information to all parties that participate in an auction. Thus, in contrast to one-to-one trading between a producer and seller, all participants in an auction market gain access to the value and transaction information generated by e-auctions. Such access to information reduces information asymmetries across market participants (Ponte, 2002; United Nations, 2003). Quality and price information disclosed by the competition and auction process should be viewed as a strategic instrument of supply chain coordination (Ponte, 2002) as they improve producers and buyers' understanding of products and market opportunities thus changing their informational and decision making roles as managers.

Specialty coffee e-auctions consist of both a cupping competition and internet auction. In the competition the coffees are cupped and rated according to their

quality on a 100-point scale. Quality ratings as well as coffee samples and production information are made available to potential buyers prior to the date of an e-auction. Once the rating, production information, and samples have been distributed to potential buyers, coffees are sold during an online auction that takes place on a specific date. There are two types of competitive e-auctions for coffee. One is the 'boutique' auction, in which small lots that average approximately 20 bags are traded. Coffees are evaluated by a jury of expert tasters who have an interest in procuring the specialty coffee. These auctions provide broad exposure to growers and give them an opportunity to showcase their high quality coffees. Such exposure tends to stimulate buyers' interests in coffees featuring similar attributes, leading to additional purchases and higher prices outside of a particular e-auction market, thus having a multiplying effect (Ganes-Chase, 2006). The other type of e-auction features much larger volumes of coffee. In large volume e-auctions, lots are measured in terms of the volume of a standard shipping container. Large volume e-auctions offer less information about traded coffees, since the uniqueness of a particular production location and a particular coffee variety can be lost in the mixing required to achieve a minimum lot size. Large volume e-auctions do offer the critical taste rating system based on the same 100-point scale as used in small volume e-auctions.

This paper analyzes the coffee attributes that add value in specialty coffees at the procurement level in the supply chain by estimating hedonic price equations for the two types of e-auctions. By examining what makes specialty coffees different from the commodity coffees and different among themselves we compare the mainstream and specialty business models and synthesize implications for supply chain managers. The analysis extends previous work on hedonic price analysis of specialty coffees by Donnet et al. (2007). In the previous paper, the authors analyzed the hedonic prices of coffees traded in small volume auctions. The approach of this paper is to compares value estimates from small volume e-auctions with estimates obtained from large volume e-auctions. Donnet et al. 2007 established the definition of specialty coffee attributes and distinguished between sensory and reputation attributes. This paper extends that work by contributing to the understanding of the role of e-auctions in disclosing information and creating value for the industry. We argue that specialty coffee auctions provide critical information for supply chain participants; information that can support improved decisions regarding product differentiation, resource allocation and marketing strategies within a new business model.

The paper is organized in the following manner. The next section presents a discussion of specialty and mainstream coffee business models. The third section provides a business model framework for accommodating managerial implications from hedonic price analysis along with examples from previous hedonic studies in wine. In the fourth section, we explain the empirical strategy. In the fifth and final sections, we present results and conclusion.

Specialty Coffee Business Models

A business model is a description of the value a company offers to one or several segments of customers and of the infrastructure of the firm for creating and delivering value to generate sustainable profits (Osterwalder et al., 2005). Table 1 presents a comparison of business models in mainstream and specialty coffee firms. The business model of mainstream coffee firms consists of delivering an undifferentiated or standardized coffee product. In contrast, the specialty coffee business model seeks to deliver value-added, highly differentiated products. To underscore the differentiated nature of their products, specialty coffee businesses have borrowed wine terminologies to describe the aroma, flavor, body and character of coffees from different growing conditions. Also similar to the wine industry, they use a 100-point scale to summarize the taste and aesthetic qualities of a brewed coffee.

Table 1: Comparison of Mainstream and Specialty Business Models

		Mainstream Business Model	Specialty Business Model
Value Proposition	Product characteristics	Homogeneous.	Differentiated through quality ratings, origins, varieties and other.
	Upgrading possibilities	Limited due to undifferentiated trade.	Increasing through differentiated procurement and marketing.
	Quality standards	Based on type (Arabicas and Robustas), place (Colombia, Brazil or other) and bean traits.	Assessment of the quality in the cup, 100 point scale quality rating, taste descriptors following wine terminology.
Customer	Target	Standardized mass consumption.	Conspicuous and indulging consumption, target hedonistic values.
	Consumption level	Consumption leveled off during the 1950s and declined after the early 1960s.	Consumption started to grow in the 80s and increased exponentially in the 90s.
Infrastructure E Emanagement	Procurement	In bulk, no quality information transmitted to growers.	Smaller quantities and more direct communication with growers with transmission of quality information.
	Roasting	Downgraded blends roasted in large quantities.	Prevalence of single origins, artisan roasting.
	Market structure	Concentration.	Fragmentation.

Source: Elaboration using Roseberry (1996), Ponte (2001) and Daviron and Ponte (2005); business model elements from Osterwalder and Pigneur (2002).

The mainstream model is associated with procurement practices in which coffee firms procure in bulk, seek to minimize cost and disclose as little information as possible to consumers (Daviron and Ponte, 2005). The mainstream coffee trade is organized around a grading hierarchy according to type (Arabica or Robusta), primary processing (wet or dry), and country of origin and grade (Ponte, 2001). Grades are solely determined by attributes of the dry beans, such as defective bean count, bean size standards, moisture content, uniformity, color and freshness. In contrast, procurement in the specialty coffee business model is characterized by an intense search for high quality coffee, careful evaluation of coffee attributes, and development of close business relationships between producers and buyers. In addition, the actual tasting of brewed samples of coffee in formal 'cuppings' is a crucial procedure used to evaluate coffee qualities[3].

Coffee prices in the mainstream supply chains are set with reference to the New York Board of Trade (NYBOT) for Arabica coffees and the London International Financial Futures and Options Exchange (LIFFE) for Robusta coffees. The prices traded on these commodity exchanges reflect the value of a lot of standardized coffee. Lots are standardized based only on the physical characteristics of the unroasted coffee beans. Hence, the prices that emerge from such exchanges provide coffee producers and buyers with no information about the value of quality deviations from that of a standardized lot of coffee. The commodity markets leave producers and buyers without a means to communicate the value and cost of coffee qualities that differ from the standardized lot. Given only commodity prices, informational asymmetries persist and demands for quality coffee are unmet (Daviron and Ponte, 2005). In contrast, the view of the specialty coffee model –at least in its original proposition– is that prices should be based on quality and its associated costs of production. Specialty coffees are therefore delinked from the New York and London commodity prices (Ponte, 2002). For specialty coffees, competitive e-auctions are a promising innovation that facilitates quality-based price discovery and the exchange of critical value-added information.

In the mainstream model, roasters blend coffee beans from different origins to produce a homogenous product that is palatable to the mass of consumers. Mainstream marketing strategies are based on standardization, consistency in providing the standardized product, and branding (Daviron and Ponte, 2005). In contrast, the specialty coffee model acknowledges places of origin, coffee varieties, production location conditions, and ratings based on the flavor attributes. In the specialty model, origin and variety are valued characteristics since specialty coffees are "far more interesting and distinctive when left unblended" (Arvidson, 2003). While the mainstream model detaches coffee from information about coffee origin

[3] Cupping is the examination of the coffee sensory attributes including olfaction, gustation, and mouth feel of the coffee, which are the tasting of the volatile, soluble and non-soluble coffee components respectively (Lingle, 2001).

and other specific qualities, these same qualities result in real value-added in the special coffee model and market (Roseberry, 1996; Daviron and Ponte, 2005). Within the mainstream model, consumer choice is largely limited to coffee brand. Within the specialty model, consumers choose from diverse combinations of characteristics, including place of origin, varieties, profile descriptions and characteristics of production locations (Roseberry, 1996). Finally, while the mainstream coffee market is dominated by a few major roasters and manufacturers that distribute through supermarkets and food services (Ponte, 2001), fragmentation is a fundamental feature of the specialty coffee model and market (Lingle, 2001b) [4].

Management Implications of Hedonic Price Information

The hedonic approach states that goods are valued according to their specific individual attributes[5]. Hedonic price analysis decomposes explicit market prices into implicit prices of individual product characteristics. Hedonic analysis consists of modeling the market price of individual products as a function of various attributes that can be encountered in them. Statistical methods are then used to estimate the implicit or marginal prices of such attributes. If the estimated implicit price is not significantly different from zero, the attribute is interpreted as not valued by procurement managers or consumers.

Implicit prices obtained from hedonic analysis provide key information for decision making in the supply chain since it allows managers to define their strategies according to the market value of the product (Figure 2). For this paper, we find it useful to classify managerial implications of price information according to the elements of business models following Pigneur (2002), Osterwalder (2004) and Osterwalder et al. (2005). Three major elements of business models can be distinguished: 1) the value proposition, 2) the market segments, and 3) the infrastructure and supply chain. The value proposition is the definition of the actual product and the customers' perception of its value. We consider implicit prices of attributes as direct indicators of the value proposition since they disclose which attributes are valued and by how much. The appreciation of new attributes in a given market generates product innovation and the transmission of attributes information to customers increases the quality perception of the product. The market segments define who the customers for the product are and allow the positioning of the firm in the area where it can gain a competitive advantage. Each segment has a distinctive supply and purchase criteria. We use hedonic analysis to distinguish among different quality segments (i.e. segments in which attributes have different valuations). Infrastructure and supply chain management refers to

[4] In 1969 there were approximately 20 small roasters, by 1979 the number had doubled, and in 1989 it was 385; since 1990, the number of small roasters opening annually increased by increments of 100 with an estimation of 1,400 by 1999 (Lingle, 2001b).
[5] For the fundamentals of the hedonic approach see Rosen (1974) and Lancaster (1966).

how to organize and allocate the resource to respond to market opportunities and to manage the value chain. We take hedonic analysis as informative of where to use resources in production, processing and retailing activities.

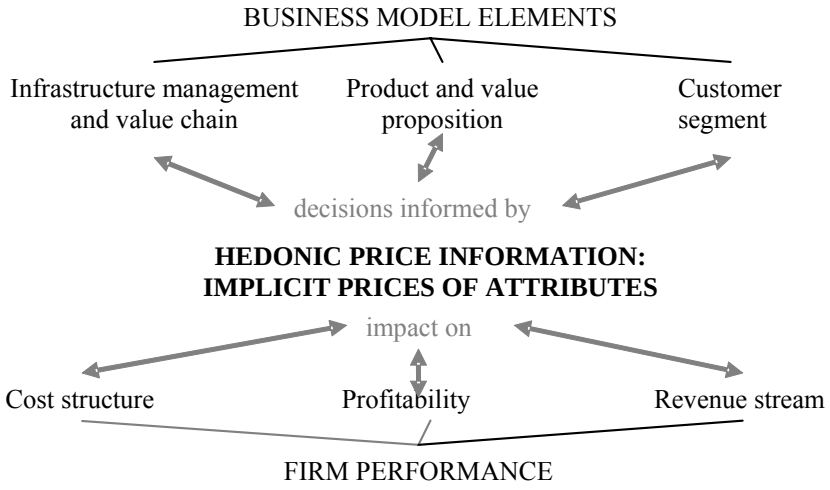

Figure 2: Management Implications on the Business Model Elements from Hedonic Price Analysis. Source: Elaboration using Pigneur (2002), Osterwalder (2004) and Osterwalder et al. (2005)

The hedonic approach has been extensively applied to wines. Most of the earlier hedonic wine studies concentrate on identifying the attributes that have the greatest impact on price at the retail level, which directly refers to the value proposition of wineries. These studies found that wine prices were essentially determined by the characteristics that can be known from the information on the bottle (e.g. region of origin, grape variety, ranking[6] and vintage year) as opposed to those that refer to the wine sensory description by expert tasters (e.g. acidity, complexity of aromas and harmony of components) (Combris et al., 2000; Oczkowski, 2001; Lecocq and Visser, 2003; Troncoso and Aguirre, 2006). The reason is that attributes listed on a bottle are easily identifiable by non-expert consumers whereas sensory attributes are only appreciated by knowledgeable buyers. These results imply that product differentiation in wine is based primarily on attributes that appear on the bottle. In particular, ranking is the major indicator of vertical differentiation of products (Combris et al. 2000). Troncoso and Aguirre (2006) outline the importance of origin as a non-replicable differentiation factor to compete in global markets.

[6] Countries that produce wine have a ranking system to distinguish wines that meet specific criteria to determine the quality of a wine. For example the ranking system for Burgundy wines includes, from highest to lowers: grand cru, premier cru, communale and regionale.

Hedonic analyses suggest implications with respect to infrastructure and resource allocation. Oczkowski (1994) noted that implicit prices can be used to evaluate long-term investment decisions against their costs of implementation in order to redirect resources towards attaining the desirable quality attributes by, for example, using better quality grapes or better wine-making skills. However, the author notes that due to production lags, making resource allocations based on implicit prices now may have unexpected consequences in the future. Troncoso and Aguirre (2006) remark that since commercial success in the wine industry is primarily related to the right variety and winery location, variety and location are the crucial choice variables in vineyard operation. Similarly, Schamel and Anderson (2003) suggest a change in winery locations since consumers pay ultra-premium prices for cool-climate wines produced uphill versus lower and warmer regions in Australia. Davis and Ahmadi-Esfahani (2005) draw recommendations for wine storage according to the marginal prices of vintage years and optimal wine age from hedonic price analysis of Australian wines.

Davis and Ahmadi-Esfahani (2005) observe that market segments are formed in wine, usually by price, in which more specific recommendations from hedonic analysis can be made. The authors argue that a better distribution of Australian wines to various overseas and domestic markets could be made according to the attributes that are more valuable to the different consumer groups leading to a greater level of satisfaction for consumers and more profit for producers and marketers.

Donnet et al. (2007) determined the relative marginal prices of sensory and reputation attributes traded in small volume special coffee e-auctions. The authors found that variables referencing coffee sensory attributes and variables referring to the coffee origin, tree variety, quantity available and quality evaluation relative to other coffees traded in the same auction were important in determining coffee prices. The authors posit that reputation variables stand alone as quality signals affecting the buyers' willingness to pay. Donnet et al. also underscores the significant impact of the quality ranking, place of origin, variety and quantity available as important reputation attributes affecting specialty coffee prices.

Data and Empirical Model

Data

The data set is an extension of the small volume Cup of Excellence (CofE) data set used in Donnet et al. (2007) and a new data set of the large volume Q auction (Q). Table 2 shows the summary statistics. The total number of coffee lots is 624 for the CofE and 57 for the Q. The total volumes traded are 13,274 and 14,340 bags of 69 kg. in the CofE and the Q respectively. The coffee origins in the CofE are Brazil, Bolivia, Colombia, El Salvador, Guatemala, Honduras and Nicaragua for the

auctions in 2003 to 2006. The Q origins include Costa Rica, El Salvador, Guatemala, Honduras and Nicaragua for the auctions in 2005 and 2006. The data set consists of the information available to bidders previous to the auction and the resulting price paid for each coffee lot at the auctions. This information is collected by the auction organization. The quality rating is the assessment of the jury in the cupping competition. For this study, we assume that the quality rating given by the competition jury is a proxy for a procurement manager's assessment of quality in the cup (recall that they are able to cup the coffee first hand). The quality ratings display a much wider range in the CofE. Prices in the CofE also vary widely,1.2 to 49.75 dollars per pound. The ranking corresponds to the order of each coffee by its quality rating relative to all selected coffees in the competition, beginning with 1 for the first place lot, 2 for the second place, and so on, until the lowest rated lot in each auction. The CofE data includes the altitude of production and coffee variety such as Caturra and Catuai, information that is not available for the Q. The price of the commodity coffee during the auction month is included as a benchmark variable.

Table 2: Summary Statistics of the CofE and Q Auctions

	Cup of Excellence			Q auction		
	Average	Min	Max	Average	Min	Max
Price ($/lb)	4.12	1.2	49.75	1.41	1.13	1.74
Rating (points)	86.77	80.25	95.85	83.34	80.83	86.54
Lot size (bags)	21	9	122	211	125	275
Commodity price ($/lb)	0.96	0.55	1.35	1.27	1.1	1.35
Ranking[1]	1 through -up to- 43			1 through -up to- 7		
Year[2]	2004, 2005, 2006			2005		
Country[3]	Bolivia, Brazil, Colombia, El Salvador, Guatemala, Honduras, Nicaragua			Costa Rica, Colombia, El Salvador, Guatemala, Honduras, Nicaragua		
Altitude[4]	1284 - 1450, 1450-1600, more than 1600					
Variety[5]	Bourbon, Caturra, Catuai, Pacamara, Typica, Other					

1 In CofE, dummy variables indicating if ranking 1, 2, 3 or 4, respectively. Base group is ranking 5 and above. In Q, ordinal variable.
2 Dummy variable indicating auction year. Base group is 2003.
3 Dummy variable indicating country of coffee origin. Base group is Brazil.
4 Dummy variable indicating variety of coffee. Base group is Bourbon.
5 Dummy variable altitude groups. Base group is Less than 1285 meters above sea level.
Source: Cup of Excellence and Q auction websites.

Model

Applying the hedonic approach, we assume that buyers' bids reflect their valuation for the individual coffee attributes known from the information available prior to the auction. Thus, the price of the i-th specialty coffee is a function of the value the procurement manager attaches to its attributes Z_{ij} (j=1, …, m). The hedonic price function for specialty coffees can be expressed as:

$$ln\,(P_i) = \beta_0 + \Sigma_j f\,(Z_{ij})\,\beta_{ij} + \varepsilon_i$$

where i=1,…, n are the observed specialty coffees, j=1,…, m are the attributes, ε_i is an independently distributed error term with mean 0 and variance σ^2, $ln\,P_i$ is the natural logarithm function of individual prices; and the functions of one variable $f\,(Z_j)$ are either the identity function, the logarithm function or a dummy variable which takes on the value 1 if the characteristic j is present for the *i-th* observation or 0 otherwise. In addition to the coffee characteristics we incorporate two control variables, the competition year and the commodity price of the corresponding coffee type during the auction month. The coefficient β_{ij}'s are the implicit prices for the attributes. We estimate the hedonic function using ordinary least squares. The semi-log functional form is chosen following the tests applied in Donnet et al. (2007).

Results and Management Implications

Table 3 *(See Appendix A)* presents the implicit prices from the hedonic estimation for the CofE and the Q. The CofE and Q model specifications explain 85 and 68 percent of the variation in prices, respectively. The model coefficients can be interpreted as the marginal impact of the attribute on the price of coffees traded on average. The attributes that significantly influence CofE auction prices are the: quality rating, quality ranking, quantity available, commodity price, country of origin, year of the competition and the production altitude. In contrast, Q prices are influenced by the quality ratings and the country of origin and are not influenced by the ranking and the quantity available. As explained above, an altitude variable was not available for Q coffees.

The first level of product differentiation is based on whether a coffee is traded in the CofE or Q. In the CofE, prices contain more information on quality and remunerate quality more heavily. Quality information contained in Q prices is relatively more limited. The most outstanding differentiation attributes of the CofE coffees are the rankings and the idea of exclusivity conveyed by the limited availability of the CofE coffee lots. Being ranked first in the CofE increased the first ranked lot price by 122 percent above the average price of coffees ranked lower than fifth place. The prices of second, third and fourth best ranked coffees are higher by 28, 27 and 11 percent, respectively, over the average price of coffees ranked below fifth place. With respect to exclusivity, the estimates show a price decrease of 0.37 percent for each one percent increase in lot quantity offered in the CofE. This means that in a 20 bag lot, one more bag decreases price by approximately 2 percent; for example, increasing the lot quantity from 20 bags to 30 would decrease the price by 20 percent.

The borrowed-from-wine marketing strategies of competitive rankings and limited editions are the hallmark of value creation in the specialty coffee industry. For growers, the importance of this differentiation is that they have a way of creating

their own unique reputation by separating small coffee lots with specific combinations of characteristics that stand out among the coffees of other e-auction participants. Thus, participation in the CofE has a significant promotion effect for both roasters and growers. By offering this possibility, the CofE is an appealing source of supply for specialty retailers of highly valued coffees and a 'must-have' for firms targeting the upper-end customer segments.

Comparing the statistically significant coefficients side by side, the impact of the quality rating is almost four times larger in the CofE versus the Q. This means that an additional rating point increases price by 7.5 and 2 percent in the CofE and Q, respectively. In addition, the wider range of quality rating at the CofE (almost 15 points versus 5 points in the Q) can result in a very high total premium for the quality rating. For example, coffees rating 90 get a 35 percent premium with respect to coffees rating 85, ceteris paribus.

The impact of country reputation is higher in the CofE suggesting a greater degree of differentiation by origin in the CofE. Buyers in the small auction are more responsive to factors not captured by the rating but captured by the 'country' and that affect their valuation of quality. In the CofE, Brazil is the most highly valued country of origin while Costa Rica is most highly valued in the Q. Other origins appear to have similar rankings by value in both the CofE and Q. Guatemala is the second most highly valued in both auctions. In both auctions, the Central American origins; El Salvador, Nicaragua and Honduras are the most discounted in both auctions.

The CofE data set lends itself to more in-depth analysis than the Q-auction because of the available data. Altitude higher than 1,600 meters, an important factor for coffee quality, has a positive implicit price of 5.6 indicating that procurement managers pay on average five percent more for coffees produced at altitudes higher than 1,600 meters above sea level relative to coffees produced at altitudes lower than 1600 meters. Coffee varieties were not statistically significant, indicating that the different varieties are equally valuable to specialty coffee buyers participating in the CofE. However, the sign and magnitude of the coefficients for variety are in agreement with the reputation of Caturra and Pacamara varieties as consistent producers of high quality coffees.

Relative to the variables that are not quality attributes per-se but affect prices of specialty coffees, the hedonic equations indicate that CofE prices are less correlated with commodity market prices than are Q prices. CofE prices increase by 0.7 percent for each one cent increase in the commodity price while Q prices increase 1 percent for each one cent increase in commodity price. The latter result seems intuitively consistent with the idea that the quality of coffees offered in the Q are between those of the commodity markets and those of the high quality CofE coffees. In addition, the year 2005 was highly significant in the CofE. Buyers paid 13

percent less for the coffees auctioned during 2005 relative to coffees auctioned in other years. The connection between specialty and commodity prices suggests an ability to substitute coffees of different quality either within the supply chain, such as in roasting, or at the retail level.

Figure 3 illustrates the combined effect of desirable attributes in each of the two auctions. In the CofE, the combination of highly valued attributes yields the exceptional explicit prices that have attracted the attention of the industry and the media. The explicit price of a coffee is decomposed into three parts: 1) the price level of reference (commodity coffee), 2) the effect of the auction (i.e. the average differentiation of the trade system with respect to the commodity), and 3) the effect within the auction (i.e. the differentiation according to valued attributes in each auction).

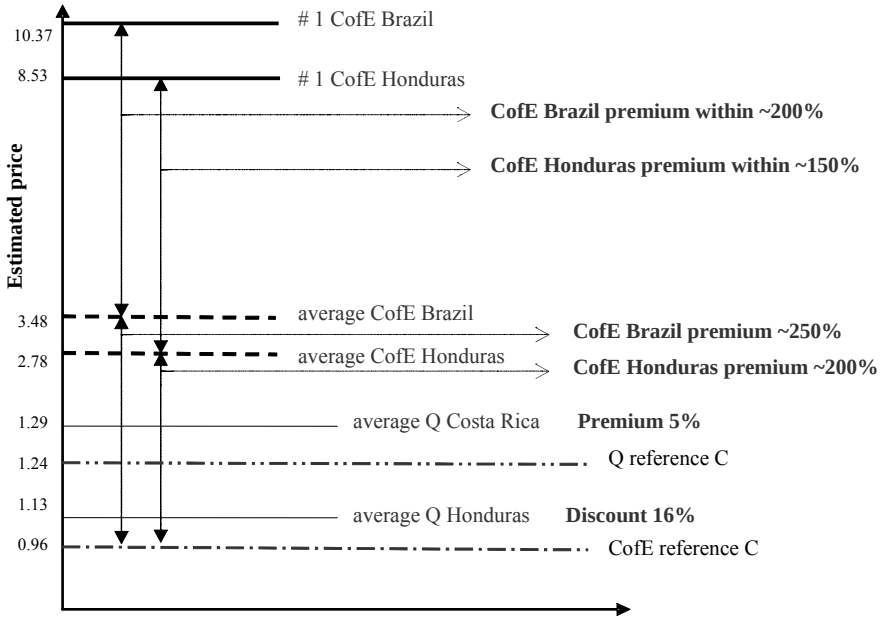

Figure 3: Estimated Explicit Prices and Premiums of the Cup of Excellence Competition and Q Auctions

For example, the estimated explicit price for the first place Brazilian coffee is 10.37 dollars per pound. Decomposing the latter price, approximately 1 dollar corresponds to the general price level, 2.5 dollars correspond to being traded at the CofE and the remaining 7 dollars correspond to the rating, ranking, country, quantity and altitude effects within the CofE. Estimated explicit prices in the Q auction are much smaller. The average effect of the trade system relative to the commodity is 5 percent. Within the Q, since the rating has a small economic impact, the main effect is the country of origin. Thus, coffees from Costa Rica on average obtain 7 cents premium and coffees from Honduras obtain an overall discount of approximately 20 cents.

Conclusion

The hedonic analysis indicates that the two competitive e-auctions trade in specialty coffees that are valued differently by coffee buyers. Both markets result in price premiums over the standard commodity price. The value added through product differentiation is larger in CofE than in the Q. The CofE e-auction reveals a greater amount of information about the values associated with coffee ratings, rankings, quantities available, and country reputation. In the Q, information on quality is more limited and tends to be remunerated to a lesser extent than in the CofE. These different valuations are indicative of different value propositions and business models within the specialty coffee industry.

The importance of the competition-auction system is that it places the grower at the center of the value adding process as opposed to the value adding created through corporate branding. In the specialty coffee model, the grower is the major player in producing the desired quality attributes. The role of coffee firm managers is to exploit this value added through procurement strategies that preserve the origin information. On the marketing side, their role is to transmit this information to consumers to capture their effective demand for the attributes, both material and symbolic. Furthermore, procurement managers' valuations reflect the value creation strategy to generating excitement around coffee, creating a demand for a different unprecedented high value product and matching willingness to pay for exceptional coffee determined by a panel of experts.

Before competition-auctions, most growers did not have quality information about their product and were not remunerated according to the detailed information that the cupping provides. Similarly, their resources and production costs used to be valued in a different context and thus the growers' reservation price is still largely the commodity price. Auctions offer the opportunity to enter a different business model as specialty coffee firms and buyers reveal the market value of specialty attributes. Hence, at these relatively early stage of development, our hedonic estimation can be taken as representing the demand side (buyers' willingness to pay) more than the supply side of the market (production costs). As knowledge on the costs of producing specialty coffee becomes available we might be able to provide insights on the final benefit from supplying the specialty markets. In particular for hedonic analysis, production costs will be reflected as sellers provide information on their reservation prices.

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Appendix: A

Table 3: Implicit Prices of Specialty Coffee Characteristics from the Hedonic Price Log-Linear Model Estimates for the Cup of Excellence and Q Auction

Dependent variable: log (price)		Cup of Excellence			Q auction		
Independent variables		Coefficient	Sig.	Implicit price (%)	Coefficient	Sign.	Implicit price (%)
Rating (points)		0.075	***	7.5	0.02	**	2.0
		(0.008)			(0.007)		
Ranking[1,2]					-0.0007	*	-0.1
					(0.004)		
	First	0.847	***	121.9			
		(0.100)					
	Second	0.296	***	28.3			
		(0.093)					
	Third	0.283	***	27.4			
		(0.082)					
	Fourth	0.144	*	11.2			
		(0.075)					
Year[3]	2004	-0.039		□			
		(0.054)					
	2005	-0.277	***	-27.4			
		(0.087)					
	2006	-0.037		□			
		(0.079)					
Country[4]	Bolivia	-0.204	*	-22.7			
		(0.108)					
	Colombia	-0.365	***	-33.7			
		(0.092)					
	El Salvador	-0.238	***	-23.6	-0.083	***	-8.7
		(0.062)			(0.017)		
	Guatemala	0.03		□	-0.049	**	-5.8
		(0.079)			(0.021)		
	Honduras	-0.509	***	-41.8	-0.136	***	-13.4
		(0.065)			(0.016)		
	Nicaragua	-0.273	***	-26.1	-0.09	***	-10.3
		(0.058)			(0.037)		
Variety[4]	Catuai	-0.069					
		(0.047)					

	Caturra	0.033					
		(0.058)					
	Typica	-0.018					
		(0.071)					
	Paca	0.098					
		(0.09)					
	Other	0.002					
		(0.061)					
Altitude[6]	**1285 - 1450**	0.036		□			
		(0.045)					
	1450 - 1600	0.039		□			
		(0.053)					
	> 1600	0.109	*	**5.6**			
		(0.063)					
Log of lot size (%)		-0.379	***	**-0.4**	-0.000		□
		(0.036)			(0.000)		
C Price (cent)		0.689	***	**0.7**	1.007	***	**1.007**
		(0.145)			(0.098)		
Constant		-4.5	***		-2.544	***	
		(0.717)			(0.577)		
R-squared		0.68			0.79		
Observations		624			57		

Robust standard errors in parentheses

* significant at 10%; ** significant at 5%; *** significant at 1%

The coefficient multiplied by 100 for continuous variables and exp (βj - 0.5 s.e. βj) -1 multiplied by 100 for dummies.

