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LOCAPOURS?
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EXAMINE FACTORS THAT INFLUENCE
WINE LIST SELECTIONS**

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Abstract

There has been an increase in interest in local foods among final consumers in the United States, and there has also been a rise in offerings of local products in restaurants. Here we use Zagat Survey data and restaurant-specific menu information to estimate factors that influence the availability of New York State (NYS) wine in 1,401 NYS restaurants. We focus on wine because the production region is clearly labeled on the menu and because there is a burgeoning wine industry in NYS. Our econometric results indicate that décor ratings, cuisine styles, certain wine list characteristics, and distance to wine regions have a statistically significant impact on the likelihood of NYS restaurants serving local wine.

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Introduction

Consumers have become increasingly interested in purchasing local foods in recent years (Feenstra 1997; Allen et al. 2003; Delind 2006; Feagan 2007; Kingsolver, Kingsolver, and Hopp 2009; Smith and MacKinnon 2007). Consumers are believed to have embraced the local food movement because of the many perceived benefits to human health, the environment, and the economies in local communities (Kingsolver, Kingsolver, and Hopp 2009; Smith and MacKinnon 2007). The rise in sales of food and beverage products distributed through direct marketing channels, such as farmers markets, farm stands, and community-supported agriculture (ERS 2010), are one indicator of the growing demand for locally produced goods. Much of the literature has focused on the demand for local products by final consumers, yet local food consumption by intermediate customers, such as schools, hospitals, grocery stores, and restaurants has also been expanding. Restaurants, in particular, offer locally produced foods and beverages, at least in part, to cater to the increased interest in these products among their customers.

Although there has been an expansion in demand for locally produced foods and beverages, there is some evidence that such sales have been concentrated among select socio-economic groups (Eastwood, Brooker, and Gray 1999; Kezis et al. 1998; Govindasamy, Italia, and Adelaja 2002; Wolf, Spittler, and Ahern 2005). Yet, other research has found that income was not a significant factor (Kolodinsky and Pelch 1997; Onianwa, Wheelock, and Mojica 2005). Zepeda and Li (2006) also found that income and other demographic variables often associated with affluence did not influence local food purchasing patterns. The contrasting evidence in the literature on the role of income on consumers' willingness to buy local food

could be due to regional differences, product availability, or problems with survey instruments. Here we attempt to circumvent some of these issues by focusing on restaurants across various price points, and we use data from an existing survey to avoid the common problems associated with conducting surveys.

Economic research regarding local food has primarily focused on estimating the willingness to pay (WTP) among final consumers for various types of local food products (e.g., see Zepeda and Li 2006; Darby et al. 2008; Carpio and Isengildina-Massa 2009; James, Rickard, and Rossman 2009; Onken, Bernard, and Pesek 2011; Onken et al. 2011). While most research suggests that final consumers are willing to pay a premium for locally produced foods, these consumers have a varying definition of what exactly constitutes local, and there is another related vein of research that examines consumer perceptions of what defines food and beverage products as local.¹ For example, Darby et al. (2008) found that consumers did not distinguish between food produced “nearby” and produced “in the state”, placing similar value on these two definitions of locally produced food. Darby et al. (2008) argue that state boundaries act as natural geographical regions for defining local. Conversely, when testing five different geographical definitions of local foods, Burnett et al. (2011) indicate that final consumer WTP increases as the geographical scale decreases from a multistate region to the county level. As Darby et al. (2008) note, this type of discrepancy may further complicate consumers’ definition of local in areas of the country where states and counties cover larger areas. Our research will attempt to shed new light on the definition of local by examining the presence of specific types of New York State (NYS) wines (i.e., red wines which are predominantly from Long Island and white wines which are produced in Long Island and in the Finger Lakes region) in restaurants in specific locations in NYS.

While final consumers' demand for local products has been closely examined in the literature, little attention has been directed towards understanding intermediate consumers' demand for local food and beverages. Some notable exceptions are Dunne et al. (2010) that studied intermediate consumers' definition of local food, Feenstra et al. (2011) that explored supply chains of farm-to-institution interactions, and Hardesty (2008) that examined the marketing channels for local produce to colleges and teaching hospitals. Restaurant demand for local foods and beverages, in particular, has not been studied in detail. Those studies which have explored restaurants' demand for local food have largely been case studies focusing on purchasing patterns (e.g., Strohbehn and Gregoire 2003) and supply chain management issues (e.g., Sharma et al. 2012), or have conducted interviews with restaurant owners but have had very small sample sizes (e.g., Gultek, Dodd, and Guydosh 2005; Preszler and Schmit 2009). Gultek, Dodd, and Guydosh (2005) examined restaurateurs' attitudes towards local wine using a mail survey with 112 subjects in Texas. They found positive attitudes toward local wines overall; taste, design (attractiveness of the bottle), and brand characteristics were the most significant attributes for the decision to carry local wines (price was not a significant factor in their analysis).

The primary objective of this study is to better understand demand for locally produced goods by restaurant owners. As part of our analysis, we will also shed new light on how intermediate consumers define local products. We think that restaurants are an interesting intermediate consumer to consider as they are expected to be reflective of the demand for food and beverages among final consumers more generally. In this regard, restaurants are the quintessential consumer of food and beverages. The product we focus on is wine, and we do this for two reasons. First, food items at restaurants are often comprised of many ingredients, some

of which may be local and others which may not be local, so it is difficult to pinpoint which food items can be appropriately labeled as local. Second, wine is one of the best examples of a product on a restaurant's menu where the region of production is well identified on the product and on the menu. We focus on restaurants in NYS because there is a burgeoning wine industry in NYS and because local wines are available at many restaurants in NYS. Our choice to focus on wine was further motivated by the observation that the locavore² movement has inspired NYS restaurants to focus on local and seasonal ingredients in their cuisine, but that there has not been a corresponding locapour³ movement; local wines have not yet received the same enthusiasm among restaurateurs in NYS (Molesworth 2011). Overall, because we are interested in the presence of local products on restaurant menus, we believe that focusing on wine will enable us to examine this question most directly.

The next section describes the data that we collected and used in our analysis, and the following section outlines the model that was developed to study restaurant demand for local wines. To summarize, we draw our sample of restaurants from the 2012 Zagat Survey database, and use the Survey to identify restaurant specific characteristics and expert ratings scores for each restaurant. The data collected from the Zagat Survey is supplemented with additional data that we collected to describe the food and beverage items available at each restaurant. We believe that this unique dataset is ideally suited to study the determinants of local beverage demand by restaurants in NYS. These data are used in a model that estimates how restaurant characteristics impact the presence of local wines on the restaurant's menu. The penultimate section provides a detailed summary of our empirical results; we provide results for all restaurants included in the analysis as well as subsets of results for specific types of wines and specific locations for restaurants within the state. We conclude with a section that discusses how

our results contribute to the understanding of demand for local products, and also highlight the implications for industry stakeholders in the wine sector.

Data

In recent years there has been a sharp rise in the number of restaurant review guides for consumers, and many of these guides are available online. For example, online reviews such as Yelp, Trip Advisor, and Zagat all provide detailed information and ratings for restaurants across a range of price categories and cuisine types. The Zagat Survey is a very rich source of restaurant ratings for locations in the United States, and in particular for NYS and New York City (NYC).⁴ Zagat Survey data provide numerical scores for restaurants on four categories: food quality, décor, service, and cost. The first three categories are based on a 0 to 30 point scale, while the cost is based on the average price for a single meal, drink, and tip. In addition, the Zagat Survey provides information on the restaurant's location, cuisine type(s), and lists any special restaurant features.

As shown in Table 1, there were 5,111 restaurants listed in the 2012 Zagat Survey in NYS. Of the 5111, we were able to retrieve food and alcohol menus for 1,530 restaurants (of which 491 restaurants served NYS wine); some descriptive statistics for the 1,530 restaurants are provided in Table 1. Here we see that the average Zagat Food Quality score was 21.8, the average Zagat Décor score was 18.9, and the average Zagat Service score was 20.4. The average cost of a meal, drink and tip of the restaurants in our sample was \$46.15, but it ranged between \$13.00 and \$585.00.

Another important Zagat Survey descriptor is the type of cuisine a restaurant serves. Previous research indicates that restaurants have a high preference to serve wines which complement the type of cuisine they serve and the type of dining experience they want to convey to their clients (Davis and Charters 2006; Gultek, Dodd, and Guydosh 2005). The Zagat Survey

separates cuisine types into 132 different categories, and often lists several cuisine types per restaurant. To simplify these categories in our framework, the different cuisine types were aggregated into six cuisine groups based primarily on regional orientation. The six cuisine types are: Standard American, New American, European, Asian, Latin American, and Other cuisine. Each restaurant was categorized into one cuisine type based on their primary cuisine type listed in the Zagat Survey. Table 1 shows that of the 1,530 restaurants in our sample, 363 restaurants serve Standard American cuisine, 286 serve New American cuisine, 593 serve European cuisine, 83 serve Latin American cuisine, and 87 serve Other cuisine.

There are 44 different special features that might be listed for a restaurant in the Zagat Survey data; these include physical features like bars and patios, food-related features such as vegetarian options or specific food preparation techniques, and various other features such as awards received and entertainment facilities. As shown in Table 1, the average number of special features per restaurant is 2.78 and ranged between 0 and 11 for the restaurants included in our sample. We are particularly interested in two of these special features listed in the Zagat Survey: the use of natural/organic ingredients and the presence of a winning wine list. These two are included in our empirical model as we expect that they may impact the presence of local wines on a restaurant's menu. As shown in Table 1, 16.5% of restaurants have the natural/organic ingredients feature, and 8.6% have the winning wine list feature.

The Zagat Survey data for the 1,530 restaurants was augmented with food and alcoholic beverage (beer and wine) menu information that we collected from each restaurant's website. Here we collected the number of entrees offered on the menu, the number and type of beers available, and detailed information on the varietals, costs, and region of origin for all wines listed on the menu. We focused on wines sold by the 750 ml bottle (or larger) and did not include

information for any wines that were only available by the glass. Wine varietals were organized into one of six categories (white, red, sparkling, rosé, dessert, and fortified) and wine regions were aggregated into four domestic categories (California, West Coast non-California, NYS, and non-NYS East Coast) and five international categories (Europe, Latin America, Africa, Australia/New Zealand, and a Rest of the World regions). Table 2 shows the summary statistics for prices and quantities of white, red, and sparkling wines from selected regions. Here we see that the mean price for white wines is highest for wines from Europe and lowest from the Latin American region. In our sample of restaurants, the average price of NYS white wines is \$41.83 and the average number of NYS white wines per restaurant menu is 2.73 bottles. The pattern is similar for red wines and sparkling wines. The average price for NYS red wines is \$52.57 per bottle and the average number of NYS red wines per restaurant is 3.03 bottles; the average price for NYS sparkling wines is relatively higher (and higher than the average price for sparkling wines from California), but the range of prices for NYS sparkling wines is narrower—and the number of offerings is smaller—than for those from California or Europe.

Next we outline our framework that uses the Zagat Survey data and the restaurant-specific menu information to better understand which factors influence restaurants' demand for local wine. We use data for 1,401 restaurants that serve wine in NYS and that have a full set of scores in the Zagat Survey. Our model considers the impact of reputation (using the Zagat scores), cuisine types, restaurant attributes, characteristics about the wine menu, and the restaurant's location.

Methodology

Although restaurants may be thought of as firms with the objective of maximizing profit, they are also significant consumers of resources including food, beverages, and various durable and intangible inputs. Here we focus on the procurement side of the restaurant business and model

restaurants as consumers with the objective of maximizing utility. Restaurant owners receive utility through their consumption of intangible goods (such as reputation and various restaurant attributes), durable goods (such as their building and their location), and non-durable goods (such as the food and beverages they purchase). Restaurant owners consume these goods in order to develop a brand and to expand their customer base. To some degree, restaurant owners will place food and beverage items on their menu as a way to further develop their brand and to attract additional customers. In particular, it has been found that restaurant owners often use this strategy when developing wine lists (Berenguer, Gil, and Ruiz 2009).

Our modeling approach adopts the framework proposed in Lancaster (1966) where utility is derived from the attributes or characteristics of a good. The utility for a good can, therefore, be decomposed into the attributes of that good, allowing a consumer to choose the bundle of characteristics that maximize their utility. Here we follow random utility theory, which states that an individual decision maker i has a choice set of j alternatives where $j = 1, 2, \dots, J$ with each j allowing for different levels of utility, U_{ij} (Train 2003). Because we cannot measure utility directly, U_{ij} can be broken down into its systematic component V_{ij} , representing the indirect utility, and a stochastic component, ε_{ij} as shown in equation (1). The stochastic component encompasses those factors which are unobservable either by the decision maker or in the attributes of the product.

$$(1) U_{ij} = V_{ij} + \varepsilon_{ij}$$

The systematic component, V_{ij} contains both characteristics of decision maker i and attributes from product j . In our application, we rely on the assumption that each individual restaurant (or restaurateur) must choose those food and beverage products which complement the

ex-post characteristics of the restaurant such as reputation and aesthetics (or restaurant attributes) given an individual budget constraint. As a result of this assumption, the decision makers have the goal of maximizing their utility by selecting those food and beverage products which offer the most representative experience of their restaurant. The systematic component, V_{ij} , is a function of reputation, denoted with r_i , restaurant attributes, denoted with a_i for decision maker i , cuisine choices indexed with j , c_j , and beverage choices, denoted with b_j ; in equation (2), we introduce the vector \mathbf{x}_{ij} to characterize these subcomponents of V_{ij} . In equation (2), β_{ij} represents the marginal utilities of these subcomponents.

$$(2) U_{ij} = \beta_{ij} \mathbf{x}_{ij} + \varepsilon_{ij}$$

The choice set for decision makers follows that which is outlined by Train (2003). We rely on the assumption that each individual restaurant owner must choose those wines that complement the ex-post characteristics of the restaurant. The restaurants in our example can then select to offer local wine (in any of the six wine categories), and the choice set is finite and exhaustive because restaurants can also decide to sell no local wines. Following standard approaches for developing consumer choice models, we define P_{ij} as the probability that decision maker i will choose product j , and equation (3) shows that the decision maker will choose product j when their utility from product j is greater than that from an alternative product k .

$$(3) P_{ij} = \text{Prob}(U_{ij} > U_{ik}, \text{ where } k \neq j)$$

We employ two modeling strategies to examine restaurant demand for local wine, defined as willingness to buy local ($WTBL_{ij}$) in the discussion and notation below. First we use a binary logit model to assess the determinants that influence a restaurant owner's decision to offer local wine. Second, because we think that the degree to which a restaurant owner includes local wine on their menu is important, we use a zero-inflated poisson model⁵ to estimate how the

determinants impact the number of local wines offered. By providing results from both a logit and a poisson model, we feel that we present a more complete analysis of the factors (reputation, restaurant and regional attributes, cuisine types, and wine attributes) that impact the likelihood of a restaurant offering local wine.

Equation (4) outlines the empirical specification that we use to estimate the models. Here we estimate the restaurant owner's decision to offer local wine; in the logit model $WTBL_{ij}$ is set equal to 1 if local wine is offered (and 0 otherwise), and in the poisson model $WTBL_{ij}$ is set equal to the number of local wine bottles offered on the menu (ranging between 0 and n). The determinants included in the model include variables that describe the restaurant's reputation (\mathbf{R}_i), variables that describe the restaurant and regional attributes (\mathbf{A}_i), the restaurant's cuisine type (\mathbf{C}_j), and the wine list attributes for the restaurant (\mathbf{B}_j).

$$(4) \quad WTBL_{ij} = \alpha + \lambda_i \mathbf{R}_i + \gamma_i \mathbf{A}_i + \delta_j \mathbf{C}_j + \phi_j \mathbf{B}_j + \varepsilon_{ij}$$

In equation (4), λ_i is a vector of parameters that describe the effect of restaurant reputation variables; the reputation variables are the four Zagat Survey scores. The vector of parameters describing the effect of restaurant and regional attributes is γ_i . Restaurant attributes includes the selected Zagat-defined special features and the regional attribute is a dummy variable that defines the location of the restaurant; dummy variables are included for either upstate New York, Manhattan, or Long Island and are all relative to the other four boroughs of NYC which we refer to as the outer boroughs here (and includes Brooklyn, The Bronx, Staten Island, and Queens). There are five dummy variables to describe the restaurant's cuisine type (Standard American cuisine, European cuisine, Asian cuisine, Latin American cuisine, and Other cuisine) and each is relative to the omitted cuisine type of New American. The vector of

parameters that describe the effect of cuisine type on local wine demand by restaurants is δ_j .

Lastly, ϕ_j is a vector of parameters that characterize the effects of a restaurant's wine list on its demand for local wine. The vector \mathbf{B}_j includes some detail from wine lists that describe the six different wine types (white wine, red wine, sparkling wine, rosé wine, dessert wine, and fortified wine), and the domestic count of wine excluding NYS wines. Lastly, ε_{ij} is the overall error term which is assumed to follow a normal distribution with mean zero.

Results and Discussion

In this section we present our empirical results that estimate the availability of local wine on restaurant menus. Essentially we are estimating restaurant demand for local wine or restaurants' willingness to buy local wine. Baseline results are provided using a logit model and the zero-inflated poisson model; the logit model was used to examine the factors that influence the presence of NYS wine on a restaurant's menu and the poisson model was used to better understand factors that increase the number of NYS wines on a menu. Because we are primarily interested in estimating factors that influence the presence of NYS wine on a menu, we provide additional logit results from models that examine specific types of local wines (local white wines and local red wines) and that examine demand in specific locations within NYS. In all model specifications we estimate the effects of a restaurant's reputation and meal price (via Zagat scores), cuisine groups, restaurant attributes, wine menu details, and regional attributes.

In Table 3 we present our baseline results using data from the 1,401 restaurants in NYS that made their menus available online and that had Zagat scores for all four categories. The first column in Table 3 shows the results from a logit model that estimates the presence of local wines on a restaurant's menu; the associated marginal effects from the logit estimation are shown in the second column. In the third column we show the results from the zero-inflated poisson

specification that estimates the number of local wines available on a restaurant's menu. Overall, the logit results in Table 3 show that the only reputation variable that has statistically significant on restaurant demand for local wine is the Zagat Survey Décor rating; the result here indicates that restaurants with a higher décor score are more likely to offer local wines. This may suggest that restaurants with a higher décor score pay closer attention to details, and that this type of restaurant is more likely to place local wines on their menu. In the poisson model all four Zagat scores are statistically significant; the Zagat Food Quality score and the Zagat Décor score have positive coefficients, while the Zagat Service score and the Zagat Cost have negative coefficients. The poisson results suggest that increases in restaurant service and increases in meal costs are correlated with a lower count of NYS wines on restaurant menus.

In the logit model all cuisine types listed have negative and statistically significant coefficients, and this indicates that restaurants with New American cuisine (the omitted category) are the most likely to include local wines on their menu. In addition, because the coefficients are more negative for European and Asian cuisines, restaurants with these cuisine types may be the least likely to include local wines in NYS. Overall, we see similar results for cuisine types in the poisson model, although here the coefficient for Latin American cuisine is positive and statistically significant. The Natural/Organic Ingredients special feature listed by Zagat and captured as a restaurant attribute in our analysis is significant in both models. This suggests that restaurants offering natural and organic foods are more likely to offer local wines. Results from the logit model also indicate that restaurants with many special features are also more likely to serve local wines.

The logit results for the wine menu attribute variables shown in Table 3 show some interesting patterns. Here we see that the availability of local wine increases with a higher

number of white wine selections, sparkling wine selections, dessert wine selections, and total domestic (non-NYS) wine selections. Restaurant demand for local wine in NYS decreases as the total number of red wines available on a menu increases. The estimated coefficients in the poisson model generally have the same signs as those estimated in the logit model, but in the poisson model we see fewer variables that are statistically significant. We take a closer look at the differences for local white wines and local red wines below. The logit results for the regional dummy variables in Table 3 show that restaurants in upstate NY and on Long Island—relative to the outer boroughs of NYC—are more likely to include local wines on their menu; the same does not appear to be true for restaurants located in Manhattan. Results from the poisson model also show a positive and statistically significant effect for the Long Island location, but not for the upstate NY location or the Manhattan location. We explore some of these regional differences further in the discussion below.

In the baseline results we found a positive effect for the number of white wine offerings on restaurants' demand for local wine and a negative effect for the number of red wine offerings. This result is intuitively appealing given that NYS is better known as a producer of white wines; however, further analysis that focuses exclusively on NYS white wines and on NYS red wines may shed additional light on restaurant demand for local wine. In the first column in Table 4 we replicate the original logit results from Table 3, the second column reports results using the presence of NYS white wines as the dependent variable, and the third column reports results using the presence of NYS red wines as the dependent variable. Many of the results for the model that focuses on white wines are similar to the baseline model. For the model that focuses on NYS red wines, we see that the Zagat décor score is not statistically significant, and a larger negative effect for restaurants serving Asian cuisine.

The most notable result in Table 4 is for the regional attributes. Here we see that NYS white wines are more likely to be offered in upstate restaurants while both white and red wines are more likely to be offered in Long Island restaurants (relative to the outer four boroughs); there is no statistically significant effect for either type of wine in the Manhattan location. Knowing that the Long Island region produces the majority of NYS red wines as well as white wines, this result suggests that the definition of local may be quite narrowly defined by restaurant owners. Because we see a positive coefficient for the Long Island region in the red wine model and no similar effect for the upstate region in the red wine model, we might infer that demand for local red wine (from Long Island) diminishes outside of the Long island region. This result suggests that defining local by state borders may be too large, and that restaurant owners use the term local to define a much smaller sub-region within a state.

In Table 5 we consider a restricted model that examines restaurant owner's demand for local wine in the NYC metropolitan area (Manhattan and the outer four boroughs that include The Bronx, Brooklyn, Staten Island, and Queens). We do this for two reasons. First, approximately two-thirds of the observations in our sample are from this area⁶, and second, many winemakers in NYS and elsewhere are keenly interested in selling their wines to restaurants in NYC and notably in Manhattan (Preszler and Schmit 2009; Gergaud, Storchmann, and Verardi 2012). The first column in Table 5 reports results for the Manhattan region, and here we find that the coefficient on the Zagat décor score remains positive and is statistically significant. In addition, the results show a negative and statistically significant effect on the Zagat cost variable suggesting that NYS wines are less likely to be available in Manhattan restaurants with higher average meal prices. The effects for the various cuisine types and wine menu attributes remain largely unchanged from the baseline results; restaurants with New American cuisine are more

likely to include local wines on the menu, and a higher number of white wines, sparkling wines, dessert wines, and domestic wines on a menu increase the likelihood of including local wines.

The second column provides results for restaurants in the outer four boroughs of NYC. Here the Zagat score for service is inversely related to the likelihood of including local wines; this suggests that more casual restaurants in this region may be more likely to offer local wines. The coefficients for European and Asian cuisine types are more negative (and remain statistically significant) than the baseline estimates or the estimates in the Manhattan model. Although the various wine menu attributes are not significant in the outer borough model, the total number of domestic wines offered continues to positively influence the presence of local wines.

Summary and Industry Implications

While there has been much work examining preferences for local products among final consumers, there has been little attention given to intermediate consumer demand for local foods and beverages. Restaurants are an intermediate consumer of foods and beverages, and we argue that the foods and beverages they procure are a very good proxy for the products that final consumers choose to consume. Our research contributes to this literature by collecting detailed data on restaurants in NYS to estimate the factors that influence the presence of local wines on their menus. We tap what we think is a novel and informative database in the Zagat Survey, as it includes standardized scores and additional information for restaurants across a wide range of locations, cuisine types, and price points. Wine is an ideal product to examine because it has well-defined labels that describe the region of production on the restaurant menu; furthermore, NYS is an ideal region to consider given the size and rising acclaim of its wine sector. Using data for 1,401 restaurants, we estimate the effect that restaurant characteristics (reputation, location, and other attributes) and product characteristics (cuisine types and wine menu details) have on the presence of local wines on restaurant menus. Our analysis also uses information

about restaurant demand for wine to shed some new light on how consumers define the term local.

Overall, our results indicate that restaurants' decisions to include NYS wines on their menus increased with higher Zagat décor scores, cuisine that is categorized as New American, the Zagat restaurant feature related to natural/organic foods, higher counts of white wine, sparkling wine, and dessert wine, a higher count of domestic wines, and location. The presence of NYS wines decreased with the number of red wine offerings on the menu. The natural/organic feature may be a signal that a restaurant is more likely to also include local food (and beverages) on their menu. The wine list attributes were important in all of our specifications that modeled the presence of NYS wines. This suggests that local wine is more likely to be placed on a restaurant menu in NYS when there are many wines that are similar to the wines produced in NYS, and when there are many domestic wines on the menu. Lastly, it appears that location matters, and that the demand for local wines has limited reach. Our results indicate that the probability of a restaurant including local wine is greatest in regions that produce wine. We find that restaurants in Long Island—a region that produces white wine and the main production region of red wines in NYS—are more likely to include local white wines and local red wines, but in other regions the demand for local red wines is not apparent.

Our results also have several important implications for wineries in NYS and in other nascent wine production regions in the United States. First, the Zagat décor score is the only reputation variable that has a consistent effect in the various models. We see the Zagat décor rating as an indicator for ambiance and attention to detail, and interpret this to be the reason these restaurants are more likely to place local wines on their menu. Second, the cuisine type also appears to play a large role in restaurants' decisions to include local wines on their menu. Wine

marketers of local wines should consider targeting restaurants with New American cuisine styles which complement local wines; our results suggest that restaurants with European or Asian cuisine styles in NYS may be less receptive to local wines. Third, restaurants that include more white wine in general, or more domestic wines overall, appear to be more likely to include local wine on their menu. Fourth, restaurants located in Long Island (the predominant region of red wine production in NYS) are more likely to list NYS red wines on their menu, yet restaurants located in other regions of NYS did not exhibit any preferences for NYS red wines. This suggests that the location of restaurant matters, but that the “local” effect is quite focused geographically and does not transcend across a large state like NYS. We also found that upstate restaurants are more likely to include local white wines, and white wines are the dominant type of wine produced in this region. Compared to other regions of NYS, the demand for local wines by restaurants in Manhattan is particularly sensitive to the Zagat décor score and the presence of red wines on the menu.

Our findings contribute specifically to a better understanding of the demand for locally produced wine by NYS restaurants. We identify the role that key determinants play in the demand for local wine by restaurants and our results offer useful guidance for industry stakeholders. In addition, this research provides a novel database and framework for assessing the demand for local products by restaurant owners which represent a group of intermediate consumers that are often overlooked in the agricultural economics literature, yet are engaged in a substantial amount of food and beverage purchases in the United States. Finally, our results indicate that consumers, if they can be accurately represented by the wine procurements decisions made by restaurants, may have a narrower geographical definition of local than what is presumed by policymakers and food marketers.

Footnotes

¹ While there is no legal or universally accepted definition of local food, the ERS (2010) states that one reasonable measure of local is when the production occurs within a state.

² A locavore is a commonly used expression to describe someone with a diet that consists only or principally of locally grown or produced food.

³ Locapour is a term coined by Molesworth (2011) and has been used to describe a person who chooses to purchase and consume locally produced wine.

⁴ The Zagat Survey provides scores for all Zagat rated restaurants in NYS, and the database is available at: <http://www.zagat.com/locations/browse?l=540>. We also purchased an annual membership with Zagat in order to receive access the scores and additional details about individual restaurants. For more information about the Zagat Survey, see: <http://support.google.com/zagat/answer/1705271?hl=en>.

⁵ A zero-inflated poisson model is used due to the large number of restaurant observations that carry no NYS wine. Essentially, the zero-inflated poisson model takes a two-step approach to estimation compared to a standard poisson model. First it applies a binary process to determine the zero group and the count group, and second, when the binary process takes on the value 1, the independent variable takes on the values from the count density function.

⁶ Of the 1,530 Zagat-rated restaurants in NYS with menus available online, 848 were in Manhattan and 198 were in the four outer boroughs; of the 1,401 restaurants used in our analysis, 779 were from Manhattan and 159 were in the four outer boroughs.

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Figure 1: Restaurant locations from our sample in the Zagat Survey for NYS

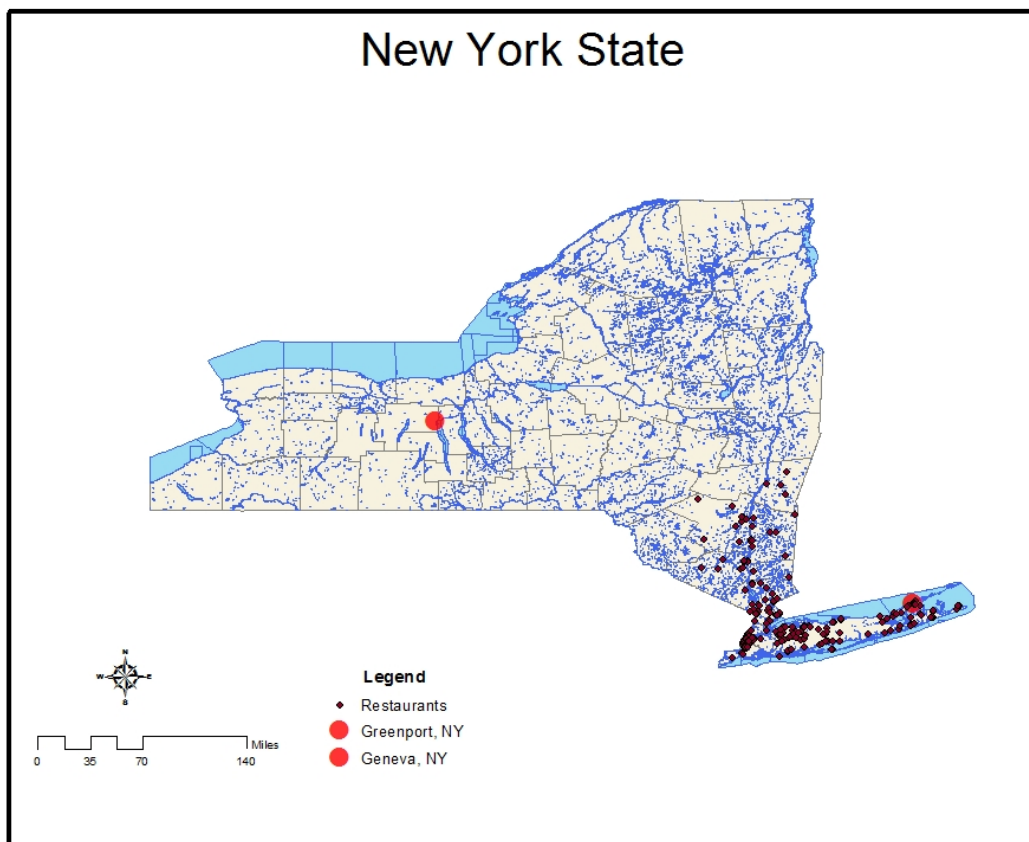


Table 1: Descriptive Statistics for the Zagat Survey Data

| <u>Zagat Survey General Wine Menu Information</u> | | | | | |
|---|--------------------------------|---------------------------|--------------------|----------------|----------|
| | <i>N</i> | | | | |
| Total Number of Restaurants on Zagat Survey in 2012 | 5,111 | | | | |
| Number of Restaurants without an On-line Wine Menu | 2,441 | | | | |
| Number of Restaurants which do not Serve Wine | 1,140 | | | | |
| Number of Restaurants which Serve Wine | 1,530 | | | | |
| Number of Restaurants which Serve NYS Wine | 491 | | | | |
| <u>Average Zagat Ratings</u>^a | | | | | |
| | <i>Mean</i> | <i>Standard Deviation</i> | <i>Minimum</i> | <i>Maximum</i> | <i>N</i> |
| Zagat Food Quality | 21.8 | 2.7 | 12 | 29 | 1426 |
| Zagat Décor | 18.9 | 3.4 | 6 | 28 | 1425 |
| Zagat Service | 20.4 | 2.6 | 12 | 29 | 1426 |
| Zagat Cost (per meal) | \$46.15 | \$27.38 | \$13.00 | \$585.00 | 1401 |
| <u>Zagat Survey Restaurant Cuisine Groups</u>^a | | | | | |
| | <i>Number of cuisine types</i> | | | | |
| Standard American Cuisine | 363 | | | | |
| New American Cuisine | 286 | | | | |
| European Cuisine | 593 | | | | |
| Asian Cuisine | 118 | | | | |
| Latin American Cuisine | 83 | | | | |
| Other Cuisine | 87 | | | | |
| <u>Zagat Survey Restaurant Feature Summary</u>^a | | | | | |
| | <i>Mean</i> | <i>Standard Deviation</i> | <i>Minimum</i> | <i>Maximum</i> | <i>N</i> |
| Total Feature Count | 2.78 | 1.59 | 0 | 11 | 1530 |
| | <i>Does not have feature</i> | <i>Percent</i> | <i>Has feature</i> | <i>Percent</i> | <i>N</i> |
| Natural/Organic Ingredients Feature Count | 1,277 | 83.46% | 253 | 16.54% | 1530 |
| Winning Wine List Feature Count | 1,398 | 91.37% | 132 | 8.63% | 1530 |

^a This sample includes the 1,530 Zagat-rated restaurants that made their food and beverage menus available online.

Table 2: Summary statistics for wine prices and quantities for selected regions (white, red, and sparkling wines)^a

| Wine Production Region | <u>White Wines</u> | | | | <u>Red Wines</u> | | | | <u>Sparkling Wines</u> | | | |
|---------------------------------|--------------------|------|---------|------|------------------|-------|---------|------|------------------------|-----|---------|------|
| | Mean | Min | Max | N | Mean | Min | Max | N | Mean | Min | Max | N |
| <u>California</u> | | | | | | | | | | | | |
| Price (\$ per bottle) | 57.80 | 9.67 | 3114.58 | 988 | 90.74 | 11 | 1498.50 | 1018 | 54.23 | 12 | 380 | 287 |
| Count (number of bottles) | 7.57 | 1 | 216 | 1106 | 20.19 | 1 | 575 | 1143 | 1.72 | 1 | 13 | 323 |
| <u>West Coast Non-CA Region</u> | | | | | | | | | | | | |
| Price (\$ per bottle) | 47.42 | 16 | 205 | 438 | 72.90 | 20.5 | 480.71 | 599 | 59.27 | 24 | 198 | 86 |
| Count (number of bottles) | 1.80 | 1 | 10 | 510 | 3.97 | 1 | 80 | 670 | 1.16 | 1 | 3 | 97 |
| <u>New York State</u> | | | | | | | | | | | | |
| Price (\$ per bottle) | 41.83 | 17 | 102.54 | 367 | 52.57 | 10.99 | 230 | 273 | 59.04 | 16 | 120 | 67 |
| Count (number of bottles) | 2.73 | 1 | 38 | 389 | 3.03 | 1 | 44 | 296 | 1.68 | 1 | 7 | 71 |
| <u>East Coast Non-NY Region</u> | | | | | | | | | | | | |
| Price (\$ per bottle) | 51.03 | 27 | 95 | 38 | 64.41 | 25 | 120 | 26 | 51 | 38 | 60 | 6 |
| Count (number of bottles) | 2.15 | 1 | 24 | 40 | 5 | 1 | 64 | 28 | 1 | 1 | 1 | 7 |
| <u>European Region</u> | | | | | | | | | | | | |
| Price (\$ per bottle) | 60.98 | 10 | 2552.88 | 1272 | 103.49 | 15 | 2291.67 | 1229 | 114.27 | 18 | 1336.06 | 1076 |
| Count (number of bottles) | 20.58 | 1 | 683 | 1415 | 41.78 | 1 | 1317 | 1351 | 7.31 | 1 | 221 | 1181 |
| <u>Latin American Region</u> | | | | | | | | | | | | |
| Price (\$ per bottle) | 35.55 | 17 | 150 | 376 | 47.96 | 10 | 420 | 772 | 40.89 | 24 | 75 | 20 |
| Count (number of bottles) | 1.75 | 1 | 12 | 405 | 3.31 | 1 | 129 | 862 | 1.29 | 1 | 4 | 21 |
| <u>Australian/NZ Region</u> | | | | | | | | | | | | |
| Price (\$ per bottle) | 44.10 | 11 | 290 | 585 | 68.98 | 10 | 775 | 574 | 48.41 | 26 | 125 | 19 |
| Count (number of bottles) | 2.15 | 1 | 57 | 655 | 3.26 | 1 | 94 | 656 | 1.32 | 1 | 4 | 22 |
| <u>African Region</u> | | | | | | | | | | | | |
| Price (\$ per bottle) | 42.16 | 19 | 125 | 168 | 58.30 | 14 | 210 | 161 | 41.95 | 20 | 66 | 5 |
| Count (number of bottles) | 1.61 | 1 | 31 | 175 | 1.73 | 1 | 24 | 167 | 3.80 | 1 | 8 | 5 |
| <u>Other Region</u> | | | | | | | | | | | | |
| Price (\$ per bottle) | 60.96 | 21 | 509 | 112 | 78.14 | 21 | 480 | 106 | 59.33 | 38 | 92 | 3 |
| Count (number of bottles) | 2.21 | 1 | 16 | 115 | 5.15 | 1 | 230 | 112 | 1 | 1 | 1 | 3 |

^aThis sample includes the 1530 Zagat-rated restaurants that made their food and beverage menus available online.

Table 3: Logit Regression Results plus Marginal Effects, and Poisson Regression Results^a

| <u>Variable</u> | <u>Logit Model</u> ^b | <u>Marginal Effects</u> ^c | <u>Poisson Model</u> ^d |
|---|--|---|--|
| <u>Zagat Reputation</u> | | | |
| Zagat Food Quality Rating | 0.0334 [0.0416] | 0.00676 [0.00843] | 0.0491*** [0.0172] |
| Zagat Décor Rating | 0.0666** [0.0282] | 0.0135** [0.00569] | 0.0685*** [0.0107] |
| Zagat Service Rating | -0.0117 [0.0495] | -0.00238 [0.0100] | -0.0559*** [0.0196] |
| Zagat Cost (per meal) | -0.00277 [0.00539] | -0.000561 [0.00109] | -0.0110*** [0.00194] |
| <u>Cuisine Groups</u> ^e | | | |
| Standard American Cuisine | -0.555*** [0.201] | -0.105*** [0.0351] | -0.0766 [0.0668] |
| European Cuisine | -1.149*** [0.189] | -0.219*** [0.0335] | -0.184** [0.0732] |
| Asian Cuisine | -1.901*** [0.357] | -0.249*** [0.0261] | -1.454*** [0.426] |
| Latin American Cuisine | -0.858** [0.343] | -0.143*** [0.0448] | 0.493*** [0.124] |
| Other Cuisine | -1.194*** [0.344] | -0.184*** [0.0371] | -0.538*** [0.200] |
| <u>Restaurant Attributes</u> | | | |
| Natural/Organic Ingredients Feature | 0.334* [0.182] | 0.0707* [0.0401] | 0.705*** [0.0572] |
| Winning Wine List Feature | -0.00757 [0.271] | -0.00153 [0.0547] | 0.07 [0.0723] |
| Total Feature Count ^f | 0.0818* [0.0448] | 0.0166* [0.00909] | -0.0119 [0.0163] |
| <u>Wine Menu Attributes</u> | | | |
| Total Count of White Wine | 0.0105*** [0.00374] | 0.00214*** [0.000761] | 0.000471 [0.000768] |
| Total Count of Red Wine | -0.00897*** [0.00190] | -0.00182*** [0.000388] | -0.000463 [0.000478] |
| Total Count of Sparkling Wine | 0.0254* [0.0131] | 0.00515* [0.00264] | 0.00797* [0.00414] |
| Total Count of Rosé Wine | -0.014 [0.0396] | -0.00284 [0.00802] | 0.0487*** [0.0122] |
| Total Count of Dessert Wine | 0.0527** [0.0228] | 0.0107** [0.00463] | 0.0119*** [0.00379] |
| Total Count of Fortified Wine | 0.0132 [0.0462] | 0.00267 [0.00936] | 0.00796 [0.00770] |
| Total Domestic Count | 0.0212*** [0.00356] | 0.00430*** [0.000737] | 0.000635 [0.000748] |

Table 3(continued): Logit Regression Results plus Marginal Effects, and Poisson Regression Results^a

| Variable | Logit Model ^b | Marginal Effects ^c | Poisson Model ^d |
|--|---------------------------------|--------------------------------------|-----------------------------------|
| <i>Regional Attributes</i> ^g | | | |
| Upstate Location | 0.430* [0.259] | 0.0925 [0.0585] | -0.00455 [0.110] |
| Manhattan Location | -0.186 [0.226] | -0.0378 [0.0462] | -0.0367 [0.104] |
| Long Island Location | 0.984*** [0.246] | 0.221*** [0.0583] | 1.002*** [0.0980] |
| Constant | -2.649*** [0.781] | | -0.0198 [0.300] |
| Observations | 1,401 | | 1,401 |
| Log-Likelihood Ratio | -684.688 | | -2051.658 |

^a Standard errors are in the parenthesis, where *** p<0.01, ** p<0.05, * p<0.1.

^b The dependent variable in the logit model is the willingness to buy local and equals 1 if the restaurant serves any NYS wine and 0 otherwise.

^c The marginal effects is for the discrete change of the dummy variable from 0 to 1.

^d The dependent variable in the poisson model is the count of local (NYS) wines.

^e Cuisine groups are relative to the omitted case of New American cuisine.

^f This category does not include the Natural/Organic Ingredients special feature or the Winning Wine List special feature.

^g Regional attributes are relative to the four outer boroughs of NYC (The Bronx, Brooklyn, Staten Island, and Queens)

Table 4: Results from Logit Regression for NYS White Wine and NYS Red Wine^a

| <u>Variable</u> | <u>All NYS Wines</u> | <u>White NYS Wines</u> ^b | <u>Red NYS Wines</u> ^c |
|---|-----------------------------|--|--|
| <u>Zagat Reputation</u> | | | |
| Zagat Food Quality Rating | 0.0334 [0.0416] | 0.000243 [0.0437] | -0.00972 [0.0495] |
| Zagat Décor Rating | 0.0666** [0.0282] | 0.0674** [0.0288] | 0.0512 [0.0329] |
| Zagat Service Rating | -0.0117 [0.0495] | 0.0577 [0.0520] | 0.0723 [0.0591] |
| Zagat Cost (per meal) | -0.00277 [0.00539] | -0.00134 [0.00425] | -0.00554 [0.00772] |
| <u>Cuisine Groups</u> ^d | | | |
| Standard American Cuisine | -0.555*** [0.201] | -0.467** [0.199] | -0.338 [0.216] |
| European Cuisine | -1.149*** [0.189] | -1.339*** [0.195] | -1.039*** [0.213] |
| Asian Cuisine | -1.901*** [0.357] | -1.715*** [0.361] | -2.252*** [0.551] |
| Latin American Cuisine | -0.858** [0.343] | -1.012*** [0.373] | -0.364 [0.382] |
| Other Cuisine | -1.194*** [0.344] | -1.031*** [0.348] | -1.134*** [0.440] |
| <u>Restaurant Attributes</u> | | | |
| Natural/Organic Ingredients Feature | 0.334* [0.182] | 0.326* [0.186] | 0.629*** [0.196] |
| Winning Wine List Feature | -0.00757 [0.271] | -0.12 [0.265] | 0.164 [0.273] |
| Total Feature Count ^e | 0.0818* [0.0448] | 0.0344 [0.0462] | 0.0326 [0.0512] |
| <u>Wine Menu Attributes</u> | | | |
| Total Count of White Wine | 0.0105*** [0.00374] | 0.00723** [0.00327] | 0.00321 [0.00324] |
| Total Count of Red Wine | -0.00897*** [0.00190] | -0.00524*** [0.00171] | -0.00483*** [0.00177] |
| Total Count of Sparkling Wine | 0.0254* [0.0131] | 0.0221* [0.0114] | 0.0215* [0.0130] |
| Total Count of Rosé Wine | -0.014 [0.0396] | -0.00931 [0.0395] | 0.00944 [0.0411] |
| Total Count of Dessert Wine | 0.0527** [0.0228] | 0.0471** [0.0208] | 0.0276 [0.0193] |
| Total Count of Fortified Wine | 0.0132 [0.0462] | -0.0573 [0.0400] | -0.0259 [0.0401] |
| Total Domestic Count | 0.0212*** [0.00356] | 0.00958*** [0.00280] | 0.0132*** [0.00300] |

Table 4 (continued): Results from Logit Regression for NYS White Wine and NYS Red Wine^a

| Variable | All NYS Wines | White NYS Wines^b | Red NYS Wines^c |
|---|----------------------|------------------------------------|----------------------------------|
| <i>Regional Attributes^f</i> | | | |
| Upstate Location | 0.430* [0.259] | 0.614** [0.270] | 0.335 [0.307] |
| Manhattan Location | -0.186 [0.226] | -0.0914 [0.241] | -0.107 [0.278] |
| Long Island Location | 0.984*** [0.246] | 1.121*** [0.259] | 1.266*** [0.287] |
| Constant | -2.649*** [0.781] | -3.492*** [0.809] | -3.771*** [0.918] |
| Observations | 1,401 | 1,401 | 1,401 |
| Log-Likelihood Ratio | -684.688 | -647.538 | -545.615 |

^a Standard errors are in the parenthesis, where *** p<0.01, ** p<0.05, * p<0.1.

^b The dependent variable in this model is the willingness to buy local white wine, and equals 1 if the restaurant serves any NYS white wine and 0 otherwise.

^c The dependent variable in this model is the willingness to buy local red wine, and equals 1 if the restaurant serves any NYS red wine and 0 otherwise.

^d Cuisine groups are relative to the omitted case of New American cuisine.

^e This category does not include the Natural/Organic Ingredients special feature or the Winning Wine List special feature.

^f Regional attributes are relative to the four outer boroughs of NYC (The Bronx, Brooklyn, Staten Island, and Queens)

Table 5: Regression Results for Restaurants in the New York City Metropolitan Area^{a,b}

| <u>Variable</u> | <u>Manhattan</u> ^c | <u>The Outer Four Boroughs</u> ^c |
|---|-------------------------------|---|
| <u>Zagat Reputation</u> | | |
| Zagat Food Quality Rating | 0.0712 [0.0606] | 0.218 [0.134] |
| Zagat Décor Rating | 0.117*** [0.0435] | 0.0806 [0.0926] |
| Zagat Service Rating | 0.00233 [0.0736] | -0.349** [0.146] |
| Zagat Cost (per meal) | -0.0178* [0.00999] | 0.0338 [0.0286] |
| <u>Cuisine Groups</u> ^e | | |
| Standard American Cuisine | -0.0676 [0.320] | -1.148 [0.731] |
| European Cuisine | -0.537* [0.290] | -2.478*** [0.728] |
| Asian Cuisine | -0.974** [0.457] | -2.663** [1.308] |
| Latin American Cuisine | -1.197** [0.552] | -0.0861 [0.914] |
| Other Cuisine | -0.868* [0.457] | |
| <u>Wine Menu Attributes</u> | | |
| Total Count of White Wine | 0.00898** [0.00399] | 0.0354 [0.0339] |
| Total Count of Red Wine | -0.0113*** [0.00235] | -0.00906 [0.0108] |
| Total Count of Sparkling Wine | 0.0392*** [0.0147] | -0.00813 [0.0992] |
| Total Count of Rosé Wine | -0.0697 [0.0559] | -0.200 [0.132] |
| Total Count of Dessert Wine | 0.0794*** [0.0270] | -0.225 [0.234] |
| Total Count of Fortified Wine | 0.0186 [0.0467] | |
| Total Domestic Count | 0.0265*** [0.00477] | 0.0667** [0.0276] |
| Constant | -4.440*** [1.188] | -1.355 [2.800] |
| Observations | 779 | 159 |
| Log-Likelihood Ratio | -343.517 | -61.885 |

^a Standard errors are in the parenthesis, where *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

^b We suppress the results for Restaurant Attributes here, but these are available from the authors upon request.

^c The dependent variable in this model is the willingness to buy local wine, and equals 1 if the restaurants in this location serve any NYS wines and 0 otherwise.

^d Cuisine groups are relative to the omitted case of New American cuisine.