Ithaca 2018 Abstract Submission

Title
Winery Clustering: Close to the Vine or to Other Sources of Cost Advantage?

I want to submit an abstract for:
Conference Presentation

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Research Question
What is the relative importance of proximity to vineyards, transportation costs and proximity to wine-making knowledge to the geographical clustering of wine production?

Methods
We conduct an observational regression analysis of the Washington State wine industry, using a detailed panel on over 15,000 observations at the zip-code / year level.

Results
Preliminary results confirm the importance of proximity to vineyards, show that transportation costs are unimportant and show that a long history of wine-making is important. Further analysis is forthcoming.

Abstract
Introduction
The production of wine is notable for its level of agglomeration. Wine connoisseurs know that great wines often come from great locations – Bordeaux, Burgundy, Napa, to name a few. Agglomeration in wine production has also been noted by regional and urban economists. For example, Ellison and Glaeser (1999) noted that the wine industry, by their measure, was the second-most agglomerated industry in the United States. They speculated that such agglomeration in the wine industry is affected by proximity to suitable areas for growing grapes: wineries cluster close to the vine.
However, the "natural advantage" of proximity to an important raw ingredient is just one of four types of cost

advantages that Marshall, in his classic work, postulated may contribute to agglomeration (Marshall, 1920). Wine production, with its high degree of differentiation by quality and increasing return to scale in its production, could be highly affected by the other Marshallian sources of cost advantage: transport costs, human capital agglomeration and knowledge spillovers.

Our paper will empirically examine the marginal contributions of each of these sources of cost advantage to clustering in wine production. The context for this study will be the wine industry of Washington State. Although we may eventually conduct a similar study of wine production in a larger area, such as California or the entire United States, the Washington wine industry provides a good opportunity to test this theory on a smaller scale. While Washington lags far behind California in total wine volume (by a factor of 23), it is closer in terms of number of wineries, where California only exceeds Washington by a factor of 5.5. This reflects the emphasis by wineries in Washington on producing high-quality wines in smaller volumes.

Washington State does not have a long history of wine production: its first wineries were started in the 1960s. The industry has subsequently grown exponentially, and as of 2014 had 681 wineries in operation. Most of these wineries have located in one of two clusters in Washington: the Columbia basin belt, an area stretching from the Yakima valley through the "Tri-Cities" (Richland, Kennewick and Pasco) to the Walla Walla valley and a second cluster centered on Woodinville in the Seattle metropolitan area.

The fact that as the number of wineries in Washington has grown they have tended to cluster is unsurprising. The surprising feature of the Washington wine industry is in the differences between the locations in which they have clustered. The geographic features of the Columbia basin belt are very different than those of Woodinville. The fact that we observe clustering in both types of locations suggests that the other Marshallian factors may be behind such clustering. The case of Woodinville is particularly interesting. It is located near Seattle: the entire population of the Seattle metropolitan area (about 4 million people) is within 100 kilometers of it. Yet the major viticultural areas of Washington are 250 to 500 kilometers from Woodinville.

Although many studies regarding agglomeration have focused on transport costs (e.g. Krugman, 1991) or knowledge spillovers (e.g. Glaeser et al, 1992), only a few have simultaneously considered transport costs, knowledge spillovers, human capital and natural advantages simultaneously. These include Ellison and Glaeser (1997, 1999) and Ellison, Glaeser and Kerr (2010). One prior study that found evidence of knowledge spillovers in wine clusters was Giuliani, 2007.

Methodology

We conduct a regression analysis that seeks to explain the geographic concentration of the Washington wine industry. The analysis makes use of panel data with observations at the county/year and zip-code/year. Panel data allows the use of lagged factors, such as the lagged effects of the historical presence of wineries. It also allows the inclusion of fixed effects and trends, to account for unobserved factors affecting the growth path of winery formation. Using GIS, we make use of detailed data on the distances between wineries and their distances to various factors.

We measure the size of the wine industry in two different ways. One dependent variable is the count of the number of wineries in a given geographic area (zip code or county). This measure accounts for the growth in wine entrepreneurship that has occurred in the past few decades. A second dependent variable is winery employment, which is related to the impact of the wine industry on local economies.

Our primary explanatory variable is an index of distance to sources of wine grapes. This variable will captures the natural advantage that such proximity has in terms of reducing transportation cost, as well as reducing transaction costs by making it easier to observe the quality of the grapes.

The transport cost of output is also likely to be a significant factor, given wine's high weight to value ratio. We will construct a similar index of distance to customers, similar to the one described above, using income-weighted population sizes of zip codes in Washington and the neighboring states of Oregon and Idaho.

Proximity to a large and talented local labor pool is another potentially significant factor influencing winery location. Again, an index of the weighted distance to population, or college-educated population, could serve here. However, human capital in winemaking is substantially enhanced by the presence of college programs in viticulture, many of which have been started in Washington State. A weighted index of distance to such programs would also serve here.

Knowledge spillovers, that is, the use knowledge by firms other than the ones that generated such knowledge, are hard to measure. We will approximate the stock of viticultural knowledge in an area using information on high-profile wineries: wineries that have won major awards and recognitions.

Data

We make use of two sources of data on wine production. The main source will be County Business Patterns (CBP), a publically available dataset from the US Census Department. CBP contains data on the number of wine producing establishments (plants) at the zip code level, by number of employees (broad categories), for the years 1994 – 2014. From the CBP data we are able to estimate the level of winemaking employment per zip code. A second source is the Employment Security Department (ESD) of the State of Washington. The ESD tracks employment and wages by industry, and so provides direct measures of both.

We supplement the CBP data with data on the number of wineries based on winery licenses issued by the Washington State Liquor and Cannabis Board, which Hickman and Miller manually collected for the years 1985 and 2014. This is a useful check on the veracity of the CBP data, as the definition of establishments and plants may have varied over the sample time frame.

Data on the quantity of grapevines in cultivation comes from the USDA National Agricultural Statistics Service publication Washington Vineyard Acreage Report, 2011. This report provided data on the quantity of vines in cultivation in each AVA, for the years 1991, 1995, 2000, 2005, 2007, 2009 and 2010. For years between those dates, we estimated the quantity using linear interpolation. Data on aggregate personal income per county come from the Bureau of Economic Analysis.

Preliminary Results

At present we still lack data from the Washington State Employment Security Department, as well as many measures of viticultural knowledge. We do have the historical, pre-1994 data on the locations of wineries to use as a measure of local knowledge. In a preliminary analysis, we regressed measures of wine production (number of wineries, estimate of winery employment) on indexes of proximity to vines, proximity to customers, and lagged wineries interacted with the number of years that at least one winery had existed in a location.

The preliminary analysis confirms that proximity to vineyards is a significant factor, but by itself explains only 10% of the variation in the number of wineries. Local winemaking history is found to accelerate the growth of the number of wineries, but reduce the growth of winery employment. Proximity to customers is not found to be a significant factor, indicating that transport costs are not important, but we think that this might change as we refine the analysis with better data. Further analysis will be necessary to confirm this, and also to better control for knowledge spillovers.

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