Explaining German wine price and quality differentials: a hierarchical multilevel approach

The impact of geological vineyard characteristics on price and quality of
German Riesling premium wines in the Rheinland-Pfalz region

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Abstract

It can be argued that consumers value products according to their utility-generating attributes. On the basis of this principle the impact of product characteristics can be estimated with a hedonic price equation, which applies to markets in perfect competition over differentiated products. This research focuses on attributes that can serve as price and quality indicators for German Riesling premium wines. Special attention goes to vineyard characteristics, or "terroir" components, that are believed to have an indirect effect on wine price, by which sensory quality serves as a mediator. Therefore, this study extends on the hedonic price function with two hierarchical multilevel models that can explain wine price and quality differentials within vineyards in comparison to variability differences between vineyards.

This investigation concerns four specified wine regions in the German state Rheinland-Pfalz, namely Mosel-Saar-Ruwer, Nahe, Rheinhessen and Pfalz. First, this research has made use of the on-line Wine Spectator database. A total number of 2169 wine reviews over the years 1992 to 2002 has been divided over 121 individual producers and grouped into 134 individual vineyard sites. This sample has been combined with vineyard specifications provided by the German Wine Institute, such as classification and aspect. Secondly, the polygons of individual vineyard sites have been plotted in Google Earth for implementation in a Geographical Information System (GIS) called ESRI ArcView. As it follows, a Digital Terrain Model at 20 meter resolution from the Rheinland-Pfalz Geology Office on vineyard slope and soil type has been linked to the original database. This sample selection allows for a price and quality comparison between wines that come from individual vineyard sites, including quantitative measures of physical factors.

This research has identified seven wine attributes to be tested in two hierarchical multilevel analyses, including vintage, quality wine with special attributes (QmP), Prädikat Wine Estates (VDP), VDP classified vineyards, slope, aspect and soil type. Predictors included in both models all show up to have a significant effect. First, the hierarchical multilevel model can explain over 68.2% of the price differential between wines from an individual site, whereas the same 10 predicators account for more than 73.8% of variance between vineyards. The QmP attributes Trockenbeerenauslese,

Eiswein, Beenerenauslese, Auslese and Spätlese have a strong positive impact on wine price. The only vintages that show up with a positive relationship are 1993 and 2002. VDP membership has a positive influence as well. Vineyard characteristics explain wine prices to a lesser extent. Slope is slightly positively related to wine price, whereas slate over "Schuttlehm" (special type of loam) indicates a negative relation. Secondly, the 17 independent variables included in the hierarchical multilevel analysis on sensory quality can explain 39.3% of variance between wines from a single vineyard. The same model estimates that 54.1% of quality differential between sites can be explained. Besides all QmP attributes, except Kabinett, most vintages have a positive impact on sensory quality and show high levels of explanatory power. This outcome supports the view that vintages do account for year-to-year variation in geographical and meteorological factors showing a direct effect on sensory quality, which serves as mediator in relation to wine price. In addition, a western and west north-western aspect has a negative influence on wine quality, which confirms expectations. Also, VDP vineyard classification Grosses Gewächs shows a positive relationship. This implies that Grosses Gewächs sites produce wines with significantly higher sensory quality than non-classified ones. Although the latter hierarchical multilevel model is more complex than its predecessor, most outcomes are consistent with theoretical assumptions made in this research. Hence, future marketing research should continue to search for attributes that explain vintage effects between wines from identical vineyard sites and focus on terroir components in particular. This can be achieved by the implementation of GIS spatial analysis as conducted in this research.

The identification of key attributes increases the transparency of the German premium wine market and contributes to the development of more effective producer marketing strategies and consumer purchase decision-making behaviour. Easy access and use of product information gives rise to higher utility generating processes. On the basis of this research an online search engine including 3563 German Riesling wines has been developed that enables producers, marketers and consumers to acquire important attribute information (http://winedb.winejob.nl).