Comparing Import Demand for Wine between the Western and Eastern United States

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Research Question
How does excess supply and demand for quality differentiated wine from the west and east coast custom districts drive this particular equilibrium?

Methods
In our analyses, we consider four different differential demand systems (Rotterdam, AIDS, CBS, and NBR) and choose the most appropriate model among them.

Results
The preliminary analysis shows statistical significant cross price elasticities between two regions of the United States, and Oceanic Countries and European Union Countries.

Abstract
Objectives and Background
In wine trade two grades of wine are recognized: bottled and bulk. The bottled wine is considered to be of the higher quality than the bulk wine, which is also consistent with unit prices for each grade. Over the last decade, an interesting trend has developed: the west coast custom districts export bottled while importing bulk wines whereas the opposite is true for the east coast custom districts, which import the bottled wine, but exports are insignificant.

This situation generates a question: what influences such trade flows? In other words, how does excess supply and demand for quality differentiated wine from the west and east coast custom districts drive this particular equilibrium. While a few studies analyze the import and domestic wine demand in the United States (U.S.), to our knowledge, there is no study analyzing the regional demand for wine, especially in terms of wine quality. This study aims to fill this gap by combining regional production and quality differentiated wine imports by analyzing regional demand from the west and east coast custom districts.

Western States of the U. S. are by far the largest wine producers in the U.S. The quality wines are exported mostly to the European Union, Canada, China, and Japan (50%, 11%, 7%, 6%, respectively, of the total export
quantity, which is 169 million liters) (USDA-FAS, 2015). On the other hand, west coast custom districts are also
the second largest wine importers, and wine is one of the largest import goods in the food categories for the
western states (USDA-FAS, 2015).

By comparing two dominant wine importing regions in the U.S. in 2014, it can be seen that east coast custom
districts import value exceeds twice that of the west coast customs districts, 62% and 29% of total wine import
in value, respectively. The west coast custom districts mostly import quality wines from Italy, France, New
Zealand, Australia, and Chile (26%, 25%, 12%, 12%, 5%, respectively, of the total import quantity) (USDA-FAS,
2015).

The quantity of imported wine are almost the same between the two regions 39% and 47% of total wine import
in quantity in 2014, respectively, the quality and price per unit of wine imported on the west coast is lower than
those of the east coast customs districts (USDA/FAS, 2015).

Literature Review
The price models on consumers’ wine preferences can be classified into three categories. Some empirical studies
used hedonic price analyses on wine markets (Oczkowski, 1994; Combris et al., 1997; Schamel, 2000; Steiner,
2004; and, Noev, 2005). Hedonic price approach allows researchers to focus on differentiation in products based
on the product attributes. However, this analysis only determines price level at the equilibrium rather than the
demand for wine products.

Simple linear demand equation estimations are also used vastly. For instance, Owen (1979) estimated the wine
demand in Australia using a log-linear consumption function. The results for these methods allow researchers to
find price and income elasticities of demand only for the analyzed region. Clemens and Johnson (1983), Tegene
(1990) and Selvanathan and Selvanathan (2004) are also analyzed wine demand for different regions with
varying research objectives. Overall, this method gives some remarkable information on consumer’s demand
based on the product and the region.

Demand models with simultaneous equations are later used to estimate differential demand systems: Rotterdam
model, Almost Ideal Demand System (AIDS), Central Bureau of Statistics (CBS) model, and the National Bureau
of Research (NBR) model. Some notable studies by Moosa and Baxter (2002), Eakins and Gallagher (2003) and
Seale et al. (2003) estimated the disproportionate growth of imported red wine sales in the US market by
including the domestically produced product into model. Lately, Zhang and Seale (2015) estimated three
different modifications of all four differential demand systems (Rotterdam, CBS, NBR, and AIDS) by separating
domestic production, including domestic production and two stage estimation including domestic wine
production.

It is argued that differential demand systems previously reported in the literature have many shortcomings
because of the aggregated data use and restrictive market structure assumptions (Davis et al., 2008). These
models are also insufficient for a differentiated market analysis by its nature because the aggregation does not
allow the different attributes of wine to be included in the analysis. However, this method gives more information
on market demand than the other methods including own price elasticity of demand, expenditure elasticity and
cross price elasticity. This study aims to use the advantages of differential demand systems to obtain necessary
information to depict the wine market for Eastern and Western United States, and it also alleviates the concerns
related with aggregation by disaggregating the data on wine quality and demand regions in the United States.

Data
The U.S import/export expenditure, quantity, and price data from 1989 to 2014 are collected from the United
States Department of Agriculture, Foreign Agricultural Service (USDA/FAS, 2105). Similar to Zhang and Seale
(2015), we include the domestically produced wine in the analysis Winters (1984). Data on U.S. wine imports
from New Zealand, Italy, France, Australia, Germany, Chile and the ROW were obtained from the United Sates
Department of Agriculture, Foreign Agricultural Service (USDA/FAS, 2105). Annual import data at International
Harmonized System of Commodity Classification are used in this analysis. The sample size includes 26 price and
quantity observations from 1989 to 2014 for each import counties. Imports quantities, measured in liters, and
the imports values, in U.S. dollars, are collected for each importer country. Unit prices of imported quality wine,
defined as cost insurance freight (CIF) price, are calculated by dividing total value by total quantity of imports.
Domestic wine production and price data are collected from different resources including the U.S. Department of
Treasury’s Bureau of Alcohol, Tobacco and Firearms and California Grape Crush Reports and other state
agricultural production datasets. Annual domestic consumption of wine was calculated using data from ATF’s “Annual Statistical Reports—Wine,” where domestic consumption equals taxable withdrawals (production) minus exports minus the change in stocks. To adjust the wine prices, a domestic wine producer-price index series that includes annual price indices from 1989 through 2014 was obtained from the U.S. Department of Labor’s Bureau of Labor Statistics.

Import Demand Model

In our analyses, we consider four different differential demand systems (Rotterdam, AIDS, CBS, and NBR) and choose the most appropriate model among them. To do so, we consider the General model introduced by Barten (1993) which nests all four demand systems. The Rotterdam model was developed by Barten (1964) and Theil (1965). In 1980, Deaton and Muellbauer (1980) introduced the AIDS model including its time-series version. Keller and Van Driel (1985) established the CBS model by combining the Rotterdam price parameterization and the AIDS income parameterization. What makes the CBS model different from the Rotterdam model is that its marginal shares are not constant as they are in the Rotterdam model. Finally, Neves (1987) developed a fourth model, called the NBR model, which had the Rotterdam income parameterization and the AIDS price parameterization.

One of the first applications of these differential demand systems to import demand for an agricultural commodity was by Seale et al. (1992) who used the Rotterdam demand model to estimate fresh apple imports. More recently, Schmitz and Seale (2002) estimated the demand for Japanese fresh fruit imports, and Seale et al. (2003) estimated U.S. demand for domestically produced and imported red wine using differential demand models. In this paper, we utilize a comprehensive estimation methodology that considers all four nested models and chooses the best model that explains the demand for imported and domestic quality wine in the Eastern and Western United States.

Expected Results

This study aims to fill this gap by combining regional production, and exported and imported wine figures by analyzing regional demand of quality wine in western region. The preliminary analysis shows statistical significant cross price elasticities between two regions of the United States, and Oceanic Countries and European Union Countries. The expenditure elasticity for domestic wine is significant and also higher in magnitude than the other countries’ expenditure elasticities which indicates that the increase in the consumer expenditure increases the demand for quality wine. Further, we can simulate the future demand possibilities for different price structures using the latest trade data. Additionally, we expect that the expenditure increase will benefit California and pacific west coast wine industry the most because of their locational and infrastructural advantages. However, the focus of this paper stops at regional impact for western states. This study can be enhanced by a comprehensive economic analyses of current and future trade policies which is a great need for negotiators, policy makers and industry stakeholders. These study results will help to quantify the quality and regional demand factors that might have an impact on U.S. wine industry.

References


