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**Keywords:** wine trade shifts, new world wine producers, old world wine producers, market shares, wine trends, wine cycles, international wine trade

**JEL codes:** Q13, Q16, O56

**Abstract:** The global wine market has witnessed major changes in recent years. Some of these changes are structural in nature, while others are cyclical. The structural adjustments reflect changing trade shares due to long term forces. Shifts in wine production capacity, mainly through increasing vineyard area and replacing table wine grapes with higher quality grape varieties, take time. New producing entrants have appeared in Latin America, the United States, Australia and New Zealand. International trade patterns and shares have thus shifted with the new market entrants increasing their exports not only to traditional European markets but to other importing regions as well. The cyclical adjustments in wine markets are medium or shorter term in nature. These vary between the impacts of weather fluctuations on grape production to the influences of business cycles on wine trade, consumption and prices. This paper employs econometric methods to analyze the recent major shifts in world wine market shares and to explain whether these are more of a secular trend-setting nature or of a temporary cyclical nature.

Paper prepared for the *OENOMETRICS XI* conference of the VDQS-AEA, Dijon France, May 20-22, 2004. Draft May 1, 2004.

## ANALYZING TRENDS AND CYCLES IN INTERNATIONAL WINE TRADE

The global wine market has witnessed major changes in recent years. Some of these changes are structural in nature, while others are cyclical. The structural adjustments reflect changing trade shares due to long term forces. Shifts in wine production capacity, mainly through increasing vineyard area and replacing table wine grapes with higher quality grape varieties, take time. New producing entrants have appeared in Latin America, the United States, Australia and New Zealand. International trade patterns and shares have thus shifted with the new market entrants increasing their exports not only to traditional European markets but to other importing regions as well. The cyclical adjustments in wine markets are medium or shorter term in nature. These vary between the impacts of weather fluctuations on grape yields to the influences of business cycles on wine trade, consumption and prices. The purpose of this paper is to analyze the global significance of these changes. This paper consists of the following parts: The Setting, The Facts, Trends or Cycles, and Prospects.

### **The Setting**

We occupy the center of a wine revolution that is without parallel. A form of globalization has truly struck wine markets. Quality wines are being produced on six continents, and developed as well as developing nations are active in international wine trade. This has occurred because high incomes, finance, politics and gourmet culture gradually emerged in former politically and culturally wine-restrictive nations. Historically wine production and consumption have been mainly in western Europe; France, Italy, Portugal and Spain constitute the core of old world wine producers. Greece and, in eastern Europe, Bulgaria, Hungary, Moldova and Romania are added to the above western European grouping to complete the list of old world wine producers. But now we have large and growing wine production and consumption in the new world: Argentina, Australia, Chile, New Zealand, South Africa, Uruguay and the United States.

The new world expansion has changed the way in which wine is appreciated according to flavor, variety and national origin as well as to wine market structure and the way that wine is traded internationally. The traditional concept of wine, designated according to vineyard of origin or appellation, is being replaced by that of varietal or grape variety. This transition began with an emerging preference for cabernet, merlot and chardonnay varietal wines. As wine producers, franchisers and distributors responded to this demand, the planting of these grapes and consequent wine production exploded globally. These three varietals provide a flavor and aroma that is agreeable and easily identifiable. Once this stage was passed, the production of varietals expanded to include many of the other grapes used in traditional wines: riesling, sauvignon blanc, gamay, gewurtztraminer, pinot noir, shiraz, just to name a few. The reaction of the old world producers to this change has been to bottle some of their wines as varietals and to begin to blend some new varietals into their traditional wines. Examples include planting viognier, supplementing sangiovese in the making of Chianti or varying pinot noir clones in the making of Bourgogne Rouge.

According to Kramer (2003), improvements in technology have made it possible to adjust the flavor and aroma of wines in almost any direction. The new wine drinkers, who represent the largest demand group, have reshaped modern taste. Not having had the benefit of tasting mature wines nor of having been tutored by traditional experts, the new drinkers seem to want ripe-tasting, rich, full-flavored wines with some oakiness and at reasonable prices. Thus, the definition of wine quality is no longer the domain of the wine producer. One of the first innovations that enabled the improvements in wines among regions and nations was the temperature-controlled fermentation tank. Then the field of sensory science made it possible to understand and to alter the sensory perception of food and beverages through olfactory profiling. Most noticeable are the Australian-led innovations. Instead of using traditional oak barrels to impart flavor, oak chips and sawdust can be added to the fermenting wine, then filtered. Wine yields are increased rather than reduced through selection. The excessively juice-laden grapes then pass through vacuum concentrators (an ultra-fine filtration process) that remove water from the diluted must made from these grapes. Also by over-ripening the grapes, wine flavor is enhanced but the sugar rises and concomitantly the alcohol of the wine. This can be lowered by using a spinning cone that can control the alcohol content fairly precisely. Finally acid levels can be modified by adding tartaric or citric acid; and powdered tannin can be added to increase the body or structure of red wines.

The existing very large wine and alcohol conglomerates have tried to address this new consumer interest mainly through franchising and marketing. Franchising here refers to a large societal impulse toward predictability, reliability and security in wine purchasing. Today consumers demand more flavorful, more aromatic, identifiable and, accessible wines, regardless of the grape variety or the traditional taste of the wine. There seems to be a preference for dry rather than sweet wines. But sparkling wines too are on the rise. Wine makers have responded by employing the new technologies to manipulate the structure of their products so that this goal is met, enlarging their efforts on marketing branded wines. Whereas European and even American wine producers identify quality with localized districts and small regions, other new world producers control fermentation and blend wines to create these uniform or branded wines that characterize their entire production.

### **The Facts**

The statistical facts accompanying this setting are well known. Wine exports and market shares have declined among the major old world producers, while the exports and shares of the new world producers have increased. Figures 1 and 2 illustrate these changes in market shares in volume terms for the major countries. Old world shares including the core have declined. Export shares show sharp gains for the new world producers. This transition has been described in greater depth and in considerable detail by Anderson and Norman (2003). They report that while European producers account for three-fourths of world wine production and almost all of wine exports, the new world producers have begun to challenge this dominance. Between 1990 and 2001, the latter group's share grew from 4 to 18 percent in value terms (AN, Table 41). Excluding intra-EU trade, the old world group's share fell from 88 to 64 percent. The new world's increase is notable, because it has occurred at the same time as a decline in world production and consumption. During the 1990's, global wine production fell 0.5 per cent per year, while global wine trade increased by 5.2 percent per year in volume terms and

7.0 per cent in nominal \$US terms (AN, Tables 11,15,37). Another aspect of these changes is the growing importance of wine in total merchandise exports. For example since 1990, this indicator has gone from 0.6 to 3.7 per cent for Chile and from 0.3 to 1.4 per cent for Australia (AN, Table 46).

Market concentration is fairly high with the top-ten wine exporting countries accounting for more than 90 percent of world wine trade. This concentration is divided about half-way between the old and new world countries. In descending order, they are in value terms for 2001: France (41.5 per cent), Italy (17.4), Spain (9.6), Australia (6.4), Chile (4.7), U.S. (3.7), Portugal (3.4), Germany (2.6), South Africa (1.6) and Argentina (1.1), (AN, Table 124). The share of France is 10 percentage points lower than 1990, which with smaller declines for Portugal and Germany have ensured that the shares of Australia and other new world suppliers correspondingly have increased substantially. Australia has gone from 6 to 23 per cent; the combined increase for Argentina, Chile, New Zealand, South Africa and the United States is from 6 to 23 percent. Wine imports are also highly concentrated. By 2001, one-half of all imports continued to be purchased by three nations: UK (19 per cent), US (16) and Germany (14) (AN, Table 125).

Anderson and Norman also interpret these market changes employing two other indicators. The wine trade volume (value) specialization index is defined as the ratio of net bilateral exports (exports-imports) to the sum of bilateral exports plus imports, so that the index measures between -1 and +1. Between 1990-2001, the value version of this index has hovered about 0.84 for the core old world producers (AN, Table 90). For Australia, the index rose from 0.71 to 0.88 during that period, for New Zealand from -0.29 to 0.16, for Argentina from 0.40 to 0.83, and for South Africa from 0.86 to 0.93. The index of comparative advantage in wine explains the share of a country's exports in total merchandise exports divided by the share of world wine exports in total world merchandise exports. Between 1990-2001, this index increased only from 6.09 to 6.35 for the core old world wine producers (AN, Table 48). But for some of the new world producers, the change has been astonishing. For Australia, the index rose from 1.29 to 6.26, for New Zealand from 0.48 to 0.67, for Chile from 2.56 to 16.46, and for the United States from 0.11 to 0.31.

### **Trends or Cycles**

Thus far all of this evidence supports the received view of recent market changes: declining market shares for old world producers and increasing market shares for new world producers. However, a more careful examination of the underlying export data (AN, 2003) would suggest that we accept this view with caution. Further analysis occurs with the regression results. Let us begin with aggregate measures. Figures 1 and 2 above suggest that for both old and old core wine producers, market shares peaked somewhere between 1987 and 1990 and declined afterwards. To appropriately test for any trends or cycles in these shares, we thus examine the data beginning then until now. To simplify our analysis, we also concentrate only on the four core producers and the four major new world producers.

The levels of market shares and their percentage changes (growth rates) are presented in Figures 3 and 4. Though downward trends appear, the shares are dominated by cycles. This is true for the old world as well as the new world producers. When the shares are transformed into fluctuations or percentage changes, in fact, only cycles are witnessed with little evidence of trends. Such cyclical dominance is not surprising, given

the annual fluctuations that occur in grape and wine production. The sources of these fluctuations, of course, are annual fluctuations in the underlying conditions, including rainfall, temperature and sunlight at different times of year. Recall that the frequency and amplitude of these fluctuations and their impacts on wine prices and producer earnings have been sufficiently severe that the OIV has organized a special investigative committee, *Analyse Economiques et Conjoncturelle*.

Another source of the market share fluctuations have been changes in demand and prices generated by business cycle fluctuations (Labys, 2001). This is not surprising given the increased globalization of the world wine market (Anderson, 2001). Earlier Lindsey (1987) examined the impacts of exchange rates (and trade barriers) on the U.S. wine industry. A study of French wine industry impacts was made by Mathis et. al. (1997). Later Phares (2000) and Auzias (2001) examined the impacts of a wide range of business cycles indicators on the wine industries of Australia, France, Germany, Italy, Spain, the United Kingdom and the United States. At the same time the studies of Wittwer and Anderson (2001), Anderson and Berger (1999), and Wittwer et.al. (2001) employed much more precise (disaggregated) macro and industry variables to this effect.

An important business cycle indicator for wine consumption is per capita income, as partially determined by such leading indicators as productivity, hours worked, and wages. Income, along with expectations, interest rates, and other economic variables, are key factors in global wine production and consumption. Some important questions surround these variables: (1) Are national product, incomes and earnings likely to influence domestic wine demands? Similar variables defined for wine importing countries or global incomes might be useful for explaining the wine exports of a country. (2) Do exchange rates (including devaluation effects) explain changes in wine exports or wine imports of a country? And (3) do changes in interest rates cause increased liquidity to finance new industry investments changing the capital stock or to store wines in inventory?

An attempt has been made to decipher the relative importance of the various trends and cycles in the market share data employing econometric regression analysis. The market share variables of the respective countries and regions have been regressed linearly against time to determine the significance of trends in the share data. Interpreting the t-statistics on the time or trend variables indicates their positive or negative significance. The regression errors reflecting cyclical movements about the trend are further tested to evaluate the presence of first or second order lags. The significance of second order lags provides some evidence though weak of the presence of a cyclical component (Mills, 2003).

The results of the regression analyses have been illustrated initially in Figures 5 and 6, again divided between the core old world and new world producers. These figures present the statistical test results for each of the equations and depict the fitted trends, actuals and errors or residuals. Table 1 further summarizes these results as well as those of the second order autoregressive tests.

Consider first the declining trends in market shares among the core producers. Clearly France and Portugal display a negative trend coefficient that is statistically significant according to the t-test. The shares of Italy appear to have a declining trend, but no confirmed significance. In contrast the shares of Spain are increasing and significant.

**Table 1**  
**MARKET SHARE TREND AND CYCLE STATISTICS**

Countries 1987-2001	Trend Equation			Cycle Equation		
	R <sup>2</sup>	bT	t <sup>a</sup>	R <sup>2</sup>	blag2	t <sup>b</sup>
France	0.57	-0.64	-4.43	0.50	-0.30	-0.98
Italy	0.03	-0.12	-0.75	0.66	-0.79	-4.30
Spain	0.28	0.36	2.53	0.22	-0.40	-1.37
Portugal	0.37	-0.12	-3.06	0.16	-0.26	-0.86
Australia	0.86	0.39	9.26	0.46	-0.53	-1.57
U.S.	0.95	0.34	17.1	0.39	-0.22	-0.76
Chile	0.98	0.40	23.5	0.35	-0.59	-2.31
South Africa	0.94	0.23	15.4	0.70	-0.60	-3.02
Old	0.81	-1.08	-7.48	0.41	-0.23	-0.84
New	0.98	1.10	28.6	0.28	-0.49	-1.93

a. 95% t-value=1.76

b. 95% t-value=1.80

Note: Trend:  $MS = a + bT + e$

Cycle:  $e = a + ce_{-1} + be_{-2} + r$

R<sup>2</sup> is adjusted.

The collective shares of the old world producers are also declining significantly. The results for the new world producers are not mixed at all. The market shares of Australia, United States, Chile and South Africa follow an increasing trend that is statistically significant. This is also confirmed for the new world total.

Earlier in this paper it was suggested that trends reflect structural changes that are long term in nature, i.e., new grape varieties, vine plantings, harvesting techniques and enological practices. Let us now examine the possibilities of cycles that reflect medium to shorter changes due to weather fluctuations or business cycles. The discovery of such cycles could well confound the interpretation of the permanency of changes in country market shares. Among the core producers only the shares for Italy appear to be cyclical in nature, suggesting that losses in market shares may be transitory rather than permanent. The trends in market shares of Australia and the United States appear to be permanent. Cyclical activity for these countries is not confirmed by second-order tests. However, for Chile and South Africa cycles as well as trends are significant. Perhaps this reflects their recent spurts in export growth.

### **Prospects**

For the purpose of analysis, we have focused on four old world producers (France Italy, Spain and Portugal) and four new world wine producers (Australia, United States, Chile and South Africa). Are the discover changes in market shares trend-setting or cyclical in nature? The results of the regression analysis raise as many questions as they answer. If one accepts as a grouping countries that share the same characteristics, neither the old world producers nor the new world producers fully fulfill these criteria, i.e. recall the trend and cycle results presented in Table 1. For the core old world producers, the trends (significant trend coefficient) in shares are significantly negative for France, Italy and Portugal but positive for Spain. Evidence for cyclicity (significant second order autoregressive structure) was found for Italy. For the old world producers taken together, the trend in shares was negative without evidence of cyclicity. For the four major new world wine producers, all exhibited upward trends in shares (as did the group total) with significant cyclicity for two of the countries only, Chile and South Africa. For the new world grouping taken together, evidence of cyclicity also exists. Thus we infer that the examination of shares might be better viewed on a country-by-country basis than by old world vs. new world groupings, however appealing this method is to conventional analysis.

The above results also suggest that the declines in shares by France and Portugal deserve serious attention by their respective domestic wine industries. For the case of Italy the declines are not clearly in evidence and a turn in cyclical activity could revive them. However, for the new producers, the increase in market shares and exports symbolizes the impact of the important underlying factors that have transformed their wine industries. Given the changing nature of wine consumption habits, one wonders whether or not old world producers are capable of reversing the patterns examined in this paper.

Earlier we attempted to review some of the factors underlying these declines. Perhaps one simple explanation is that good wines should taste good. At a previous VDQS conference, members of this group were offered a tasting of wines of the region. The wines that we were served were extremely below average in quality. Most certainly only one out of the six or seven of the wines served could be considered even drinkable. Yet the instructor conducting the tasting spoke again and again of how good these wines

were. That is the heart of the problem of the declining exports of the old world producers. They and the associated establishment simply have forgotten that good wines taste good and have not yet responded to the challenge facing them. This simple idea explains why the exports of the new world countries have expanded so rapidly.

Note. References made to AN 2003 refer to the Anderson and Norman (2003) publication cited below. All data for this study also appear from this publication and its predecessor (1999) as well.

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