Title

Products and Prejudice: Measuring Country-of-Origin Bias in U.S. Wine Imports

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Abstract:

Should exporters worry about country-of-origin bias? Although the pervasiveness of country-level product advertising suggests that they do, lack of data has limited the empirical study of subjective bias toward products from a specific country. Using data from the U.S. wine industry, including numerical blind tasting evaluations, this paper directly computes the impact of country-of-origin bias upon wine import prices. A hedonic pricing framework is used to control for vintage, blind-tasted quality, varietals, production costs and quantities. Cross-country comparisons of price residuals suggest that "Product of Italy" on the label can raise the price of a bottle by more than fifty percent.

Keywords: International trade, hedonic pricing, wine.

JEL Classification: F13, L11, L15, Q11, Q17.

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I. Introduction

Should exporters worry about country-of-origin bias? Although country-level marketing campaigns and debates over country-of-origin labeling requirements suggest they do, lack of data has limited the empirical study of subjective bias toward products from a specific country.[2] Despite its potential importance, most trade researchers implicitly assume that consumers and producers are fundamentally objective about country-of-origin.[3] In their minds, differences in prices across goods from different countries are caused by differences in variety and quality, not subjectivity.

Directly confronting this assumption, this study asks: are consumers simply biased by country-of-origin? As in any study of discrimination, the proof is in the absence of alternative explanations for import price differences across countries-of-origin. Computing country-of-origin bias in import prices therefore requires controlling for all other objective product characteristics, including variety, product quality, and costs.

Aspiring to this ideal, we turn to the case of U.S. wine imports as providing the best possible industry data available. Individual bottles of wine are usually identical in size, have a clear country-of-origin, and are often classified by specific varietals. Moreover, wine prices have been successfully modeled using hedonic pricing in a

[2] The country-of-origin issue has received some attention in the marketing literature, primarily with survey data, such as in the survey of salesmen in D'Astous and Ahmed (1999), or in controlled experimental studies, such as in Wall, Liefeld, and Heslop (1991). To the best of my knowledge, there was only one attempt to use a natural experiment to measure the economic impact of country-of-origin, which was by Aggrawal and Kamakura (1999). This study did not find statistically significant country-of-origin effects after controlling for quality, but it used a much smaller set of *Consumer Reports* data, and was forced to compare heterogeneous electronic products.

[3] Two noteworthy exceptions in the literature have considered country-of-origin from slightly different angles. The first is the investigation of home bias, as described by Wolf (2000). The second group applies the gravity model to the home market effect and the Armington assumption, such as Head, Mayer and Ries (2002), Head and Ries (2001), Davis (1998) and Feenstra, Markusen and Rose (2001).

number of studies.[4] Perhaps most importantly, there are numerous blind-tasted quality ratings of wine offered by multiple sources.

In this paper, we estimate the impact of country-of-origin bias upon price for the U.S. wine industry using hedonic pricing to control for quality, vintage, age, variety, and date of price observation. We then examine the robustness of these estimates to variety classification, outliers, quality rating bias, and costs.

Overall, the empirical analysis demonstrates that average prices are significantly affected by country-of-origin, even after controlling for blind-tasted quality, varietals, age, exchange rates, and beverage industry real wage levels. The evidence suggests that country-of-origin bias significantly affects U.S. wine prices, by more than fifty percent in some instances. In addition to academic economists, these results are useful to policy makers, particularly those considering country-of-origin labeling policies; export import banks, particularly those considering export promotion; and the everyday wine consumer.

The rest of the paper is organized as follows: Section 2 outlines the empirical framework. Section 3 describes the data. Section 4 estimates the impact of country-of-origin bias upon price. Section 5 considers robustness, and Section 6 concludes.

II. Hedonic Pricing

Returning to the discrimination study analogy, country-of-origin bias can only be measured after controlling for "objective" product characteristics, including blind-tasted

[4] Ashenfelter, Ashmore, and Lalonde (1995) found that they could explain 83 percent of the variation in the vintage wine prices of French Bordeaux variety wine with four variables: the age of the wine, the average temperature during the growing season, rain in August and September, and the rain in the winter preceding the vintage. Building upon this model, Byron and Ashenfelter (1995) found that estimating the same model lead to similar coefficients for the Australian Grange Heritage, but could only explain 60 percent of the price variation.

quality, vintage, and variety. Building upon the seminal work of Rosen (1974), we will assume that the price of a label of wine is a function of product characteristics:

$$\log(P_i) = \alpha + \beta D_{ic} + \eta X_{io} + \varepsilon_i \qquad (1)$$

The dependent variable, $\log(P_i)$, is the logarithm of the price of a unique bottle of wine.[5] The measured characteristics, X, of the wine are: blind-tasted quality, year of price observation, age, variety, and quantity of bottles imported. The matrix D contains dummy variables for each country-of-origin, excluding the United States. The vector β measures the relative contribution of country-of-origin to wine prices, namely the "country-of-origin bias."

In contrast with most hedonic analyses of wine, we emphasize the vector β, the relative contribution of country-of-origin to wine prices.[6] We will then discuss whether the statistically significant estimates of β reflect differences in quality, variety misspecification, biased quality evaluations, or production costs. We conclude that data supports the residual hypothesis, namely that β estimates subjective American preferences for wines from a specific country-of-origin.

III. The Data

The data used in this paper is publicly available in *The Wine Advocate*, a bi-monthly publication by Robert Parker. The set contains over 20,000 evaluations of table wines from 1992-1998. These represent what Parker considers to be the "best" wines, as

[5] Although we use the log-linear specification for the regressions reported in this paper, and dummy variables to incorporate most measured characteristics, the results appear robust to model specification.
[6] A few studies have included country-of-origin dummies without emphasis. Nerlove (1995) computes a hedonic estimate for non-Europe, Sweden, and rest of Europe. Likewise, Schamel (2000) includes dummy variables for Australia, Chile and South Africa. Although neither study analyzes the estimated coefficients nor has a comparable quantity of data to this paper, it is worth comparing the results in Table 2A and Schamel's Table 2. Using data from the *Wine Spectator*, Schamel obtains estimates for Chile

he tastes roughly 15,000 wines a year and reports on only 4,000 of those. The data set includes variety, vintage, maturity, and a blind-tasted quality rating from 50-100. The price data is the approximate price of one bottle of wine in U.S. dollars on the date it was published in *The Wine Advocate*.[7] The wines covered in the current sample are imported from the following countries: Argentina, Australia, Austria, Chile, France, Germany, Italy, Spain, and the United States.[8] Each observation in the data set represents a different wine evaluated by Parker, classified by a unique combination of producer, vintage, and label.[9]

With the goal of analyzing "standard" table wines, four types of data were excluded. First, non-standard size bottles were deleted.[10] Second, the sample was limited to "dry red or white table wines," thus dropping all sherry, sparkling wine, sake, port, rose wine, dessert wine, or wine described as "sweet" rather than "dry." Third, with wines that have been tasted more than once, only the most current rating at the time of publication in the *Wine Advocate* is used. Finally, because of their luxury and infrequency, all wines that were more than ten years old were discarded.

Some data was also available as to the maturity of the wines when tasted. This data was highly correlated with the wine variety classifications, which suggests that Parker tends to review wines in the same stage of their maturity cycle. After controlling for the age of the wine, the variety of wine, and the date of the tasting, the maturity

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(-0.477) and Australia (-0.299) that are very similar to our results.

[7] Parker provides this estimate; his methodology on obtaining prices is not provided in the magazine.

[8] All countries with fewer than twenty observations were deleted.

[9] Four examples of the producer-label-vintage combination of observations are: Caballero de la Cepa Cabernet Sauvignon (1985), Caballero de la Cepa Cabernet Sauvignon (1986), Casa Lapostolle Cabernet Savignon Cuvee Alexandre (1995), and Casa Lapostolle Cabernet Sauvignon (1994).

[10] The standard size of a bottle of wine is 750 mL.

variables were not significant. Because the maturity data was also frequently missing observations, it was discarded.

Summary statistics of the data are offered in Table 1. It is worth noting that the price of the average bottle of wine in the sample is arguably “steep” at $31.56. Chilean wines are the cheapest in the sample, running at $9.86 on average whereas French wines are the most expensive at $38.63. Price estimates range from $2 to $1,200, motivating the use of the natural logarithm of price as the dependent variable—this specification “shrinks” the long tail of the price distribution.

The similarity of average quality ratings across countries may lead to worries that Parker seeks an average while tasting wines, thereby arbitrarily equating country qualities. To the contrary, individual issues offer hundreds of observations on a few varieties and countries; yet have average quality ratings that fluctuate quite randomly between 85.5 and 90.5. Another concern is that Parker drops the lower qualities of wine. In this sense, we are only estimating country-of-origin bias for higher quality table wines. Although the demand for these wines may be affected by luxury and prestige, the fundamental conclusions regarding country-of-origin bias are not affected.

IV. Estimates of Country-of-Origin Effects

Controlling for the quality, age and variety of wine, estimates of the effect of country-of-origin upon prices are reported in Table 2A. Most of the estimates on the country-of-origin dummy variables are statistically significant, which suggests that country-of-origin bias exists when imported wine is priced relative to its American counterpart.[11] The French, Italian and Austrian imports benefit the most from this bias, while Argentinean wines are among the less favored.

It is worth noting how stable these country-of-origin estimates are across different model specifications. Although this paper uses age (as opposed to vintage) in the remaining analysis, a comparison of Columns (1) and (2) suggests that either specification produces similar results.[12] The estimates are also robust to: limiting the sample to red wine; limiting the sample to frequently occurring pure varietals; or changing the model specification to contain natural logarithms of age and rating, as opposed to using dummy variables for every age and rating.

The price of wine does vary significantly across varietals in these regressions, as is reported in Table 2B. The baseline bottle of Pinot Noir is most expensive, while Gamay, Sangiovese and Sauvignon Blanc are the cheaper varieties. These price gap estimates are also robust to model specifications, with similar variety discount estimates across all five columns.

The evidence from Table 2 suggests that import prices vary because of subjective bias, rather than differences in product quality. In particular, the variation in country-of-origin effects does not correspond with countries that have better average quality wine in the sample. The decomposition in Figure 1 suggests that international price variation in the regression is significantly more influenced by country-of-origin bias than individual

[11] Throughout this paper, the United States is the omitted country dummy variable in the regressions. Furthermore, in all cases the joint F-test of whether the coefficients on the dummy variables for country of origin are equal to zero is rejected at the 99% level.

[12] Age was chosen instead of vintage because it was more theoretically justifiable. Whereas wines have "good years" and "bad years", one would expect vintage effects to vary across countries, thereby muddying the interpretation of results. We share Robert Parker's vision that his quality rating can be used to create a vintage chart. Age, on the other hand, has a clear relationship to price, because of wine storage costs.

quality differences. It appears that subjectivity toward products from a specific country dominates the quality of the individual product.[13]

V. Robustness

1. Variety classifications

One obvious concern is how variety classifications affect these estimates. In Table 3, we illustrate that the estimates are similar when using pure varietals. One noteworthy exception is the atypically low brand-values for the French Cabernet Sauvignon and the French Merlot. France's exclusive rights to the Bordeaux Blend classification can readily explain this exception--- only the worst French wines, which cannot be classified as French Bordeaux, are sold as Cabernet Sauvignon. This variety selection bias is corrected for in Column (3) by grouping together the Merlot, Cabernet Franc, Cabernet Sauvignon, Malbec and Bordeaux Blend varietals. When the Bordeaux Blends are grouped with their American counterparts, the French country-of-origin estimate is restored.[14]

2. Outlier Robustness

One advantage to having such a large data set is the ability to undertake many investigations of outlier robustness, as in Table 4. Prior country-of-origin estimates are recalculated under five separate data conditions: dropping all observations with a quality rating of 80 or below; dropping all observations that were either tasted more than once or priced at auction; dropping all observations with the lowest and highest ten percent of

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[13] Note that this statement is only relative to the Parker sample. Regrettably, Parker only reports the higher quality wines, thereby limiting our capacity to analyze the relationship between country-of-origin bias and average import product quality.

[14] Furthermore, using the Bordeaux style grouping in place of the Bordeaux Blend, Cabernet Franc, Cabernet Sauvignon, and Merlot varietals in any of the specifications from Table 2 does not substantially change the results.

prices in the sample; using only the first chronological half of the sample; and using only the second chronological half of the sample.

The only troubling instability revealed in this table affects German wine imports in Columns 4 and 5. Germany, which normally has had a positive COO Bias, seems to have a negative COO Bias during the last three years of the sample. A deeper look suggests that this change in COO bias reflects reality. In terms of Riesling, Germany's best-represented wine in the sample, Germany experienced a "fall from fame" in the data. Germany laid claims to 80% of the Riesling evaluations in the first half of the sample, which fell to 40% in the second half. Austria and Australia, unrepresented in the early Riesling sample, provided 30% of the Riesling observations in the second half. Finally, comparing statistics from the U.S. Department of Commerce, the number of liters of German wine imported in the United States fell during the period from 12.8 million in 1992 to 9.9 million in 1998. In stark contrast, the aggregate import volume for all eight countries rose during the same period from 196.9 million liters to 339.0 million liters.

3. Country of Origin vs. Region of Origin

Regrettably, it is impossible to completely isolate regional effects from country effects in this model, since the estimated bias toward the country can be decomposed into a weighted sum of its regional biases. The strong linkage between variety and European regions (especially in Italy and France) makes identifying regional effects and variety effects even more complicated. Bordeaux Blends, for example, come solely from Bordeaux. This phenomenon also exists in the other European countries, but with less rigidity. Pure varietal wines are also more common in the Parker data for countries other than France or Spain. If regional dummies replace country dummies in the model, a few large regions have statistically significant above-average positive bias estimates, such as: Burgundy, Piedmont and Tuscany. Many more regions produce statistically below average estimates, in large part because the negative estimate regions tend to be much smaller (such as Aragon, Spain, with 11 bottles reported, or Valencia, Spain, with 6). At the regional level, Parker's quality selectivity appears to have deleterious effects on the quantity of wines tasted in sub-standard regions, thereby limiting the value of a regional analysis.

The case of Burgundy, however, ought not be overlooked. Burgundy has the largest regional estimate by far with the highest t-statistic, and it has a story of its own. Robert Parker is renowned for criticizing Burgundy wines. To quote Steinberger (2003), "he is considered the pre-eminent Burg-basher." A large Burgundy coefficient probably reflects Parker's aversion to the variety, as opposed to a true premium on Burgundy.

4. Quality Rating Bias

Particularly in light of the Burgundy effect, it is worth investigating measurement error in Parker's system of rating. Measurement error is particularly troubling if Parker himself suffers from country-of-origin bias, or simply cares less about a dimension of wine quality that is correlated with the country-of-origin.

Although it is impossible to read Parker's mind, we can interact the country dummy variables with the rating dummy variables to test the question of whether individual countries share comparable relationships between his quality rating and price. After a series of F-tests, the data suggests a separate treatment for French quality ratings may be appropriate.

Figure 2 is a graph of dummy variable coefficient estimates corresponding to specific ratings, interacted with the France dummy variable, and omitting the "87" rating. The coefficient estimates suggest that Parker may underrate French wines, because the premium received by "Rest-of-World" wines with high Parker ratings is significantly lower than its French counterpart.[15] Although a gap definitely exists in the return-to-price of highly rated French wines as compared to other countries, the relief is that this critique appears to only affect France's country-of-origin bias estimate (much like the case of variety classification error).

VI. The Cost Explanation

Because the wine industry is known to be imperfectly competitive, a worthwhile alternative hypothesis that the country-of-origin estimates measure markups on differing production costs. Regrettably, we have no distributor cost data, and no direct cost data from producers. As a poor substitute we exploit fluctuations in the real exchange rate and real wages to control for differences in costs that transcend borders in Table 5.

The details underlying Table 5 are as follows. Real wages are taken from UNIDO for the beverage industry.[16] The real wage reported for a specific Vintage-Label-Producer combination is the real wage for the beverage industry in the country-of-origin for a specific vintage year. The real exchange rate is taken from the *International Financial Statistics.* This exchange rate is a real exchange rate between the U.S. and the relevant country with 1985 set equal to one. The U.S. rate is set equal to one for all

[15] This observation depends somewhat upon variety specification. When the same experiment is repeated for the "Bordeaux Group"- Bordeaux Blend, Cabernet Franc, Cabernet Sauvignon, and Merlot-- there is not a gap between French and American ratings. However, in the case of both the Chardonnay and Pinot Noir varieties, the American rating curve is significantly lower than its French counterpart.

[16] Ideally we would use wine industry data instead of the beverage industry, however, that data was not available.

years. The real exchange rate reported for a specific Vintage-Label-Producer observation is the real exchange rate for the country-of-origin for the year Parker published the price estimate.

As is demonstrated in Table 5, incorporating cost variables into the regressions does not sweep away country-of-origin bias. Neither the real exchange rate nor the real wage are consistently significant in the hedonic regression, suggesting either that exporters are pricing to market or that available cost data is insufficient.

VII. Conclusion

Contrary to traditional views of exporting, country-of-origin bias truly matters. After controlling for variety, age, vintage, and quality rating, country-of-origin bias significantly affected the price of table wines sold in the United States from 1992-1998. France and Italy benefit from a premium, while Argentina and Chile tended to sell wines at a discount. Comparing Italian and Chilean wines, country-of-origin bias affected the price of a representative bottle of wine by more than fifty percent.

The applicability of this investigation is widespread. For trade theorists, the results strongly affirm the Armington assumption (1969), where products are considered differentiated by country. For policy-makers, the results suggest that country of origin labeling policies can be non-tariff barriers, causing disregard for individual product quality. For Export-Import Banks, these results suggest large potential gains from export market promotion. For the American consumer, the results suggest that you should obtain *The Wine Advocate*, select a few Argentinean wines, and head to the store.

Table 1: Summary Statistics

	N[a]	Average Price	Average Rating[b]	Average Age	% Red	% Pure Varietals	Varieties	Wineries
Argentina	89	$11.02	87.2	4.8	88%	78%	8	20
Australia	373	$23.45	88.3	2.5	64%	80%	16	91
Austria	93	$19.73	87.1	2.5	1%	96%	8	22
Chile	104	$9.86	85.8	2.1	64%	96%	7	21
France	11003	$38.63	87.5	2.3	71%	58%	39	1593
Germany	572	$16.48	87.6	2.0	0%	99%	11	83
Italy	1609	$29.43	88.4	3.8	91%	71%	37	385
Spain	424	$19.70	88.0	3.2	87%	28%	14	112
USA	6154	$23.03	87.9	2.3	67%	91%	38	658
Total	20421	$31.56	87.7	2.4	69%	70%	79	2985

	Min Price	Max Price	Min Rating	Max Rating	Min Age	Max Age	Min Vintage	Max Vintage
Argentina	$4.25	$40.00	82	93	1	10	1983	1997
Australia	$4.75	$150.00	82	99	0	7	1986	1998
Austria	$7.00	$50.00	70	96	1	5	1991	1997
Chile	$5.00	$25.00	70	91	0	7	1987	1997
France	$4.00	$1,200.00	62	100	1	9	1985	1997
Germany	$8.00	$150.00	70	99	1	5	1988	1996
Italy	$4.50	$200.00	74	99	1	10	1982	1997
Spain	$4.00	$180.00	82	99	1	10	1985	1997
USA	$2.00	$399.00	64	100	0	9	1983	1997
Total	$2.00	$1,200.00	62	100	0	10	1982	1998

[a] Each data point represents a unique producer-label-vintage combination. Four examples of the producer-label-vintage combinations are: Caballero de la Cepa Cabernet Sauvignon (1985), Caballero de la Cepa Cabernet Sauvignon (1986), Casa Lapostolle Cabernet Savignon Cuvee Alexandre (1995), and Casa Lapostolle Cabernet Sauvignon (1994). If a wine is tasted more than once, only the most recent tasting is included.

[b] The relatively similar average qualities may lead you to worry that Parker seeks an average while tasting wines. The data does not support this theory if you consider individual issues. The average score across the hundreds of wine labels reported in a single issue fluctuates randomly between 85.5 and 90.5.

Table 2A. Evidence of Country of Origin Bias Relative to the US
Estimates for the most prevalent varietals are in Table 2B.

Dependent Variable: *ln(Price)*

	(1)	(2)	(3)	(4)	(5)
	Basic Model	Vintage Model	Red Wine Data	Major Varietals[a]	*ln(Rating) ln(Age)*
Argentina	-0.569***	-0.528***	-0.644***	-0.623***	-0.624***
	(0.05)	(0.05)	(0.06)	(0.06)	(0.06)
Australia	-0.093***	-0.115***	-0.108***	-0.079***	-0.109***
	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)
Austria	0.275***	0.251***	0.149	0.337***	0.367***
	(0.06)	(0.06)	(0.45)	(0.07)	(0.07)
Chile	-0.457***	-0.423***	-0.481***	-0.471***	-0.549***
	(0.05)	(0.04)	(0.06)	(0.05)	(0.05)
France	0.235***	0.231***	0.116***	0.396***	0.245***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Germany	0.109***	0.094***		0.228***	0.092**
	(0.04)	(0.04)		(0.04)	(0.04)
Italy	0.278***	0.290***	0.237***	0.193***	0.272***
	(0.02)	(0.02)	(0.02)	(0.04)	(0.02)
Spain	-0.053**	-0.066**	-0.111***	-0.315***	-0.064**
	(0.03)	(0.03)	(0.03)	(0.08)	(0.03)
Controls:					
Variety	Yes	Yes	Yes	Yes	Yes
Age	Yes	Vintage	Yes	Yes	*ln(Age)*
Ratings	Yes	Yes	Yes	Yes	*ln(Rating)*
Report Year	Yes	Yes	Yes	Yes	Yes
N	20421	20421	14106	13192	20414
$\overline{R}^2$	0.619	0.623	0.617	0.632	0.523

*** indicates the estimate is significantly different from zero at the 99% level, ** at the 95% level, and * at the 90% level. Standard errors are in Parentheses. Statistical significance of country dummy variables is relative to the United States (omitted country).

[a] The major varieties in the data sample are defined as those with greater than 1% of the pure varietal observations. They are: Cabernet Sauvignon, Chardonnay, Gamay, Gewurztraminer, Merlot, Nebbiolo, Pinot Blanc, Pinot Noir, Riesling, Sangiovese, Sauvignon Blanc, Syrah, and Zinfandel.

Table 2B. The Role of Varietals in the International Reputation Regressions

Model specifications are identical to Table 2A. Pinot Noir is the omitted variety.

Dependent Variable: *ln(Price)*

	(1)	(2)	(3)	(4)	(5)
	Basic Model	Vintage Model	Red Wine Data	Major Varietals[a]	*ln(Rating) ln(Age)*
Cabernet Sauvignon	-0.444***	-0.486***	-0.509***	-0.310***	-0.440***
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
Chardonnay	-0.358***	-0.379***		-0.323***	-0.363***
	(0.01)	(0.01)		(0.01)	(0.01)
Gamay	-1.209***	-1.243***	-1.113***	-1.245***	-1.268***
	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)
Gewurztraminer	-0.796***	-0.808***		-0.788***	-0.715***
	(0.04)	(0.04)		(0.03)	(0.04)
Merlot	-0.620***	-0.644***	-0.664***	-0.529***	-0.689***
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
Nebbiolo	-0.485***	-0.483***	-0.512***	-0.224***	-0.420***
	(0.03)	(0.03)	(0.03)	(0.05)	(0.03)
Pinot Blanc	-0.893***	-0.909***		-0.859***	-0.966***
	(0.04)	(0.04)		(0.04)	(0.04)
Riesling	-0.772***	-0.786***		-0.753***	-0.754***
	(0.03)	(0.03)		(0.03)	(0.03)
Sangiovese	-0.841***	-0.832***	-0.883***	-0.631***	-0.883***
	(0.03)	(0.03)	(0.03)	(0.04)	(0.03)
Sauvignon Blanc	-0.856***	-0.862***		-0.794***	-0.943***
	(0.02)	(0.02)		(0.02)	(0.02)
Syrah	-0.603***	-0.622***	-0.599***	-0.570***	-0.558***
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
Viognier	-0.278***	-0.289***		-0.236***	-0.257***
	(0.04)	(0.04)		(0.04)	(0.04)
Zinfandel	-0.716***	-0.723***	-0.802***	-0.596***	-0.691***
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
N	20421	20421	14106	13192	20414
$\overline{R}^2$	0.619	0.623	0.617	0.632	0.523

*** indicates the estimate is significantly different from zero at the 99% level, ** at the 95% level, and * at the 90% level. Standard errors are in Parentheses.

[a] The major varieties in the data sample are defined as those with greater than 1% of the pure varietal observations. They are: Cabernet Sauvignon, Chardonnay, Gamay, Gewurztraminer, Merlot, Nebbiolo, Pinot Blanc, Pinot Noir, Riesling, Sangiovese, Sauvignon Blanc, Syrah, and Zinfandel.

Table 3. Evidence of Country of Origin Bias Within Specific Varietals
Countries with fewer than 20 applicable observations are dropped.

	Dependent Variable: *ln(Price)*				
	(1)	(2)	(3)	(4)	(5)
	Cabernet Sauvignon	Merlot	Bordeaux Group[a]	Chardonnay	Riesling
Argentina	-0.823***	-0.932***	-0.833***		
	(0.08)	(0.13)	(0.06)		
Australia	-0.288***	-0.225**	-0.279***	-0.205***	0.342***
	(0.06)	(0.11)	(0.06)	(0.06)	(0.09)
Austria					0.528***
					(0.09)
Chile	-0.757***	-0.586***	-0.600***	-0.312***	
	(0.07)	(0.09)	(0.06)	(0.10)	
France	-0.903***	-0.700***	0.117***	0.457***	0.673***
	(0.07)	(0.05)	(0.02)	(0.02)	(0.06)
Germany					0.365***
					(0.06)
Italy	0.255***	-0.029	0.149**	0.183*	
	(0.09)	(0.08)	(0.07)	(0.10)	
Spain	-0.172		-0.321***	-0.399***	
	(0.12)		(0.10)	(0.14)	
Controls:					
Variety	N.A.	N.A.	N.A.	N.A.	N.A.
Age	Yes	Yes	Yes	Yes	Yes
Ratings	Yes	Yes	Yes	Yes	Yes
Report Year	Yes	Yes	Yes	Yes	Yes
N	1232	539	4492	3121	749
$\bar{R}^2$	0.549	0.686	0.509	0.580	0.589

Standard errors are in parentheses.
*** indicates that the estimate is significant at the 99% level, ** at the 95% level, and * at the 90% level.

[a] The Bordeaux Blend Group contains wines used to make Bordeaux-style blends: Merlot, Cabernet Franc, Cabernet Sauvignon, Malbec and Bordeaux Blend. This group is separated out because only French wines are classified as Bordeaux Blends.

Table 4. Slicing to Demonstrate Robustness

Dependent Variable: *ln(Price)*

	(1)	(2)	(3)	(4)	(5)
	Wines Rated Above 80	Dropping Wines that Were Sold at Auction or Double-Tasted	Dropping the Lowest and Highest 10% of Price Estimates	Magazine Date: 2/21/92 to 6/30/95	Magazine Date: 8/31/95 to 12/23/98
Argentina	-0.572***	-0.575***	-0.563***	-0.565***	-0.569***
	(0.05)	(0.05)	(0.05)	(0.07)	(0.08)
Australia	-0.091***	-0.038	-0.055***	-0.247***	-0.132***
	(0.03)	(0.03)	(0.02)	(0.05)	(0.03)
Austria	0.247***	0.245***	0.182***		0.143**
	(0.07)	(0.06)	(0.05)		(0.07)
Chile	-0.457***	-0.416***	-0.512***	-0.548***	-0.401***
	(0.05)	(0.05)	(0.05)	(0.08)	(0.05)
France	0.221***	0.209***	0.227***	0.344***	0.108***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Germany	0.083**	0.094**	-0.010	0.226***	-0.202***
	(0.04)	(0.04)	(0.03)	(0.05)	(0.06)
Italy	0.280***	0.317***	0.217***	0.455***	0.151***
	(0.02)	(0.02)	(0.02)	(0.04)	(0.03)
Spain	-0.056**	0.005	0.038	0.069	-0.178***
	(0.03)	(0.03)	(0.03)	(0.04)	(0.03)
Controls:					
Variety	Yes	Yes	Yes	Yes	Yes
Age	Yes	Yes	Yes	Yes	Yes
Ratings	Yes	Yes	Yes	Yes	Yes
Report Year	Yes	Yes	Yes	Yes	Yes
N	19609	12942	16176	10228	10193
$\overline{R}^2$	0.633	0.592	0.486	0.622	0.623

*** indicates the estimate is significantly different from zero at the 99% level, ** at the 95% level, and * at the 90% level. Standard errors are in Parentheses. Statistical significance of country dummy variables is relative to the United States (omitted country).

Table 5: Country of Origin Bias, Controlling For International Cost Variation

The model specifications in Table 2 are repeated including country-level data for real exchange rate fluctuation and real wages (in U.S. dollars).

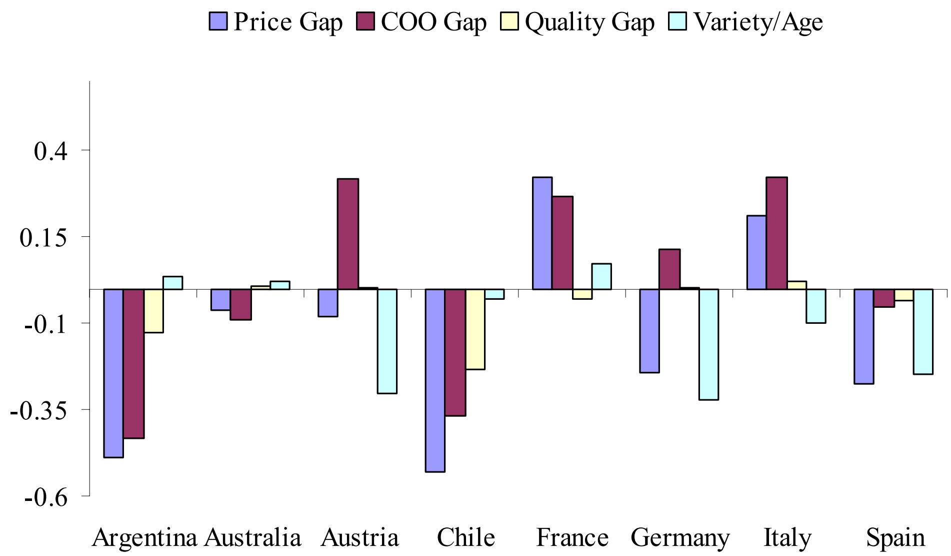
Dependent Variable: *ln(Price)*

	(1)	(2)	(3)	(4)	(5)
	Basic Model	Vintage Model	Red Wine Data	Major Varietals	*ln(Rating) ln(Age)*
ln(Real Wage)[a]	0.029	0.182***	0.083	-0.093	-0.101**
	(0.05)	(0.07)	(0.05)	(0.06)	(0.05)
ln(Real Exch Rate)[b]	0.145	0.000	0.000	0.150	0.097
	(0.14)	(0.14)	(0.16)	(0.17)	(0.15)
Argentina	-0.614***	-0.284**	-0.559***	-0.955***	-0.828***
	(0.10)	(0.13)	(0.12)	(0.13)	(0.11)
Australia	-0.263***	-0.245***	-0.232***	-0.218***	-0.346***
	(0.05)	(0.06)	(0.07)	(0.06)	(0.06)
Austria	0.304***	0.277***	-0.012	0.401***	0.396***
	(0.07)	(0.07)	(0.44)	(0.07)	(0.07)
Chile	-0.529***	-0.268***	-0.465***	-0.738***	-0.795***
	(0.08)	(0.10)	(0.10)	(0.10)	(0.09)
France	0.351***	0.280***	0.230***	0.629***	0.418***
	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)
Germany	0.250***	0.249***		0.375***	0.270***
	(0.04)	(0.04)		(0.04)	(0.05)
Italy	0.311***	0.275***	0.236***	0.277***	0.352***
	(0.03)	(0.03)	(0.03)	(0.05)	(0.03)
Spain	-0.102***	-0.048	-0.126***	-0.431***	-0.138***
	(0.03)	(0.04)	(0.04)	(0.08)	(0.04)
Controls:					
Variety	Yes	Yes	Yes	Yes	Yes
Age	Yes	Yes	Yes	Yes	*ln(Age)*
Ratings	Yes	Yes	Yes	Yes	*ln(Rating)*
Report Year	Yes	Yes	Yes	Yes	Yes
N	14079	14079	9929	9223	14073
$\overline{R}^2$	0.577	0.581	0.566	0.613	0.478

[a] This is the real wage as reported by UNIDO for the beverage industry. Using the real wage as opposed to the logarithm does not improve cost results. The vintage year of the wine bottle is used here, although using the tasting date produces similar results.

[b] A variety of exchange rates from the *International Financial Statistics* were tried, with similar performance. This exchange rate is a real exchange rate between the U.S. and the relevant country with 1985=1. The U.S. rate is set equal to one for all years.

Figure 1: Decomposing the Effects of Quality, Vintage, and Variety

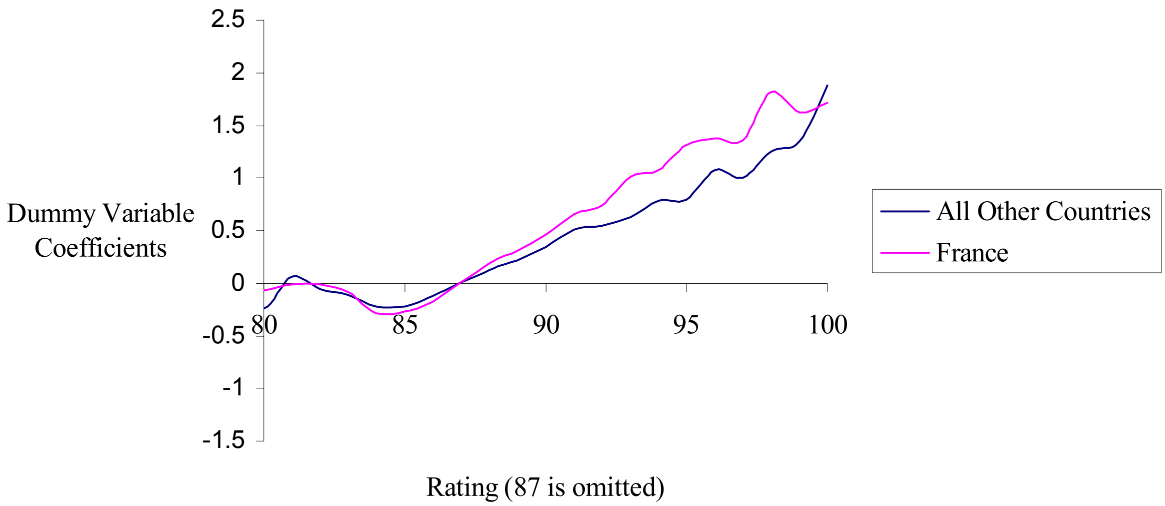


Decomposition Percentages Relative to the U.S.:[a]

	Price Gap	COO Gap	Quality Gap	Variety and Age Gap
Argentina	-49%	-43%	-13%	4%
Australia	-6%	-9%	1%	2%
Austria	-8%	32%	0%	-30%
Chile	-53%	-37%	-23%	-3%
France	32%	27%	-3%	7%
Germany	-24%	12%	0%	-32%
Italy	21%	32%	2%	-10%
Spain	-27%	-5%	-3%	-25%

[a] Because these are decomposed from a Ln(Price) regression, the percentages sum together geometrically, rather than arithmetically. Percentages are computed by taking the inverse logarithm of both sides and subtracting one. For example, the percentage gap in French prices as compared to American prices is actually computed as $gap = \exp(\overline{\ln P}_{France} - \overline{\ln P}_{USA})$. As a result, the gap in prices should be thought of as the percentage gap in the geometric mean of prices, rather than the percentage gap between arithmetic averages.

Figure 2: The Relationship Between Price, Rating, and Country-of-Origin
This graph plots the coefficients on the dummy variables for each of the ratings reported by Parker. The regressions included dummy variables for variety, age, observation date, and Parker's rating as independent variables, and ln(Price) as the dependent variable. The dummy variable for Rating=87 from the regression. The French wines were allowed their own dummy variables. This specification was selected using numerous F-tests.



VIII. References

Agrawal, Jagdish and Wagner A. Kamakura, "Country of Origin: A Competitive Advantage?" *International Journal of Research in Marketing* 16:4 (1999), 255-267.

Armington, Paul, ''A Theory of Demand For Products Distinguished By Place Of Production,'' *IMF Staff Papers* 16:1 (1999), 159–78.

Ashenfelter, Orley, David Ashmore, and Robert Lalonde, "Bordeaux Vintage Wine Quality and the Weather," *Chance* 8:4 (1995), 7-14.

Byron, Ray and Orley Ashenfelter, "Predicting the Quality of an Unborn Grange," *The Economic Record* 71:212 (1995), 40-53.

Davis, Donald R., "The home market effect, trade, and industrial structure," *American Economic Review* 88 (1998), 1264-76.

D'Astous, Alain. and Sadrudin A. Ahmed, "The Importance of Country Images in the Formation of Consumer Product Perceptions," *International Marketing Review* 16:2-3 (1999), 106-125.

De Long, Steve and Deborah De Long, "Delong's Wine Grape Varietal Table." *De Long's Wine Information*. http://www.delongwine.com/interactive_chart.htm (Accessed March 15, 2003).

Feenstra, Robert C., James R. Markusen and Andrew K. Rose, "Using the gravity model equation to differentiate among alternative theories of trade," *Canadian Journal of Economics* 34:2 (2001), 430-447.

Head, Keith and John Ries, "Increasing returns versus national product differentiations as an explanation for the pattern of US-Canada trade," *American Economic Review* 91:4 (2001), 859-878.

Head, Keith, Thierry Mayer, and John Ries, "On the Pervasiveness of Home Market Effects," *Economica* 69:275 (2002), 371-390.

International Monetary Fund, *International Financial Statistics* (Washington, D.C.: IMF, 1999). [CD-Rom]

Nerlove, Marc, "Hedonic Price Functions and the Measurement of Preferences: The Case of Swedish Wine Consumers," *European Economic Review* 39 (1995), 1697-1716.

Parker, Robert, *The Wine Advocate* (Monkton, MD: The Wine Advocate, 1992-1998).

Parker, Robert, *Robert Parker's Wine and Cellar Manager* (Chestnut Hill, MA: Wine Technologies, Inc., 1999) [CD-Rom]

Rosen, Sherwin, "Hedonic Prices and Implicit Markets: Product Differentiation in Pure Competition," *The Journal of Political Economy* 82:1 (1974), 34-55.

Schamel, Günter, "Individual and Collective Reputation Indicators of Wine Quality," CIES Discussion Paper no. 9 (2000).

Steinberger, Mike, "The Burgundy Brawl" *Slate Magazine -Wine's World Section* (April 4, 2003).

UNIDO, *Industrial Statistics Database* (Vienna, Austria: UNIDO, 1998).

United States Department of Commerce, *U.S. Imports History Historical Summary* (Washington, DC : U.S. Department of Commerce, 1994). [CD-Rom]

United States Department of Commerce, *U.S. Imports History Historical Summary* (Washington, DC : U.S. Department of Commerce, 1999). [CD-Rom]

Wall, Marjorie, John Liefeld and Louise A. Heslop, "The Impact of country-of-origin cues on consumer judgments in multi-cue situations: a covariance analysis," *Journal of the Academy of Marketing Science* 19:2 (1991), 105-113.

Wolf, Holger C., "Intranational Home Bias in Trade," *The Review of Economics and Statistics* 82:4 (2000), 555-563.