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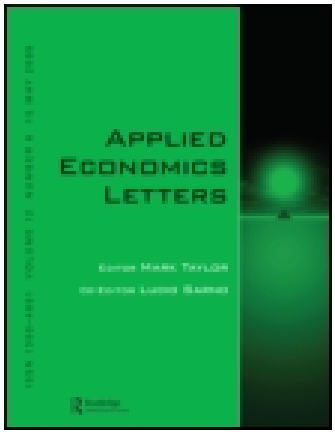

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Country of origin advertising and US demand of imported wine: an empirical analysis

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Country of origin advertising and US demand of imported wine: an empirical analysis

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We investigate the impact of media advertising on the US consumption of imported wine. Panel data from six countries over 15 years (1994–2008) are used to estimate an aggregate demand function for US wine imports. Our empirical analysis reveals evidence of important effects of advertising of domestic and imported wines on imported quantities; the advertising of imported wines significantly increases the quantity of imports for most countries while the advertising of domestic wines has a mixed effect on imported wine volumes. Other determinants such as price and real income are also found significant.

Keywords: media advertising; import wine; domestic wine; panel data

JEL Classification: C20; Q11

I. Introduction

Wine consumption in the United States has grown dramatically since the mid-1990s. By 2008, the US consumption reached nearly 9.4 litres per capita, up from just 42% 14 years earlier (Fig. 1). Imported wines are a big part of the increased consumption. The proportion of imported wines increased from 12.9% in 1994 to 26.2% in 2008 (Table A1). The annual growth rate of imports was 7.4%, more than three times the growth rate of domestic wines.

Not only has the United States imported more wine, but the *geographical origin* of the imports has changed over time. Import data show that New World wines are making advances in the US market at the expense of Old World wines (Table A1). For example, since 1994 the combined share of US imports from France, Italy, Portugal and Spain fell from 74% to 55% in 2008 while imports from Australia and Chile grew from 14% to 28%; Australia alone saw its share increase from 5.3% to 20.9%. Australia is rapidly increasing its market share, now accounting for about 5% of the total US bottled wine market.

In seeking to capture a larger share of the US market, importing countries have made continued efforts to inform consumers and differentiate their wines. While over the period 1995 to 2005 advertising expenditures for *domestic* US wines have doubled, advertising expenditures for *import* wines have increased much more rapidly. In Fig. 2, advertising expenditures are presented; using these data the computed import share of total media advertising has averaged about 41% since 2000.

The effectiveness of advertising to influence consumer purchasing decisions is of great interest to both importers and domestic producers alike. There is considerable evidence that the product origin matters in consumer purchasing decisions. Consumer surveys reveal that, upon entering a wine shop, the initial decision criteria are the country of origin, followed by colour, variety, year, and so on. For instance, Orth and Krska (2002, p. 391) found that 'buyers

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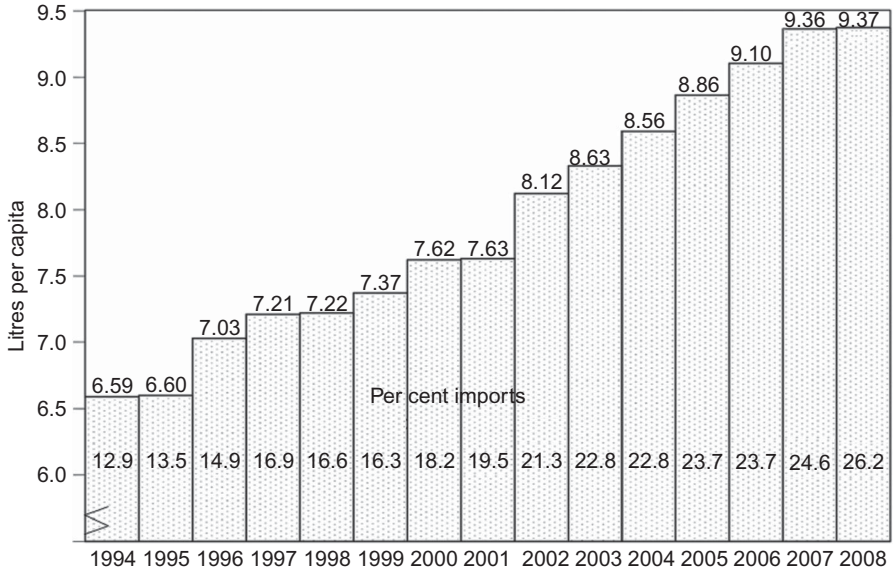

Fig. 1. US wine consumption and per cent imports (litres per capita)

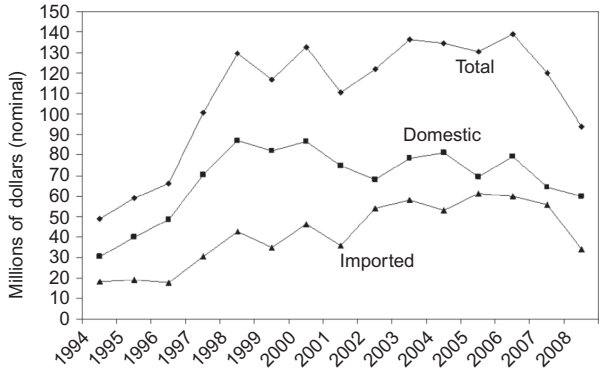

Fig. 2. Wine media advertising expenditures by origin

rank country and region at the top of wine attributes, while price, type, and producer name ranked lower'. In a recent consumer survey, Ribeiro and Santos (2007, p. 11) found 'the dominant factor of influence in the acquisition of wine is the region of origin'. In recognition of these and other studies, advertising and promotion efforts are a means of providing geographical product signals. Both brand and generic advertising contribute to the collective reputation of a country by sending a *geographical origin* message of product quality. We posit that an important economic determinant of the volume of wine imported into the United States is the degree of advertising effort.

Consequently, we investigate the effect of media advertising on the US consumption of imported wine. In so doing, we seek to distinguish the advertising impact of domestically produced wine from that of imported wine. To our knowledge, no previous empirical work has sought to explore the role of both domestic and foreign advertising on wine imports. We estimate a US import wine demand function of which both importer and domestic advertising expenditures are arguments. Our results reveal evidence of strong price and advertising effects on wine imports. The remainder of this article is organized as follows. In Section II we discuss our data and propose an econometric model; in Section III we present and discuss the results of our statistical estimations; and Section IV provides concluding remarks.

II. Empirical Framework

We estimate the US import wine demand function using a panel data set for the period 1994 to 2008 that includes the annual volume of US wine imports from the six largest wine exporting countries (France, Italy, Spain, Portugal, Australia and Chile) and the Rest of the World (ROW). While also a large exporter, Argentina was included in the ROW category since a complete set of advertising data was not available. Due to lack of price data, we use unit values computed from the reported value and volume of wine consumption, as in Seale *et al*. (2003). Wine import data as well as US Gross Domestic Product (GDP) and population data were obtained from WINEFACTS (2007). Annual media advertising expenditure data were provided by IMPACT DATABANK (2008) M. Shanken Communications (personal communication), Inc., New York. The advertising data include branded and generic expenditures for television, radio, outdoor and Internet; no merchandising expenditures are included. For the panel data set used in this study,

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only aggregate wine imports and aggregate advertising data were available (see Tables A1–A3).

To gauge the effects of advertising on wine imports, we estimate a parsimonious system of dynamic double-log import demand function, a specification used in several previous studies[1]:

$$\log(M_{it}) = b_{i0} + b_{i1}\times\log(M_{it-1}) + b_{i2}\times\log(\mathrm{ADM}_{it}) + b_{i3}\times\log(\mathrm{ADD}_{it}) + b_{i4}\times\log(\mathrm{PM}_{it}) + b_{i5}\times\log(\mathrm{PD}_{it}) + b_{i6}\times\log(\mathrm{GDP}_{it}) + e_{it} \quad (1)$$

where i indexes the country of origin of the imported wine, t indexes the year of imports and b_i and e_i are, respectively, the parameter and error vector for country i. M measures the per capita volume of wine imports into the United States, ADM represents per capita foreign advertising expenditure of imported wine, ADD is per capita advertising expenditure of domestically produced wine, PM and PD are, respectively, the price of imported and locally produced wine and GDP is the per capita GDP of the United States. The US Consumer Price Index (CPI; base year 2000) is used to deflate the nominal values of the price and advertising and GDP is in constant 2000 dollars.[2] We opt to estimate a system of individual (country) regressions instead of a panel data model in order to distinguish the price and advertising elasticities between import countries which compete fiercely among each other for US market opportunities.

We use instrumental variable approach to estimate Equation 1 consistently by relying on lagged values of the exogenous variables as identifying instruments for the lagged dependent variable. We only chose the one-period lagged values of the explanatory variables (PM, PD, ADD, ADM, GDP) as instruments to save degrees of freedom. This instrumental variable approach yields consistent estimates of the model parameters. The Granger causality test fails to reject the null that the dependent variable does not Granger-cause the advertising variables (ADD and ADM) with a p-value of 0.18, implying that the advertising variables can be used as independent variables. To test whether the dependent variable follows a unit root process, we perform the augmented Dickey–Fuller nonstationarity test. The test statistics (for different lags, and assuming a single mean and/or a trend) are lower than the 10% critical value of −2.57. That is, the null hypothesis of nonstationarity is rejected at the 10% significance level.

III. Econometric Results

In Table 1, we present the coefficient estimates (elasticities since we are using a double-log specification) of

Table 1. Price, income and advertising elasticity estimates of import wine

Variables	(1) Australia	(2) Chile	(3) France	(4) Italy	(5) Portugal	(6) Spain	(7) ROW
Log(M_{t-1})	0.244**	–0.0373	0.202	0.815***	0.663***	0.840***	0.481***
	(0.108)	(0.102)	(0.222)	(0.181)	(0.241)	(0.0663)	(0.140)
Log(PM)	–2.747***	–0.185	–0.168	–0.520***	–0.368**	–1.123***	–0.776***
	(0.384)	(0.152)	(0.149)	(0.122)	(0.183)	(0.137)	(0.106)
Log(PD)	3.112***	2.313***	2.091***	0.286	0.971*	1.164**	–1.015**
	(0.409)	(0.424)	(0.648)	(0.523)	(0.578)	(0.561)	(0.411)
Log(ADM)	0.137***	0.0287*	0.124***	–0.00225	0.00399	0.217**	0.0566***
	(0.0179)	(0.0164)	(0.0434)	(0.0357)	(0.0242)	(0.0954)	(0.0185)
Log(ADD)	0.458***	0.133**	–0.118	–0.0989	–0.190***	–0.187*	–0.362***
	(0.0835)	(0.0597)	(0.0922)	(0.0881)	(0.0435)	(0.102)	(0.117)
Log(GDP)	–1.253**	1.126***	–1.255***	0.959	–0.212	0.821**	4.006***
	(0.568)	(0.339)	(0.464)	(0.649)	(0.284)	(0.321)	(0.728)
Constant	10.53*	–18.37***	7.934**	–10.17	–0.715	–9.105***	–39.68***
	(5.690)	(3.180)	(3.317)	(6.376)	(3.423)	(2.992)	(7.566)
R^2	0.991	0.910	0.857	0.978	0.897	0.994	0.977

Notes: Number of observations = 98. Robust SEs are given in parentheses. ROW, Rest of the World.
***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.

[1] For example, Gallet (2007) reports 72 estimations of the effect of advertising on alcohol demand using double-log models.
[2] We also used a Media Index to deflate our two advertising variables; the results of our estimations are similar to those obtained when the CPI is used as a deflator. Therefore, only the results using the CPI as a deflator are presented.

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the import demand functions (Equation 1) along with their robust *t*-statistics.

Turning to the results, we note that the coefficient on the lagged dependent variable is statistically significant in five of the seven regressions, lending support to our partial adjustment specification. Furthermore, these coefficients accentuate the importance of price and advertising as driving forces of the demand for imported wine. For example, long-run price and advertising elasticities are 1.32 times larger for Australia and 5.4 times larger for Italy than short-run elasticities.[3] We find no statistical difference between short-run and long-run elasticities for Chile and France with a statistically insignificant coefficient of the lagged imports from these countries.

We also note that the import (own) price elasticities carry negative signs in all seven equations as prescribed by economic theory. However, the coefficients are either not statistically significant or below 1 for all but two countries, Australia and Spain, suggesting that only wines from these two countries are own-price elastic. The own-price elasticity of Aussie wine implies that a 1% price increase leads to 2.75% drop in demand in the short run and 3.63% in the long run. The average own-price elasticity of import wine is –0.861 which is in line with previously reported own-price elasticities of wine demand of –0.67 (Nelson, 1999), –0.55 (Pompelli and Hein, 1991) and –0.60 for red wine *imports* (Seale *et al*., 2003). Seale *et al*. (2003) is the only previous paper to estimate own-price elasticity of import wine demand; all others reflect ordinary demand elasticities. However, in a related study of US wool imports, Dewbre *et al*. (1987) found a long-run own-price elasticity of –0.788.

With the exception of wine from the ROW, all cross-price elasticities are positive indicating that domestic (US) wine is a substitute to import wines. For example, a 1% increase in domestic wine leads to a 2.1% increase in French wine imports. Australia appears to be the biggest beneficiary of a domestic price increase with a cross-price elasticity of 3.1%. Our results suggest that, in absolute value, imported wine is more sensitive to the price of domestically produced wine than it is to a change in its own price.

Surprisingly, our results indicate that Aussie and French wines are inferior goods with significantly negative income elasticities. We caution, however, that these coefficients may be picking up a time trend effect given the high correlation between GDP and time (correlation coefficient of 0.98) instead of a pure income effect.[4] Previous studies have found that wine is a luxury good with income elasticities of 1.7 (Nelson, 1999) and 1.1 (Gallet, 2007).

Turning to the advertising variables, we find that own-media advertising has a statistically significant positive impact on the import wine demand for five of the seven countries. Spain has the largest own-advertising elasticity followed by Australia and France. In the short run, a 10% increase in advertising increases wine imports from Spain by 2.17% versus 0.29% for Chile. The size of the average elasticity of own-advertising (0.08) is similar in magnitude to other reported advertising elasticities of domestic wine demand: 0.07 by Nelson (1999) and 0.08 by Franke and Wilcox (1987). In a related study, Dewbre *et al*. (1987) found short-run and long-run advertising elasticities for Australian wool *imported t*o the United States to be 0.105 and 0.354, respectively.

Our cross-advertising elasticity estimates are significantly positive for Australia and Chile but significantly negative for Portugal, Spain and the ROW. We therefore find that advertising by US wine producers generates positive spillovers for Aussie and Chilean wines but depresses demand for wines made in Portugal, Spain and other parts of the world.

IV. Concluding Remarks

There is ample evidence that foreign wines are taking an increasing portion of the rapidly growing bottled wine market. Foreign and domestic wines are imperfect substitutes. Countries exporting wine to the United States are interested in how advertising affects their products sales in the US market. In the same way, domestic US sales are impacted by both foreign and domestic advertising expenditures. We empirically investigate these and other interrelationships by estimating a system of dynamic equations of wine imports into the US market. We use annual data over the period 1994 to 2008 consisting of US import volumes from the six highest volume foreign countries, advertising expenditures by each foreign country, domestic wine sales, domestic advertising expenditures and other relevant import demand determinants. We find that empirical determinants of wine imports vary significantly in size and relevance across countries. Regarding the advertising effects, the results show that advertising of imported wines significantly increases the quantity of imports for all countries except Italy and Portugal while the advertising of domestic wines has mixed effects on imported

[3] For Australia, we obtain the multiplier as follows: 1/(1–0.244) = 1.32.
[4] We attempted to control for both time trend and GDP in our regression. However, doing so results in insignificant coefficients for both GDP and the time trend variable due to multicollinearity.

wine volumes. Specifically, domestic advertising generates positive spillovers for wines imported from Australia and Chile but has the expected negative effect for wines from Portugal, Spain and the ROW. Our average own-advertising elasticity estimate is similar in size to previously reported advertising elasticities for domestic wines.

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Appendix

Table A1. US bottled wine imports by country, total volume and market share, 1994–2008

Millions of litres	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
France	59.3	61.2	70.8	89.4	86.7	80.4	88.5	86.8	92.1	81.2	75.6	75.5	85.7	87.3	74.8
Import share (%)	26.5	25.9	25.1	26.9	26.2	24.1	22.6	20.5	18.5	14.8	13.2	12.1	13.3	12.6	10.0
Italy	89.8	95.1	106.0	118.5	117.3	120.5	142.5	156.6	179.3	193.1	181.1	197.9	210.6	224.2	267.8
Import share (%)	40.1	40.2	37.6	35.7	35.5	36.1	36.4	37.0	36.1	35.1	31.6	31.8	32.7	32.3	35.9
Portugal	5.9	6.3	7.2	7.3	7.4	7.6	7.8	8.1	8.8	7.9	9.1	9.8	10.1	11.1	15.6
Import share (%)	2.6	2.7	2.6	2.2	2.2	2.3	2.0	1.9	1.8	1.4	1.6	1.6	1.6	1.6	2.1
Spain	10.0	10.4	10.7	12.2	12.7	12.2	13.2	15.1	19.1	21.3	25.0	29.2	32.5	35.7	52.1
Import share (%)	4.5	4.4	3.8	3.7	3.9	3.7	3.4	3.6	3.9	3.9	4.4	4.7	5.1	5.2	7.0
Australia	11.8	13.9	18.3	25.5	29.9	38.6	52.7	67.3	103.2	144.5	169.5	177.2	167.7	177.5	155.9
Import share (%)	5.3	5.9	6.5	7.7	9.0	11.6	13.5	15.9	20.8	26.3	29.6	28.5	26.1	25.6	20.9
Chile	19.8	23.4	37.3	44.5	44.6	43.4	49.9	51.5	51.2	51.2	53.7	56.5	53.0	59.5	52.1
Import share (%)	8.9	9.9	13.3	13.4	13.5	13.0	12.8	12.2	10.3	9.3	9.4	9.1	8.2	8.6	7.0
Other	27.6	26.5	31.3	34.8	32.1	31.4	36.7	38.3	42.9	51.2	59.3	76.0	83.6	98.2	128.5
Import share (%)	12.3	11.2	11.1	10.5	9.7	9.4	9.4	9.0	8.6	9.3	10.3	12.2	13.0	14.2	17.2
Total import volume	224.2	236.8	281.6	332.2	330.7	334.1	391.3	423.7	496.6	550.4	573.3	622.1	643.2	693.5	746.8
Total US consumption	1733.7	1756.4	1892.7	1964.6	1991.1	2055.5	2150.1	2172.8	2335.6	2418.9	2517.3	2619.5	2714.1	2820.1	2850.4
Import share of US consumption (%)	12.9	13.5	14.9	16.9	16.6	16.3	18.2	19.5	21.3	22.8	22.8	23.7	23.7	24.6	26.2

Source: WINEFACTS (2007).

Table A2. Wine media advertising expenditures by origin

Origin	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Domestic (million $)	30.5	40.1	48.5	70.3	87.1	82.1	86.4	74.9	68.0	78.6	81.2	69.2	79.2	64.5	59.8
Share (%)	63.0	68.0	73.5	69.8	67.2	70.1	65.1	67.6	55.8	57.5	60.4	53.0	57.0	53.6	63.6
Imported (million $)	18.3	18.9	17.5	30.4	42.5	35.0	46.4	35.9	53.8	58.0	53.2	61.2	59.7	55.9	34.2
Share (%)	37.0	32.0	26.5	30.2	32.8	29.9	34.9	32.4	44.2	42.5	39.6	47.0	43.0	46.4	36.4
Total	48.8	59.0	66.0	100.7	129.7	117.0	132.8	110.8	121.8	136.6	134.4	130.4	139.0	120.3	94.0

Source: IMPACT DATABANK (2008) M. Shanken Communications (personal communication), Inc., New York.

Table A3. Wine media advertising expenditures by country origin (millions of dollars)

Origin	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Australia	0.1	0.1	0.1	0.1	0.6	0.8	5.2	4.8	8.8	12.2	17.7	20.1	14.1	9.5	6.3
France	3.7	4.3	5.9	8.7	10.5	15.2	16.0	8.7	10.0	17.8	12.2	15.4	21.4	19.0	8.1
Italy	7.9	8.7	4.5	12.5	17.8	11.8	16.0	15.4	27.2	14.1	10.0	14.5	11.2	13.6	10.4
Spain	4.7	4.2	5.2	4.9	4.2	4.5	6.0	4.6	4.0	5.8	6.2	4.3	5.6	3.7	2.5
Portugal	0.1	0.2	0.6	1.4	0.8	0.5	1.8	1.1	1.1	0.5	0.4	0.9	0.5	0.8	1.0
Chile	0.9	0.5	0.8	1.5	1.6	0.1	0.5	0.4	1.0	0.7	0.5	0.6	1.3	0.8	1.2
Other	0.9	1.0	0.6	1.4	7.1	2.2	1.0	1.0	0.7	5.7	4.8	4.0	3.8	5.8	4.3
Total	18.3	19.0	17.7	30.5	42.6	35.1	46.5	36.0	52.8	56.8	51.8	59.8	57.9	53.2	33.8

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