

# What does California have in common with Finland, Norway and Sweden?

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## **Abstract:**

The aim of this paper is to analyse the retail prices on wine in different countries. In general, country-specific price differences on identical wines are expected to reflect differences in taxes, import prices, transportation and other costs. Also the competitive conditions on the retail markets in the relevant countries are important. Accordingly, lack of competition at the retail level, high import prices and high duties on wine all contribute to increase wine prices. Next, consumer prices on wine are expected to be relatively lowest in the producer country and even lower on the local markets in the producing region. The Nordic countries are located far away from California and they all tax wine higher than the State of California. Some, e.g. Finland, Norway and Sweden, have state monopoly in the retail trade of wine and spirits whereas the sales system for wine in Denmark is more in line with the Californian system. Based on price information at the retail level, the paper analyses the logic of the relative prices on identical Californian wine bought in California compared to Denmark, Finland, Norway and Sweden.

**JEL Classification:** D4, L81, O57

**Keywords:** Wine prices, Californian wines, wine taxes

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## 1. Introduction

It is a well-known fact that there are cross-country differences in wine prices. The most popular explanation for price differences is variations in duties and other taxes among countries. In general, economists pay attention to real differences in supply and demand conditions. Thus, producers may exploit different demand conditions and charge different prices at different market segments if the necessary conditions for price discrimination are fulfilled. This may explain price variations between e.g. geographical distant markets. Besides taxes, different import prices, transportation and other costs in the distribution chain are important supply factors in explaining price variations. On the local market, competitive conditions on the retail markets certainly are very important. Lack of competition at the retail level would probably cause high prices on wine, even though the import prices and wine duties were low. Finally, transportation costs must be considered an important factor if the foreign markets are located far away from the producing region. In this case, wine prices are expected to be relatively lowest in the producer country and even lower on the local markets in the producing region. Yet, economists who are interested in wine know that *actual retail prices* that can be observed on separate markets may differ quite notably from what should be expected solely from these arguments. Quite often it can be observed that wine prices are lowest in countries where they expectably should be highest.

This paper deals with extreme price comparisons. California is located 6000 miles from the Nordic countries and the total population in Denmark, Finland, Norway and Sweden sums up to less than 23 million people, which are significantly lower than the US population size (285 million people) and the Californian population size (35 million people). Each of the four - in fact totally separate - Nordic markets probably are of limited importance to Californian wine producers even compared to the Californian 'home market' alone. Furthermore, taxes are relatively high in all Nordic countries - especially on alcohol, and in the latter 3 countries alcohol policy is very strict, which further reduces the consumption of e.g. wine. Consequently, most people would not hesitate to conclude that Californian wines are more expensive to buy in any of the four countries than in California itself.

This paper analyses prices on Californian wine. To give an overview of the Nordic wine markets, section 2 briefly reviews trends in Nordic wine consumption with a description of wine taxes and retail sales systems for alcoholic beverages. Section 3 deals with Californian wines on the Nordic wine markets and ends up with principal reflections on cross-country variations in prices. The following sections include pairwise cross-country price comparisons on Californian wine. In particular the price of the wine itself seems to explain some part of the price variations.

## 2. Trends in wine consumption in the Nordic<sup>1</sup> countries

Probably, most people know that none of the Nordic countries are wine producing countries. Probably therefore none of them have great traditions for wine drinking. Figure 1 shows that until the early 1970s the wine consumption was at a fairly low level in all countries, i.e. approximately 2-6 litres per capita older than 15 years, highest in Denmark and lowest in Norway.

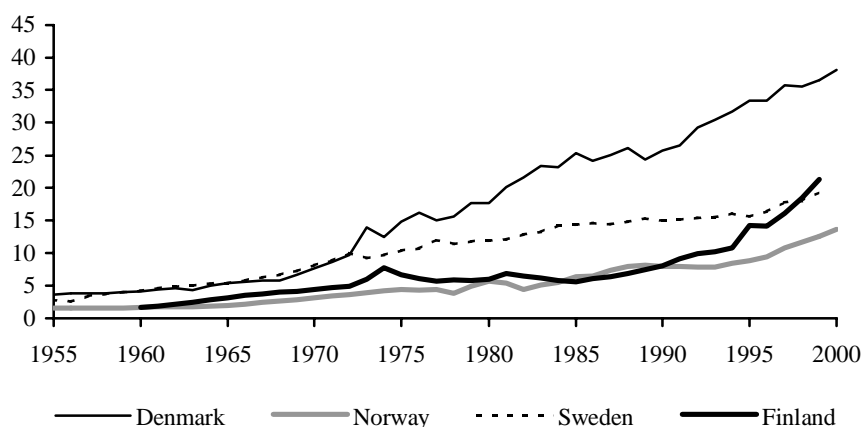
Due to the Danish membership of the EC in 1972 taxes on alcohol (especially wine) were lowered significantly in the early 1970s. Consequently, Denmark became the first Nordic country where wine became a regular consumer good and at a level comparable to other European countries, as can be seen from Figure

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<sup>1</sup> Iceland is normally included in the 'Nordic area'. In this paper 'Nordic' means Denmark, Finland, Norway and Sweden.

1. As Denmark is a part of the continental Europe, the Danish alcohol policy has been forced to be close to e.g. the German standard (except for the alcohol taxes) and therefore quite different from the policies in the other Nordic countries – each of them having quite restrictive alcohol policies. Still, Denmark is lagging behind the wine consumption levels of Southern Europe; e.g. Italy with approximately 50 litres of wine per capita and France with 60 litres per capita. (These numbers for the Southern European countries are probably underestimated due to unrecorded wine consumption.)

**Figure 1. Wine consumption in Denmark, Finland, Norway and Swede, 1955-2000, (litres per capita, 15 years+).**



Note: Data for Finland covers 1960-1999.

Sources: Statistical Yearbooks for the relevant countries; Alkoholstatistik 1999 (Alkoholinspektionen 2000, Sweden); Nordic Alcohol Statistics 1994-1998 (2000).

After Sweden and Finland joined the EU in the 1990s the wine consumption of these countries developed as in Denmark in the early 1970s. Thus, both countries appear to have entered trajectories of strongly increasing wine consumption levels – even though both countries still have a rather restrictive alcohol policy, see below. Note that Norway - still being able to pursue a very restrictive alcohol policy – is lagging notably behind the other countries even today with a yearly wine consumption level around only 13-14 litres per capita, 15years+.<sup>2</sup>

## 2.1 The retail systems for sales of wine in the Nordic countries

The Swedish retail system for sales of alcoholic beverages is organized by the state-owned monopoly ‘Systembolaget’. Sales of spirits, wine and strong beer can only take place through Systembolagets shops (approx. 411) or local agents in 575 communities. This amounts to 5 shops per 100.000 inhabitants or

<sup>2</sup> The increases in wine consumption can probably be explained by 1) the rising living standards due to the significant growth rates of real incomes in the Nordic countries, 2) trade liberalisation and especially 3) growth in Nordic charter tourism - travels to the climatically more comfortable Southern Europe where wine also is abundantly and cheaply available. As no wine production, apart from fruit wines, is taking place in the Nordic countries, consumer preferences or habits for wine have to be adopted from outside.

alternatively 1 shop per 1100 km<sup>2</sup> ground area. Only light beer is available in other shops, and the Swedish breweries have a right to sell strong beer (above 3.5% alc.) directly to restaurants.

During the period 1954-1994, 'Systembolaget' had an effective monopoly not only concerning retail sales, but also in case of quantities sold to e.g. restaurants. The monopoly concerning sales to restaurants, hotels etc. ceased in 1995, opening up for private import companies who can sell wines directly to 'Systembolaget', restaurants, hotels etc. Approximately 200 companies are licensed.

In 1995 Sweden joined the European Union, which was expected to cause problems for the sales monopoly in the market-oriented community. The EU Court of Justice ruled in 1997 that 'Systembolaget' was not in contradiction with a EU membership as the system was created from public health considerations and was not found to be discriminatory towards foreign products. But a gradual liberalization of the border trade regulations, i.e. personal imports of (cheaper) alcoholic beverages, has taken place and a direct result of the EU membership was the disappearance of monopolies in import/export, wholesales and production (spirits).

The Norwegian sales system, 'Vinmonopolet', is quite similar to the Swedish system. As in Sweden it was originally established to control a widespread abuse of spirits – 'aqua vitae'. Norway is not a member of the European Union but due to trade-agreements – and the general liberalization of international trade – the state-monopoly was split up in the mid-1990s. Today, 'Vinmonopolet' is only a retail sales monopoly. In total there are 140 shops, but Vinmonopolet plans to expand this number to 163 in 2002. Currently the density of shops is as low as 3 per 100.000 inhabitants or alternatively 1 shop per 2300 km<sup>2</sup> ground area. The number of shops were even lower in 1991, i.e. 101, and hence the low density of alcohol stores combined with the geographical conditions, i.e. mountains, forests, a lot of snow in the wintertime etc., makes it difficult for people to buy alcohol.

After a prohibition period 'Alko' was established Finland along the lines of the Swedish and Norwegian systems. One of the purposes was also to prevent profit-making concerning alcohol. After Finland joined the European Union in the 1990s, it has been forced to liberalize the state-monopoly. Therefore 'Alko' is now only a purely retail sales monopoly. Still there are only 6 shops per 100.000 inhabitants and 1 for each 1100 km<sup>2</sup> ground area.

The sales monopoly and the very low liqueur-store density have undoubtedly had significant effects on the absolute consumption levels in the three countries regarding both wine and other beverages from the monopoly systems.

As noted earlier Denmark has always adhered to liberal, market-oriented systems and the temperance movement has been relatively weak compared to the neighbouring countries. Taxes have been applied mainly for fiscal purposes. There have been no other impediments to alcohol consumption except for a minimum age of 18 years for sales at restaurants. Recently, an age limit of 15 years was introduced for the sale of alcohol from retail shops. However, except for some specific rules concerning alcohol sales from gas stations late at night, wine can be bought in nearly any shop.

## **2.2 Prices developments and wine taxes**

Focusing on prices, Bentzen and Smith (2001) analyse the experience in the Nordic countries. In the 1990s there was an 18% decline in the real price on wine in Denmark; in Finland the real price on wine fell by 4%. In Norway and Sweden the real wine prices have increased by 6% and 7%, respectively.

The decline in Danish real prices is partly due to a continuation of changes in the Danish excise system on alcoholic beverages, which started with a tax cut of 75% on wine with the Danish entry into the EC in 1972. Tax cuts were resumed in the 1990s in order to complete the harmonization of the Danish tax level to the EU level. Thus, by the middle of the 1990s, nominal taxes on wine in Denmark correspond to the 1970 level.

Finland, Norway and Sweden all decided not to enter the EC in 1972, and accordingly, all three countries have been able to decide the taxation of alcoholic beverages, which partly explains the increase of the real price on wine (in fact since 1970). It is obvious that in general fiscal considerations have been of great importance to the taxation of alcoholic beverages.

The present levels of wine taxation in the Nordic countries are presented in Table 1. In all cases, except Finland, the wine taxes are scaled progressively according to the alcohol content. The last column in the table presents comparable taxes in Euros per litre wine.

**Table 1. Wine taxes in the Nordic countries and California, 2001.**

	Tax in national currency; per litre	Wine (12%) tax; Euro per litre
Denmark; DKK	10.15 (>15%) 7.05 (6-15%) 4.50 (<6%)	0.95
Norway; NOK	3.65 per % volume per litre (<22%)	5.47
Sweden; SEK	45.17 (>15%) 27.50 (8.5-15%) 18.98 (7-85.%) 13.80 (4.5-7%)	3.00
Finland; FIM	14.00	2.36
California, US\$	Federal .tax \$ 1.07/gallon (<14%), \$ 1.57/gallon (14-21%), Californian.tax \$ 0.20/gallon	0.37

*Notes:* The exchange rates as of december 2001.

*Source:* Nordic policies on alcohol (2001). Californian figures were kindly provided by Prof. Heien, University of Cal, Davis.

Norway has some of the highest taxes even globally – five to eight times the Danish level which is higher than in most other European countries. Finland and Sweden have rather similar levels of taxes but still much higher than the Danish wine taxes. Comparing the tax level with California, all the Nordic countries have significantly higher wine taxes. Furthermore, sales taxes are different in different countries. Thus, currently VAT in Denmark, Finland, Norway and Sweden is 25%, 22%, 24% and 25% respectively. Sales taxes in most counties in California are near 7.5%.

Judged solely from the tax rates shown in Table 1, Norway is expected to have the highest prices on wine, followed by Sweden and Finland. Among the Nordic countries, Denmark is predicted to have the lowest prices. But compared to California, higher wine prices are anticipated in all the Nordic countries. Focussing solely on wines produced in California would make this expectancy even stronger because of transportation costs.

### 3. Californian wines on the Nordic market

As noted earlier the aim of this paper is to analyse price variation on Californian wine in the Nordic countries. Moreover, the price structure on Californian wines sold on the Nordic market is compared with prices on the Californian home market.

#### 3.1 Market position

The importance of Californian wine on the Nordic markets is illustrated in Table 2. Note that the data covers all wines from the USA, but a visual inspection of the specific US brands sold in Denmark, Norway and Sweden reveals that 95-98% of all US wines come from California. Compared to the major European wine-producing countries, France, Spain and Italy, having a combined market share between 50 and 70% in the respective countries, there is much less demand for Californian wines. The highest market share is found in Sweden and Finland, i.e. 4.3% and 4.8%, respectively, whereas Californian wines count for only 1.5% of the total wine sales in Norway. The number of different Californian wines sold in Sweden and Finland add up to 4.6% and 3.8% of the number of all different wines sold in each country. The similar figure for Norway is 4.2%, which together with Californian market share indicates relatively low consumer preferences for the Californian brands supplied in Norway.<sup>3</sup>

**Table 2. Market shares on the Nordic market for wine, by country of origin, 2000.**

	<i>Denmark</i>	<i>Norway</i>	<i>Sweden</i>	<i>Finland<sup>1</sup></i>
	----- Market shares, % -----			
France	39.6	24.9	14.2	13.7
Spain	21.0	13.4	27.3	21.4
Italy	10.9	16.1	15.8	13.6
Germany	6.4	8.8	7.8	7.2
Australia	2.1	6.1	5.1	2.3
Chile	7.9	16.1	7.0	8.7
Portugal	2.1	2.5	3.7	1.0
<b>USA</b>	<b>2.2</b>	<b>1.5</b>	<b>4.3</b>	<b>4.8</b>
Argentina	1.7	0.5	1.0	1.6
South Africa	2.9	1.7	4.1	3.0
Bulgaria/Hungary/Romania	0.5	1.7	5.0	14.0
Other countries	2.9	6.7	2.6	7.8

1) Finland (1999)

Sources: VSOD (Denmark), Vinmonopolet (Norway), Systembolaget (Sweden) and Alko (Finland).

Looking at Denmark, the market share for US wines has been declining for some years. Still, in 2000 the market share was 2.2% despite of the relatively strong \$/DKK relationship.

Comparing the market position of US wines with other overseas wine exporting countries in all Nordic markets, Chile has gained an outstanding position. However, at the Swedish and Finnish markets USA is the second largest overseas supplier, whereas the South African wines hold this position in Denmark.

<sup>3</sup> In May 2002, 'Vinmonopolet' in Norway supplies 25 different US wines to the Norwegian consumers. In Finland and Sweden the similar numbers are 20 and 83, respectively. The numbers vary from month to month. In Denmark wines from 164 different *vineyards* are at the market, meaning that at least 300-400 different wines can be bought in Danish shops.

### 3.2 Prices

Retail prices on Californian wine are generally composed of the following cost elements

- Producers price, ab winery
- Transport and insurance costs
- Payment to wine-merchants
- Expenses and profits at the wholesale level
- Wine duties
- Distribution costs
- Costs and profits at the retail level
- VAT.

As a starting point it is assumed that producers price is the same for all Nordic buyers. Then the price variations must reflect differences in one or several of the other cost components. There are good reasons to assume that at least transport and insurance costs, potential payment to wine-merchants and wine duties plus VAT in sum are notably highest for Nordic consumers. In fact VAT plus duties are significantly higher in all Nordic countries compared to the Californian taxes, suggesting that wines should be cheaper in California than in the Nordic countries.

Another potential factor explaining price variations is price discrimination. Demand elasticities vary across countries and producers can exploit this and charge different prices. Moreover, within a country demand elasticities most likely vary from the low price to the high price segment depending inter alia on the income levels and distribution. In California the income distribution is much more skew than in any of the Nordic countries and the income level of a quite large group of the population is quite high compared to the Nordic standard. Consequently, the demand for wine in the high price segment is expected to be relatively large and most likely more inelastic in California than in the Nordic countries where only relatively few consumers demand expensive wines because of the even income distribution. Therefore, the price structure might be affected by the relative demand in each group of countries, i.e. low prices vs. high price segment. Price discrimination is potentially a factor that would cause high Californian prices for expensive wines.

Looking at the relative prices within the Nordic countries, and noting that the transportation costs from California to each country probably are equal, the wine prices are expected to be lowest in Denmark due to stronger competition at all levels in the national distribution chain. Furthermore, taxes on wine are significantly lower in Denmark. However *ALKO*, *Systembolaget* and *Vinmonopolet* must be considered as large buyers on the wine market<sup>4</sup>, because of the state monopoly that until recently has been in each country also at the import/wholesale level. Consequently, their bargaining position against the supplier of wine is stronger than the position of a small Danish importer. In addition, the demand for Californian wines in Denmark is relative lower than in Sweden and Finland, maybe due to a more niche-oriented market in Denmark with higher prices. Note however, that sales prices in each of the three other Nordic countries are set according to the overall alcohol (and fiscal) policy of the countries, whereas the Danish prices result from competition giving generally lower prices. All in all, wines sold in Denmark are expected to be the cheapest within the Nordic countries.

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<sup>4</sup> In 2000, the sizes of the populations in Finland, Norway and Sweden were 5.2 million, 4.5 million and 8.9 million people.

Finally, focusing on the relative position of Sweden, Norway and Finland, higher prices can more easily be sustained in Norway, because of Norway not being a member of the EU. Moreover, the Norwegian taxes are far the highest in the Nordic countries (see above) and Norway has rather restrictive rules for border trade, see Bentzen and Smith (2001). Finland and Sweden have been forced to start harmonizing their taxes and to deregulate the restrictions on border trade because of their EU memberships. Wine taxes are lowest in Finland, but Sweden being a neighbour to Denmark and with a location much closer to i.e. Germany has relatively more pressure on its prices than Finland.

Concluding on prices, Californian wines are expected to be cheapest in California, followed by Denmark. Sweden presumably has lower prices than Finland. Finally, Norway most probably has far higher prices on all wines than any of the other countries in this analysis.

### 3.3 Data

The data used in the analysis are retail prices in each country on specific red wines from specific vintages from specific Californian vineyards. This gives a data set including identical wines, and consequently comparisons can be made as matched pairs between countries at least at the bilateral level.

Data derive from several sources. Wine prices at the retail level for Finland, Norway and Sweden are obtained from ALKOs, Vinmonopolets and Systembolagets price catalogues, see Appendix for web-addresses. Prices on Californian wine in Denmark were collected using a complete list of all importers of Californian wine with links to retailers. In most cases, the importers' catalogues included standard list prices at the retail level. In order to make the Danish prices comparable to the prices in the other Nordic countries, where they never have special price offers, the price concept used for Denmark is list prices/normal prices at the retail level. Noting that about 1/3 of all Danish retail sales on wine takes place as special offers (normally 10-15% off if you buy 3 bottles instead of one) Danish prices are measured quite conservatively compared to the other Nordic countries.

Next, having identified specific wines in each Nordic country, the Californian prices of identical wines were collected using wine-searcher.com at the Internet, searching for Californian suppliers. Finally, all prices were harmonized with respect to taxes, i.e. the prices in the final data set include all wine-specific taxes and other sales taxes, e.g. VAT, local sales tax (set to 7.5% in California) etc. All prices were collected in April/May 2002. All prices are measured in US dollars using ultimo 2001 currency rates in order to take account of delivery lags, transportation time etc. from USA to the Nordic countries.

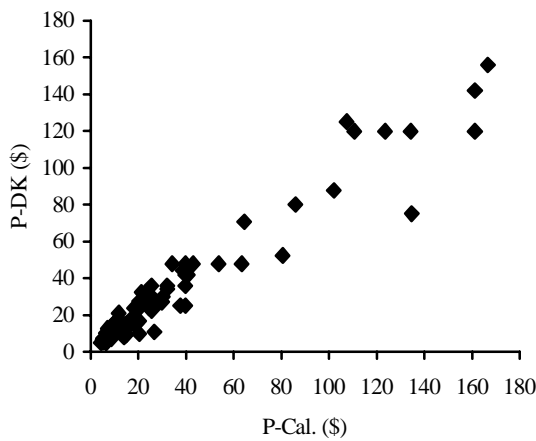
Concerning calculation of the final price shipment costs from the retailer to the consumer mark a special problem. The Californian prices relate to Internet purchasing, which on average would add \$ 2 per bottle shipped to addresses in California. The Swedish, Norwegian and Finnish prices are also measured at retailers shop, meaning that some part of the population would need to order by post or incur significant transportation costs. In Denmark, the density of retailers is quite high, meaning that transportation costs in relation to buying wine are ignorable. However, noting that the market share for Californian wine is close to 2%, only a few of the most well-known brands can be bought without extra costs for shipment if the consumer lives outside the area of the 2-3 largest agglomerations in Denmark. However, shipment costs on e.g. Internet purchasing from Danish distributors are lower compared to California (\$ 0.5 per bottle). Still, no corrections are made for any of the countries' prices in connection with final shipments to the consumers – probably resulting in a minor upward bias in Danish prices.



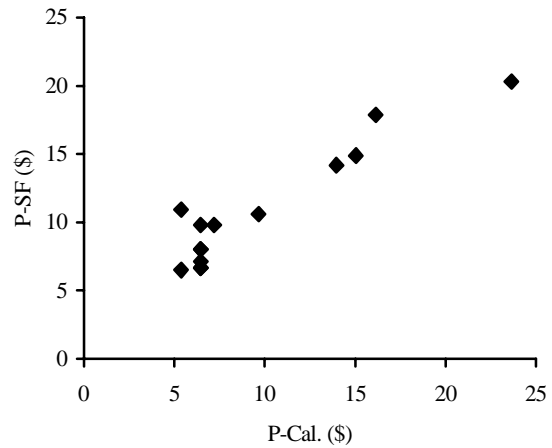
## 4. Price analyses

Figures 2 to 5 give bilateral price comparisons, i.e. California vs. each of the Nordic countries on identical wines. The figures clearly suggest that Californian wines are more expensive to buy in Finland and certainly in Norway, where all the wines for which it was possible to find a matching wine in California are more expensive than in California. The picture is more blurred for Sweden and Denmark. The scatter plot shows that lower prices exist in Denmark and Sweden at all price levels, i.e. both at the low-price segment and the high-price segment. More precisely, 41% and 43% of the wines included in the analyses are more expensive in California than in the two Scandinavian countries. Furthermore, the figures seem to indicate a tendency towards lower prices in Denmark/Sweden the more expensive the wine is.

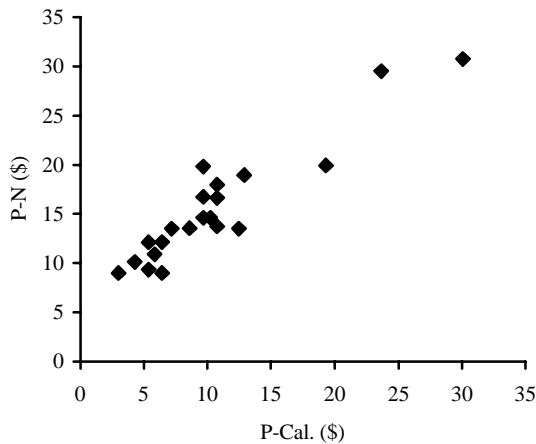
**Figure 2. Retail prices on Californian red wine, Denmark vs. California, US\$ per bottle, 95 wines.**



**Figure 3. Retail prices on Californian red wine, Finland vs. California, US\$ per bottle, 14 wines.**



**Figure 4. Retail prices on Californian red wine, Norway vs. California, US\$ per bottle, 21 wines.**



**Figure 5. Retail prices on Californian red wine, Sweden vs. California, US\$ per bottle, 83 wines.**

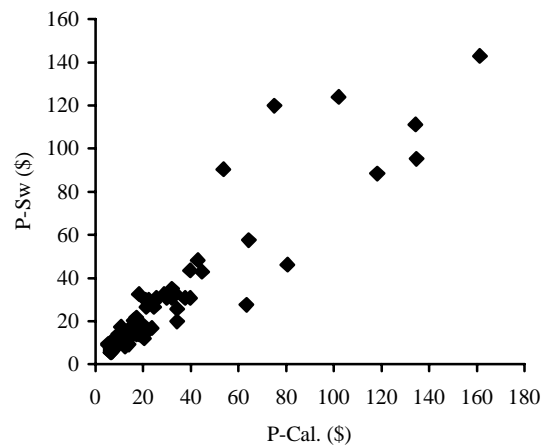


Table 3 includes summary statistics. The average price difference in absolute terms is positive in Denmark and Sweden, suggesting *higher* prices in California. However, the t-statistics (row 5) shows that absolute

price differences are not significant, except for Norway having clearly higher prices than California. In Norway, all wines are more expensive than in California and this is also nearly the case in Finland. Out of 14 wines in the Finnish sample only 2 can be bought cheaper than in California.

**Table 3. Comparison of prices on identical Californian red wines, California vs. Nordic countries.**

	Denmark	Finland	Norway	Sweden
Average absolute price difference (\$), (Californian price minus Nordic price)	1.23	-1.18	-4.74	0.66
Standard error of absolute price difference	10.24	2.01	2.39	11.54
Average relative price difference (% of Cal. price)	-5.43	-5.78	-63.87	-5.97
Standard error of relative price difference	27.44	29.33	46.72	28.72
T-statistics for absolute price difference	0.1508	-0.1571	-9.45	0.52
Average diff. (\$) / T-stat. for absolute price difference, sub-sample: price below median price in sample	-0.77 -1.778	-	-	-1.11 -3.085
Average diff. (\$) / T-stat. for absolute price difference, sub-sample: price above median price in sample	3.23 1.581	-	-	2.43 0.978
Share of wines where P-California greater than P-Nordic, all wines in sample	0.41	0.14	0.00	0.43
Share of wines where P-California greater than P-Nordic, sub-sample: price below median price in sample	0.29	-	-	0.29
Share of wines where P-California greater than P-Nordic, sub-sample: price above median price in sample	0.53	-	-	0.60
Number of wines in each sample	94	14	21	83

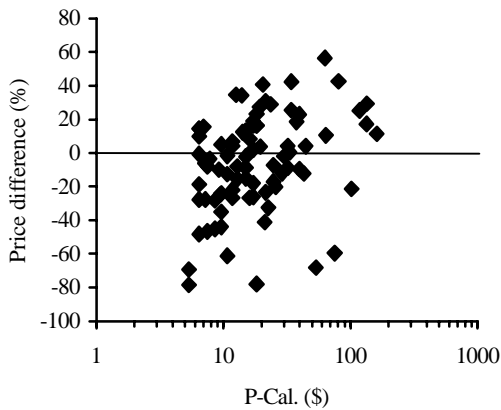
Figures 2 and 5 indicate that price variation is dependent on price segment, i.e. low-priced vs. high-priced wines. Therefore, data for Denmark and Sweden are further divided into wines below and above the median price (P-California). The shares of wine that are more expensive in California as compared to Denmark and Sweden are clearly much lower in the low-price segment than in the high-price segment, see rows 9 and 10 in Table 3. Only 29% of the wines included in the analyses in the low-price segment were in fact more expensive to buy in California. But in the high-price segment the opposite is nearly found as 0.53%-60% of the wines are cheapest to buy in Denmark/Sweden. Rows 6 and 7 include test-statistics. One-sided P-values for Denmark are 0.042 in the low-price segment and 0.059 in the high-price segment suggesting that cheap wines are cheapest in California and that more expensive wines are cheapest in Denmark. The corresponding prob-values for Sweden are 0.002 and (>)0.162 suggesting that wines in the low-price segment are clearly cheapest in California. However, at the high-price segment price differences are in favour of Sweden, but not significant.

The overall analyses in this section suggest that only Norwegian consumers pay significantly higher prices for Californian red wine than Californian consumers. In the low-price segment, all Nordic countries experience higher prices than California itself. But there is a tendency towards smaller price differences with higher price. In fact, high-priced wines are most likely cheaper in Denmark and Sweden.

## 5. Prices and price differences

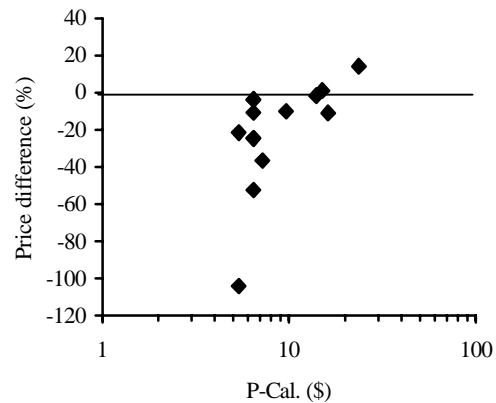
In this section the relationship between price of the wine and the price difference is further investigated. Figures 6-9 present scatter plots of the relative price difference against the price in California for each Nordic country. It is easily seen that especially for the low-priced wines the Nordic prices are above the Californian level, i.e. in most cases the price difference is negative. However, as the wine gets more expensive, the price gap vanishes and in the case of Sweden and Denmark the price difference seems to favour their consumers.

**Figure 6. Relative price difference (%) as a function of the retail price in California (log), Denmark vs. California.**



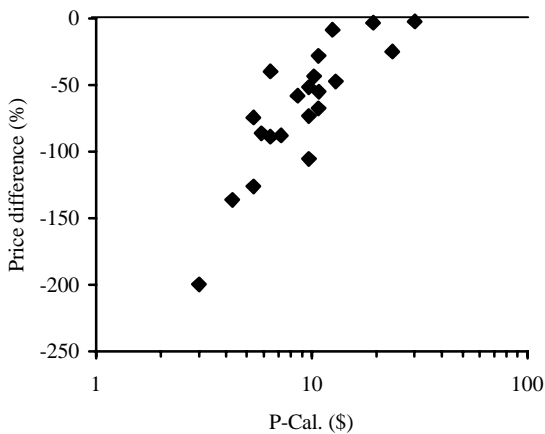
Note: Price difference measured as P-Cal. minus P-Denmark. Price on 1<sup>st</sup> axis in \$ per bottle.

**Figure 7. Relative price difference (%) as a function of the retail price in California (log), Finland vs. California.**



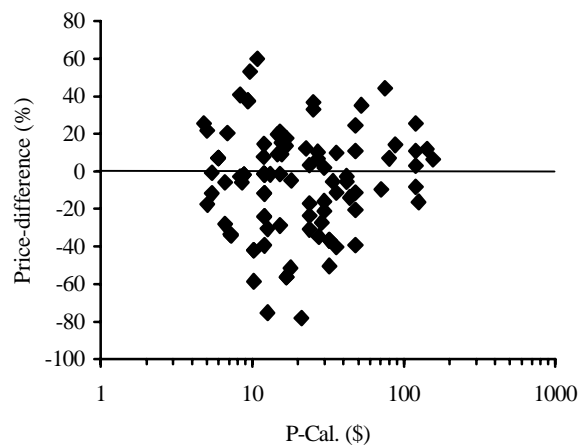
Note: Price difference measured as P-Cal. minus P-Finland. Price on 1<sup>st</sup> axis in \$ per bottle.

**Figure 8. Relative price difference (%) as a function of the retail price in California (log), Norway vs. California.**



Note: Price difference measured as P-Cal. minus P-Norway. Price on 1<sup>st</sup> axis in \$ per bottle.

**Figure 9. Relative price difference (%) as a function of the retail price in California (log), Sweden vs. California.**



Note: Price difference measured as P-Cal. minus P-Sweden. Price on 1<sup>st</sup> axis in \$ per bottle.

As noted earlier systematic price differences can potentially exist between separate market segments due to producers' price discrimination in order to exploit variations in demand elasticities across countries. Furthermore, some of the price differences are quite substantial and potential measurement errors cannot be totally excluded. In order to eliminate uncertainty about the exact magnitude of the price differences, which potentially might cause extreme values to affect the conclusions, a more conservative test is needed. Consequently, a binary variable is constructed having the value 1 if Californian wines are cheapest in California and 0 if not. Next, a probability model is formulated where the independent variable is the price of the wine in California.

Assuming a probit-specification the estimation results are shown in Table 4, partly for Sweden and Denmark and partly on a pooled data set including all 4 countries.<sup>5</sup>

**Table 4. Probit model of the probability that a Californian wine is cheaper in California than in the Nordic countries as a function of the wine price in California.**

	All Nordic countries (pooled)	Denmark	Sweden
Intercept	0.5772* (0.1637)	0.6267* (0.1826)	0.4153* (0.1876)
Wine price in Cal. (\$)	-0.0119* (0.0033)	-0.0136* (0.0045)	-0.0088 (0.0049)
Dummy for Sweden	-0.0828 (0.1950)		
Dummy for Norway	4.9198 (190.3)		
Dummy for Finland	0.6234 (0.4431)		
Likelihood ratio, $\chi^2$ (prob. value)	40.52 (<.0.0001)	11.75 (0.0006)	3.5687 (0.0589)
Concordants (%)	74.0	68.3	65.5
Number of observations,	212	94	83
Response profile (1,0)	(136,77)	(55,39)	(48,36)

Dependent variable eq. 1 if  $P_{cal}$  lt.  $P_{Nordic}$ , else eq. 0.

Numbers in brackets below the estimated parameters are standard errors. An \* indicates that the parameter is significant at the 1% level of significance, \*\* at the 5% level.

The results of the model estimated on pooled data suggest that the probability that a particular Californian wine is cheapest to buy in California depends negatively on the price of the wine itself. This effect is highly significant. None of the control dummies for country (other than Denmark) are significant, which is a little surprising. Note however, that there are only a few observations for Norway and Finland, which weakens the conclusions for both countries. Finally, the predictions of the model are correct for 74% of the observations.

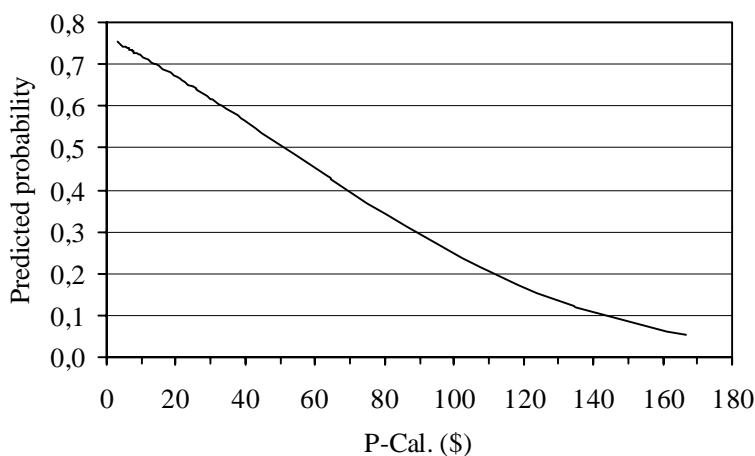
Looking at Denmark, the influence from price is a little stronger as compared to the pooled sample and still highly significant. But in the Swedish case (column 3), the estimated coefficient is smaller and insignificant,

<sup>5</sup> No separate models were estimated for Norway because the response variable contains only zeros. The same is the case for Finland because the Finnish data set includes only 2 observations with value 1 out of (only) 14 observations.

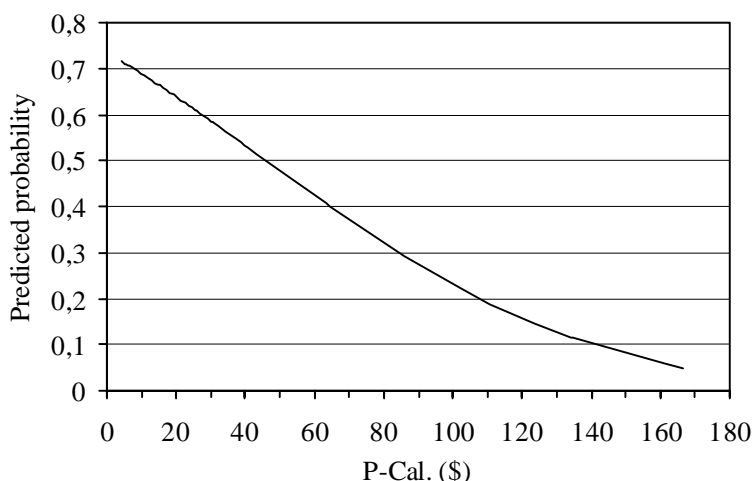
suggesting that the model only holds for Denmark and for all Nordic countries pooled together. The predicted probabilities in the latter two cases are shown in Figures 10 and 11.<sup>6</sup>

The simulated probabilities put emphasis on some of the arguments in section 3.2, different income distribution, different taste and a degressive tax system on wine. Thus, if a Californian wine costs more than approximately \$45 in California then most likely the wine is cheapest to buy in Denmark (probability under 0.5), but probably not in the other Nordic countries. Furthermore, looking at the low-price segment the probability that Californian wines are cheapest to buy in California is *not* always 1. Thus, the probability that a Californian wine sold for \$4.99 + sales tax in California is cheaper to buy there than e.g. in Denmark is around 0.75.

**Figure 10. Simulated probabilities that Californian wines are cheaper in California than in Denmark.**



**Figure 11. Simulated probabilities that Californian wines are cheaper in California than in Nordic countries in general.**



<sup>6</sup> Predicted probabilities on the pooled data set are based on a re-estimated model without country dummies (because of their insignificance), meaning that the curve reflects a rather abstract region ‘average Nordic countries’.

## 6. Conclusion

In this paper prices on Californian wine have been examined. The Nordic countries are located more than 6000 miles away from California. Consequently, Californian wines are expected to be more expensive to buy in any of these countries than on location in California.

Finland, Norway and Sweden have state monopoly retail systems for sales of wine, and there is no competition on the wine market in any of these countries. In Denmark, the competition at the retail level within sales of wine is rather significant. Because of this it is argued that Californian wine should be rather expensive in Finland, Norway and Sweden as compared to Denmark and California.

Based on a sample of 212 pairwise identical wines, it is found that - except for Norway - the Californian wines are not necessarily cheapest to buy in California. This applies for all price segments. Furthermore, for all Nordic countries the analyses indicate that the more expensive the wine gets the less price disadvantage against California in general. Focusing at the *Danish* market, the expensive Californian wines are significantly cheaper than in California, which is verified in the estimated probability model.

Therefore, asking the question '*What does California have in common with Finland, Norway and Sweden?*', the answer must be: It pays to buy your expensive Californian wine in Denmark when you live in Finland, Norway, Sweden or California.

## Literature

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Bentzen J. and Smith V. (2001), Wine in the Nordic countries: Historical and recent trends in the development of wine consumption, prices and taxation, Paper to be presented at *The International Wine Economics Workshop*, Adelaide University, October 2001.

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## Appendix

### 1. Data sources

Denmark: Information on all Danish importers of Californian wine, VSOD, The Wine and Spirits Organisation in Denmark, [www.VSOD.dk](http://www.VSOD.dk)

Finland: Alko, [www.alko.fi](http://www.alko.fi)

Norway: Vinmonopolet, [www.vinmonopolet.no](http://www.vinmonopolet.no)

Sweden: Systembolaget, [www.systembolaget.se](http://www.systembolaget.se)

California: Wine-searcher, (links to dealers of Californian wine), [www.wine-searcher.com](http://www.wine-searcher.com)

### 2. Alphabetic list of Californian wines used in the analyses

Note that the number of wines in the list is lower than the total number of observations in the data set used in the analyses, because the same wine in different vintages in some cases has been included in the data set in order to obtain as many observations as possible for all Nordic countries.

Acacia Pinot Noir	Kautz Ironstone Vineyards, Cabernet Sauvignon
Alluvium (Beringer, Knights Valley)	Kautz Ironstone Vineyards, Merlot
B.V. Georges de Latour Private Reserve Cabernet	Kautz Ironstone Vineyards, Zinfandel
Backus Vineyard, Cabernet Sauvignon, Joseph Phelps	Kendall-Jackson collage Cab/Sauvignon-Shiras
Barefoot Merlot	Kendall-Jackson collage Zinfandel-Shiraz
Barefoot Zinfandel	Kendall-Jackson Vintner's Grand reserve Cab/Sauvignon
Barrelli Creek Vineyard Zinfandel	Kendall-Jackson Vintner's Reserve Cab/Sauvignon
Benziger Family Winery Cabernet sauvignon	Kendall-Jackson Vintner's Reserve Pinot Noir
Beringer Knight Valley Cabernet Sauvignon	Kendall-Jackson Vintner's Reserve Zinfandel
Beringer Merlot	Le Cigare Volant
Beringer North Coast Pinot Noir	Le Mistral, Joseph Phelps Vineyards
Beringer North Coast Zinfandel	Marimar Torres Pinot Noir
Beringer Stone Cellars Cabernet Sauvignon	Mayacamas Cabernet Sauvignon
Beringer zinfandel	Mayacamas Vineyards Library Cabernet Sauvignon
Bonterra Cabernet Sauvignon	McDowell Vineyards Syrah Mendocino county
Bonterra Cabernet Sauvignon Organic North Coast USA	McDowell Vineyards Syrah Mendocino county Reserve
Bonterra Zinfandel	Montevina Zinfandel
Burlwood Cabernet Sauvignon	Mystic Cliffs shiraz
Calera Pinot Noir	Napanook
Callaway Coastal Cabernet Sauvignon	Nathanson Creek Red
Callaway Coastal Cabernet Sauvignon	Newton Merlot Unfiltered
Canyon Road Cabernet Sauvignon	Opus One, Mondavi & Rothschild, 1997 H, bottle

Canyon Road Coastal cabernet sauvignon  
 Canyon Road Coastal merlot  
 Canyon Road Merlot california  
 Cartlidge & Browne zinfandel california  
 Caymus Cabernet Sauvignon  
 Caymus Cabernet Sauvignon  
 Cline Syrah  
 Cline Zinfandel  
 Clos du Bois Cabernet Suvignon  
 Cuvaision Cabernet Sauvignon  
 Cuvaision Merlot  
 Deer Valley Cabernet Sauvignon  
 Deer Valley Merlot  
 Deloach Estate Bottled merlot  
 Deloach Estate Bottled pinot noir  
 Deloach estate bottled zinfandel  
 Deloach Los Amigos Ranch, Sangiovese  
 Deloach o.f.s. Merlot  
 Deloach OFS Cabernet sauvignon  
 Deloach peletti zinfandel  
 Deloach Pinot Noir, O.F.S.,  
 Deloach Zinfandel Barbieri  
 Deloach zinfandel alifornia  
 Deloach Zinfandel Papera,  
 Deloach Zinfandel Saitone  
 Deloach, Los Amigos Ranch, cabernet sauvignon  
 Dominus Estate  
 Duck Pond Pinot Noir  
 Fetzer Barrel Select Pinot Noir  
 Fetzer Barrel Select Zinfandel  
 Fetzer eagle peak merlot  
 Fetzer Valley Oaks Cabernet Sauvignon  
 Fetzer Valley Oaks Zinfandel  
 Gallo Barbera  
 Gallo Cabernet Sauvignon  
 Gallo Merlot  
 Gallo Sonoma Pinot Noir  
 Gallo ruby cabernet  
 Gallo Sonoma Cabernet Sauvignon  
 Gallo Sonoma County Pinot noir  
 Gallo Sonoma Estate Bottled, Northern Sonoma Cab. Sauvignon  
 Gallo Sonoma Frei Ranch , Zinfandel  
 Gallo Sonoma Frei Ranch, Cabernet Sauvignon  
 Gallo Sonoma Winery Zinfandel Frei Ranch  
 Gallo Sonoma Zinfandel  
 Gallo Zinfandel  
 Georges de Latour Private Reserve  
 Geyser Peak Cabernet Sauvignon Sonoma  
 Opus One, Mondavi & Rothschild, 1998  
 Pahlmeyer Napa Cabernet  
 Pahlmeyer Red Table Wine  
 Parducci cabernet sauvignon  
 Parducci merlot  
 Parducci Syrah  
 Parducci zinfandel  
 Parducci, Vintage Red  
 Paso Robles Cabernet Sauvignon  
 Pastiche, Napa Valley, Joseph Phelps Vineyards  
 Paul Mason California Red wine  
 Quintana Cabernet Sauvignon  
 R H PHILLIPS Merlot  
 Rancho Zabaco Zinfandel  
 Rancho Zabaco Zinfandel "Sonoma Heritage Vines"  
 Ravenswood Vintner's Blend Zinfandel  
 Ravenswood Zinfandel  
 Renaissance Syrah  
 Ridge Geyserville Zinfandel  
 Ridge Lytton Springs Zinfandel  
 Ridge Monte Bello  
 Ridge Santa Cruz Mountains Merlot  
 Ridge Vineyards Zinfandel Geryserville  
 Ridge York Creek Petite Sirah  
 Riverside Cabernet sauvignon  
 Robert Mondavi Cabernet Sauvignon  
 Robert Mondavi Cabernet Sauvignon Reserve,1998  
 Robert Mondavi Coastal Pinot Noir  
 Robert Mondavi Pinot Noir  
 Robert Mondavi Zinfandel  
 Round Hill Cabernet Sauvignon  
 Rutherford Ranch Cabernet Sauvignon  
 Rutherford Ranch Merlot  
 Saint Francis Cabernet Sauvignon Reserve  
 Saint Francis Old vines zinfandel  
 Saint Francis Pagani vineyard zinfandel  
 Saint Francis Sonoma Merlot  
 Schug Pinot Noir  
 Seghesio Home Ranch Zinfandel  
 Seghesio Zinfandel  
 Shafer Cabernet Sauvignon  
 Simi Cabernet Sauvignon Reserve  
 St Francis Merlot  
 Stag's Leap Fay Cabernet Sauvignon  
 Stefani Vineyard Cabernet Sauvignon  
 Stonehedge Cabernet Sauvignon  
 Stonehedge Cabernet Sauvignon Napa Valley  
 Stonehedge Old Vine Zinfandel



Geyser Peak Cabernet Sauvignon Sonoma	Sutter Home cabernet sauvignon
Geyser Peak Merlot Sonoma	Sutter Home Winery Cabernet Sauvignon, Signature
Geyser Peak Reserve Alexandre Meritage	Sutter Home Zinfandel
Geyser Peak Shiraz Sonoma	Talus cabernet sauvignon
Geyser Peak Zinfandel Sonoma	Talus zinfandel
Glen Ellen Cabernet Sauvignon Proprietor's Reserve	Talus merlot
Glen Ellen Merlot Proprietor's Reserve	Trincherio Familie Estates Winery Zinfandel
Hawk Crest Cabernet Sauvignon	Trincherio Familie Estates Winery, Cabernet Sauvignon
Hawk Crest Merlot	Turley Old Vines Zinfandel
Heitz Cabernet Sauvignon	Turning Leaf Cabernet Sauvignon
Heitz Martha's Vineyard Cabernet Sauvignon, Napa Valley	Turning Leaf merlot
Heritage cabernet sauvignon	Turning Leaf Reserve Cabernet Sauvignon
Hess Collection Cabernet	Turning Leaf zinfandel
Inglenook Zinfandel	Vendange Zinfandel
Insignia, Joseph Phelps Vineyards Napa Valley	Wente Cabernet Sauvignon
J Lohr Cabernet sauvignon	Wente Zinfandel
J Lohr Hilltop Cabernet sauvignon	Woodbridge Cabernet Sauvignon (Mondavi)
J Lohr Merlot	Woodbridge zinfandel (Mondavi)
J Lohr Shiraz	
J Lohr zinfandel	
Joseph Phelps Vineyards Napa Valley Merlot	