

The background of the slide features a repeating pattern of stylized grape clusters. Each cluster is rendered in a light, golden-brown color and is set against a textured, light beige background. The clusters are arranged in a grid-like fashion, with some overlapping slightly. The overall aesthetic is clean and professional, with a clear focus on the wine industry theme.

# The Economics of the California Wine Industry

Tony Lima

**`tlima@csuhayward.edu`**

**`http://www.sbeusers.csuhayward.edu/~alima/wine/`**

# Wine Industry Market Structure

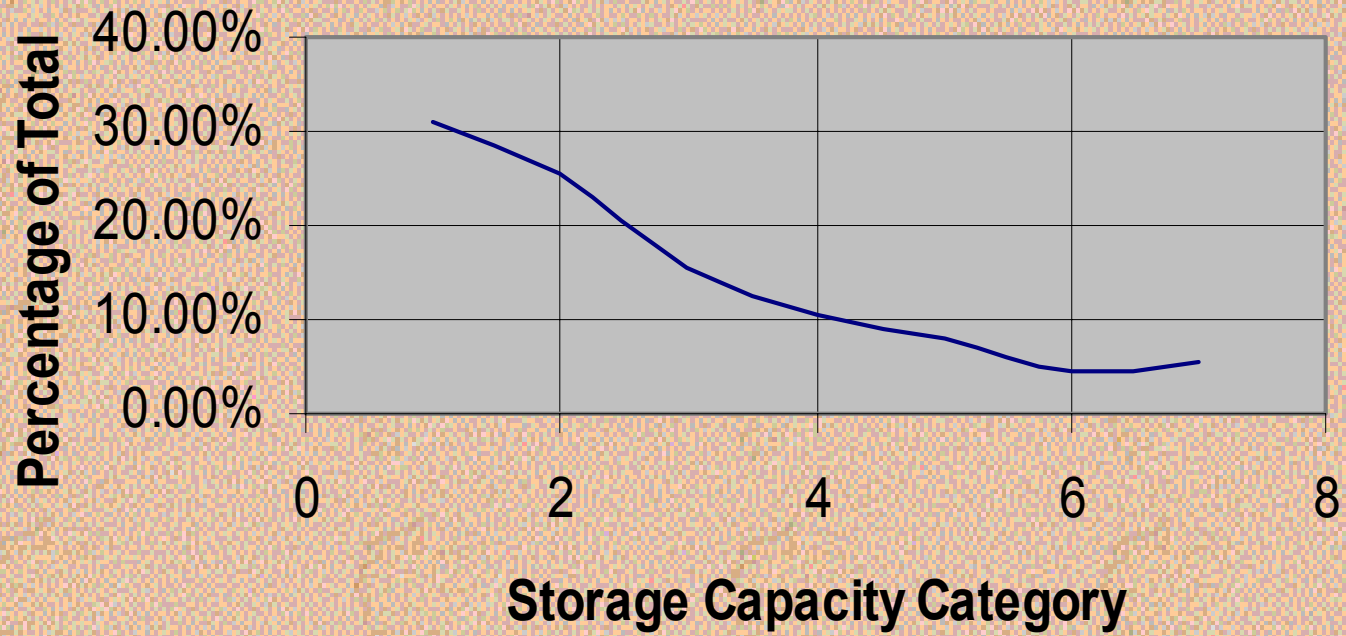
- ◆ Many small producers, a few large producers (e.g., Gallo).
- ◆ Main characteristic: product differentiation (monopolistic competition).
- ◆ Price varies on a number of different dimensions.
- ◆ Large economies of scale.

## Winery Size Distribution (1977)

Storage Capacity (gallons)	Number	Percent of Total
Less than 10,000	115	30.83%
10,000 - 100,000	96	25.74%
100,000 - 500,000	58	15.55%
500,000 - 2,000,000	39	10.46%
2,000,000 - 5,000,000	29	7.77%
5,000,000 - 10,000,000	16	4.29%
Over 10,000,000	20	5.36%
	373	100.00%

Source: *Wine Production Technology in the United States*,  
Maynard A. Amerine (ed.) American Chemical Society, 1981

## Winery Size Distribution (1977)



# Update to 2000

- The best estimate is 847 wineries in California.
- That's over twice as many as in 1977.
- Unfortunately I couldn't find winery sizes for a more current year.



# U.S. Wine Consumption

- ◆ The U.S. ranks 34<sup>th</sup> in the world in per capita wine consumption (just ahead of the Czech Republic).
- ◆ While U.S. wine sales have been rising, most of the increase is due to consumers' shift toward higher priced wines.

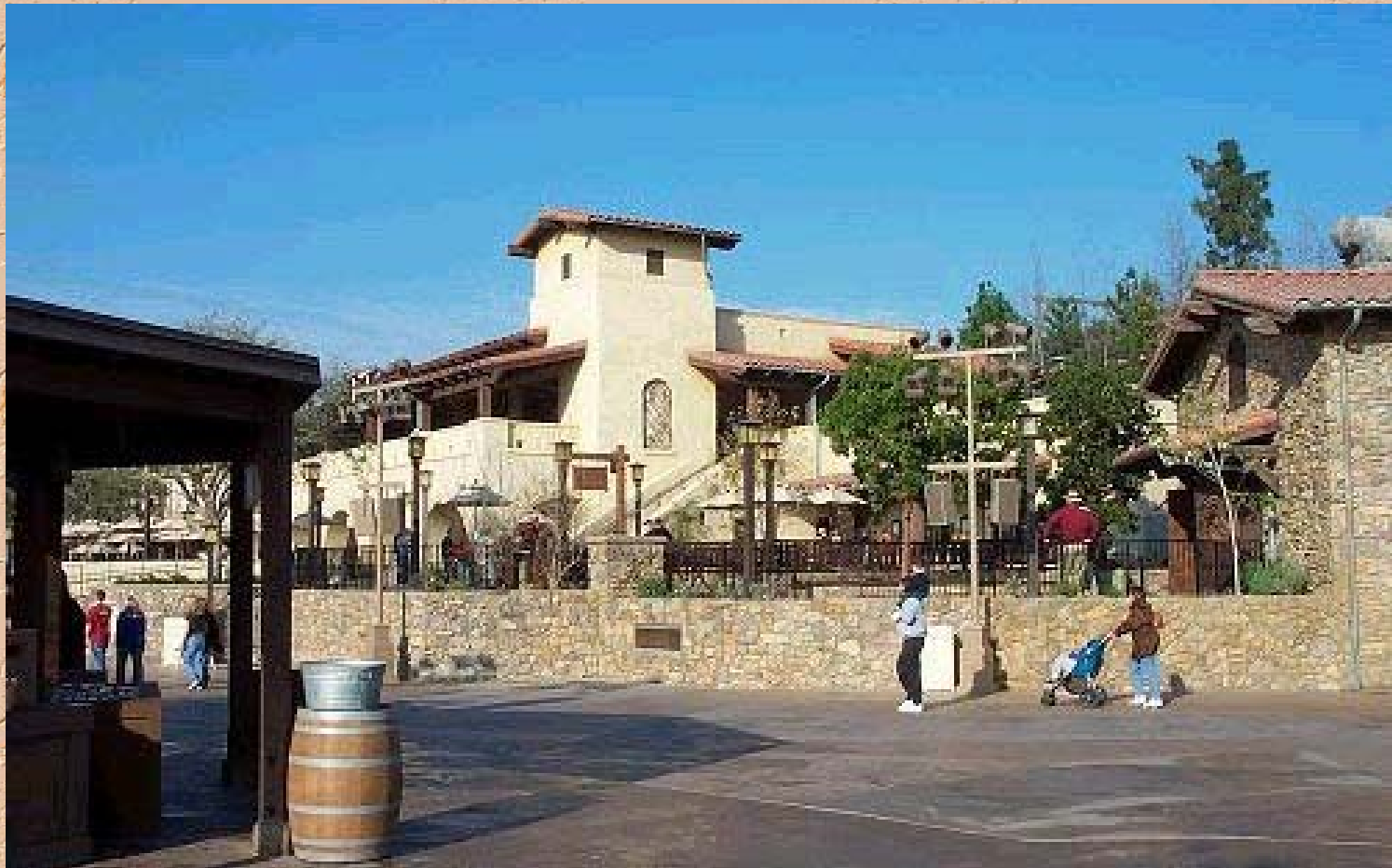
# Even the Wall Street Journal is getting involved

From the May 11 edition (p. W10):

“...And while alcohol has never been allowed in **Disneyland**, a prominent feature of the new park is the Golden Vine Winery -- wine country as imagined by the Disney empire and its new partner, the Napa Valley-headquartered Robert Mondavi wine dynasty. [Mondavi is no longer involved in this business.]

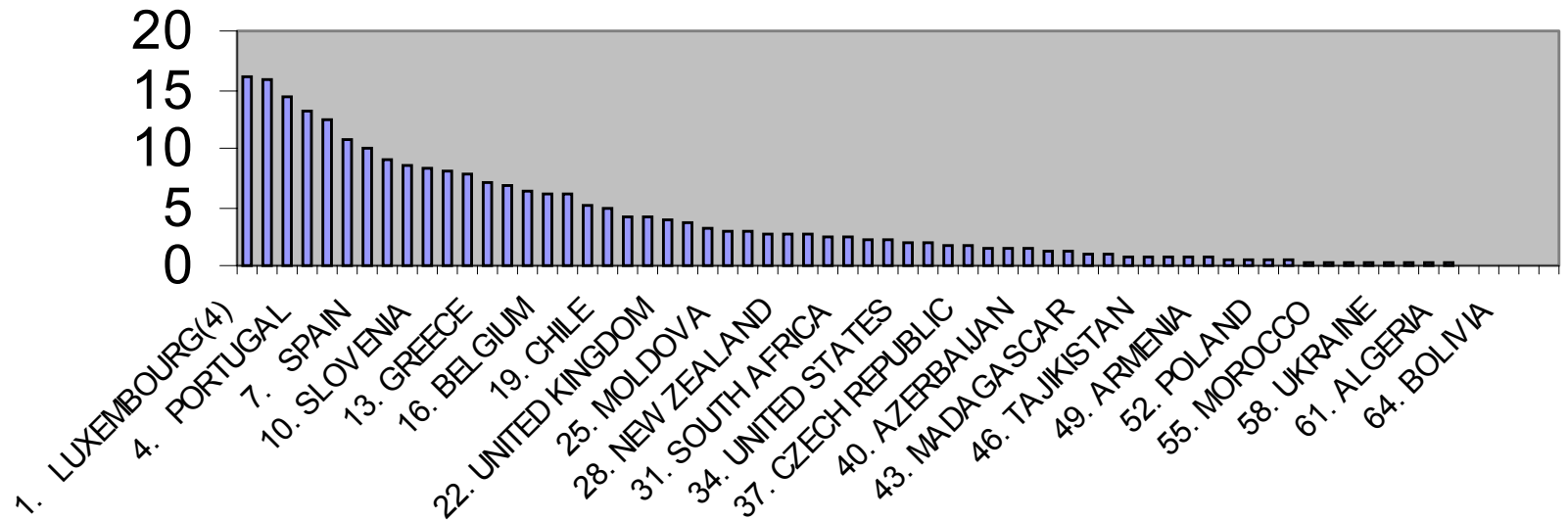
Located near the entrance, on the park's main thoroughfare, the California-mission-style Golden Vine Winery is not a winery at all, but a combination deli, wine bar, shop and open-air restaurant. ...”

# The Golden Vine Winery



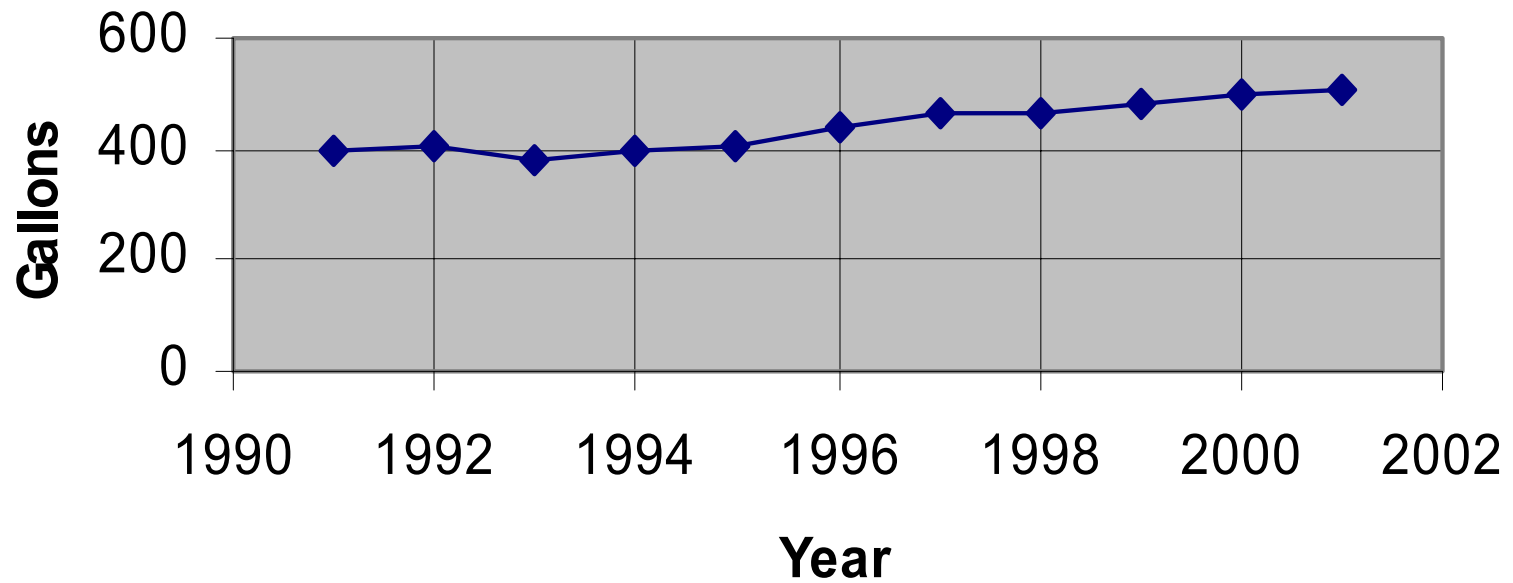
## Per Capita Wine Consumption, 1999

Gallons per capita

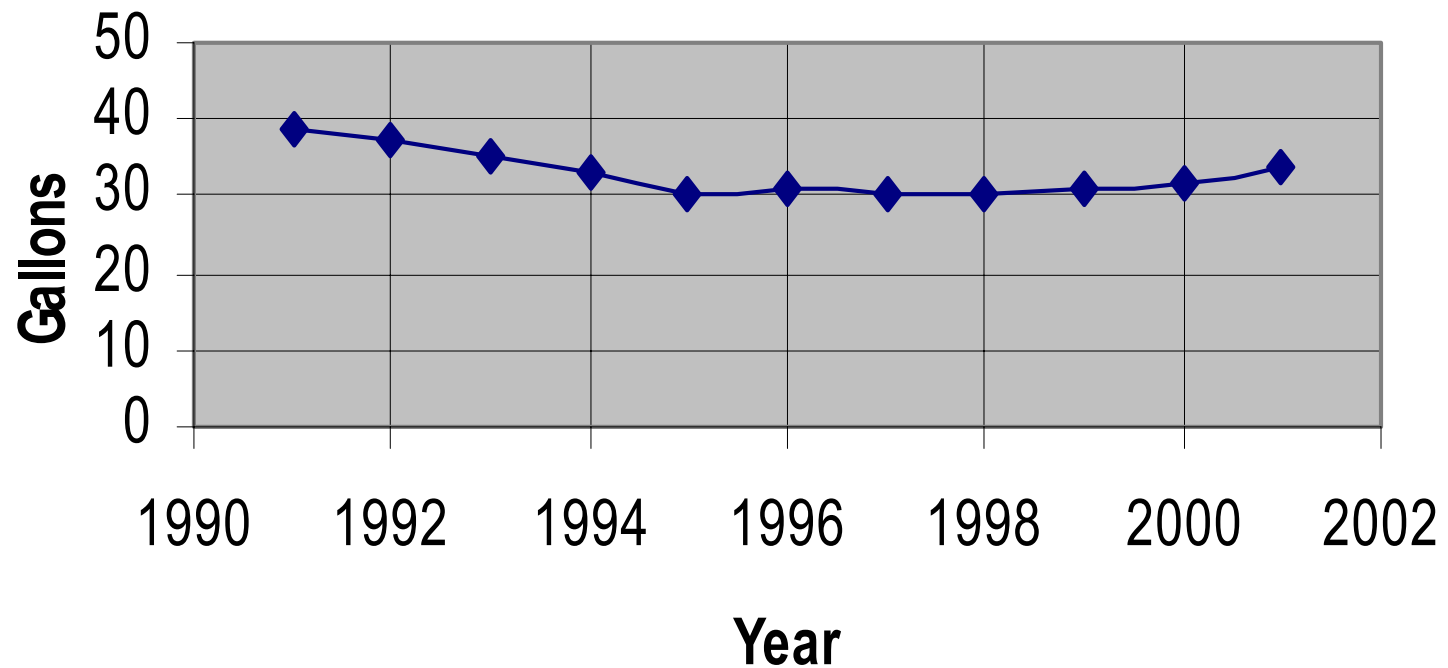


Country

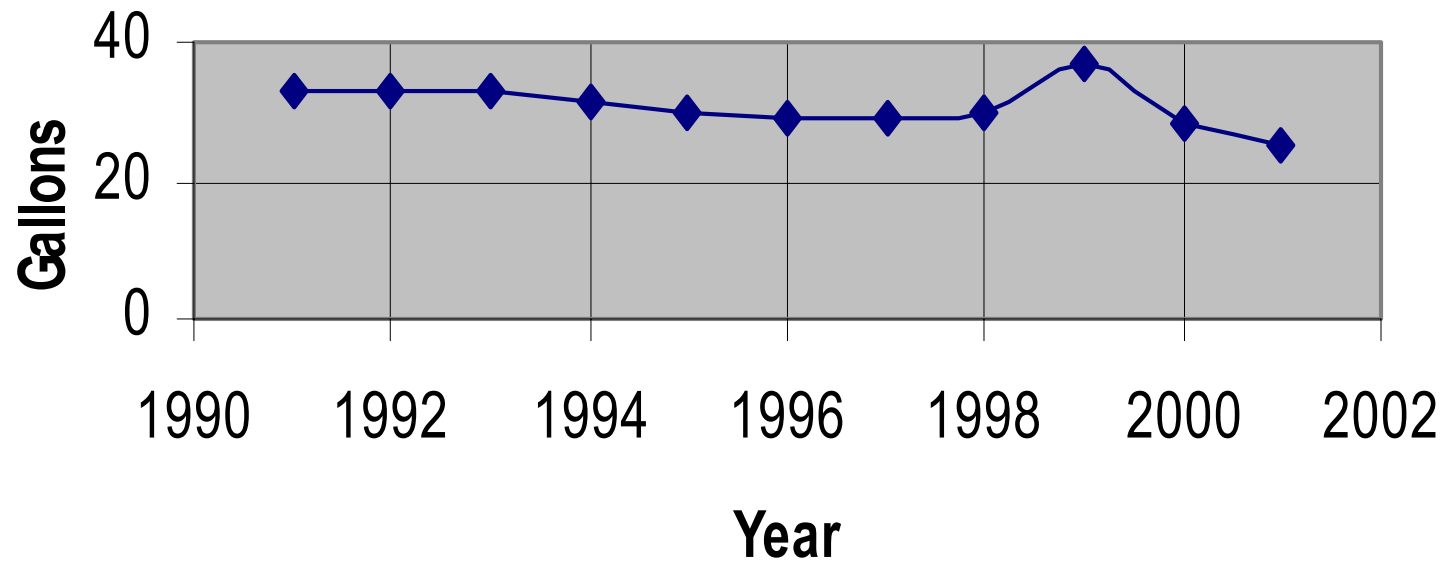
## Table Wine sales, U.S., million gallons



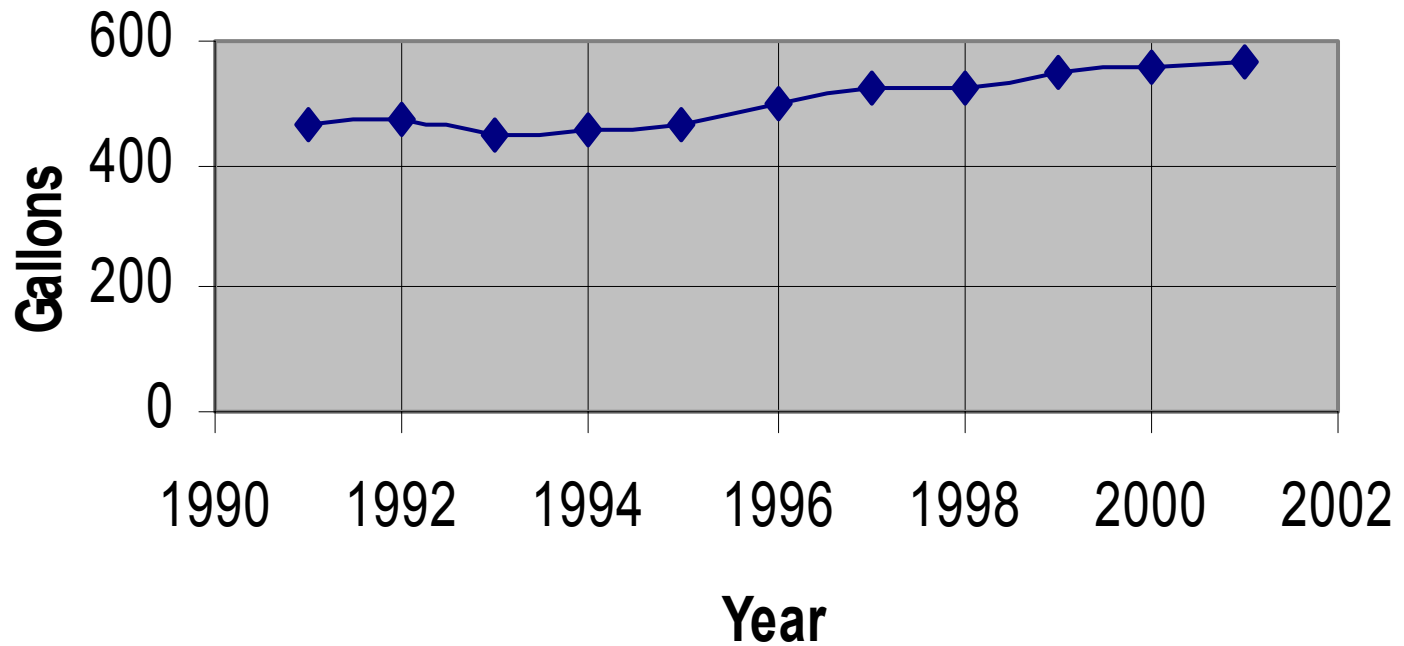
## Dessert Wine sales, U.S., million gallons



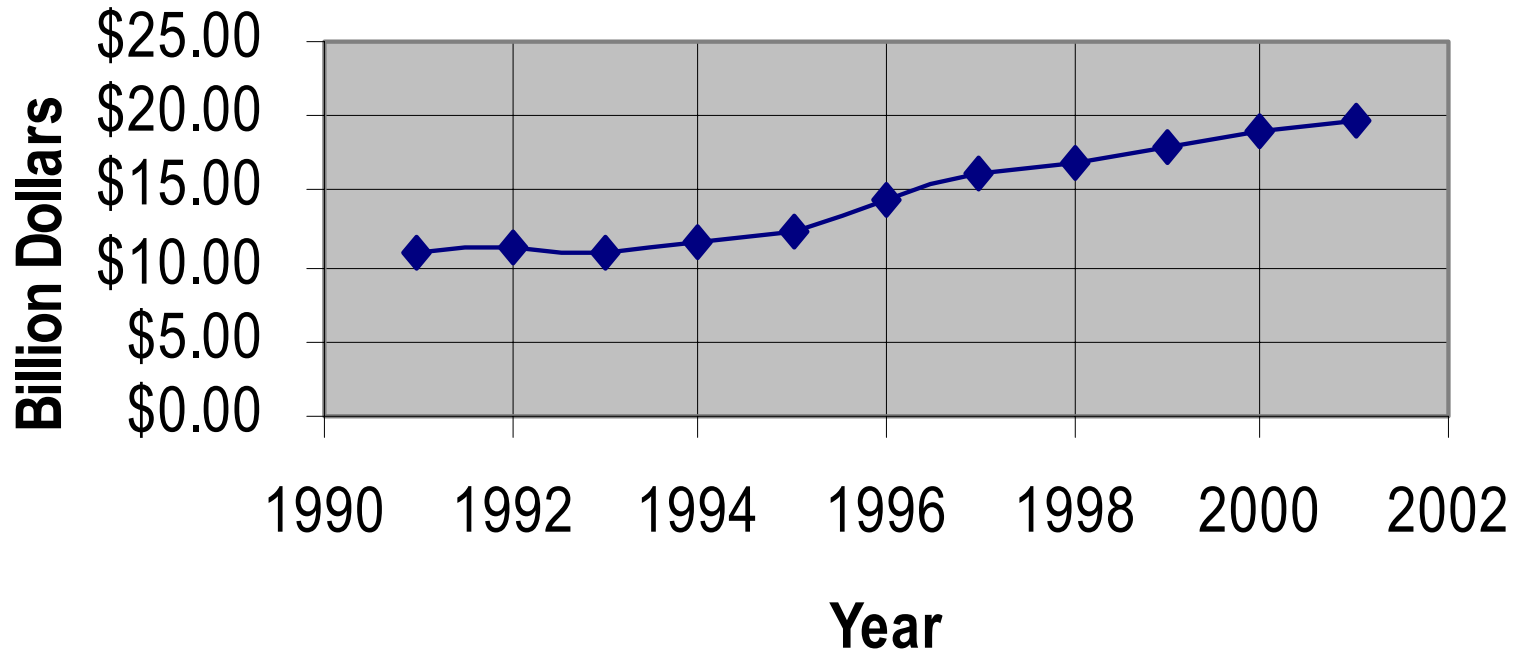
## Sparkling Wine Sales, U.S., million gallons



## Total Wine Sales, U.S., million gallons



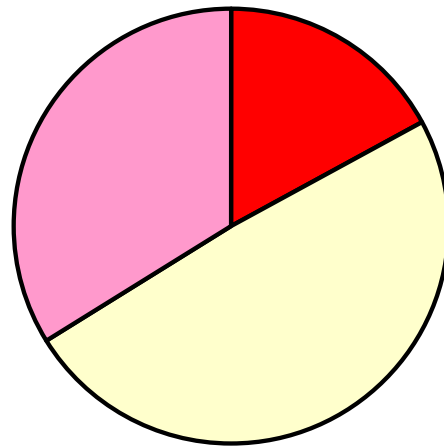
## Retail Value, U.S. Wine Sales (\$ billion)



# What Color Is Your Wine?

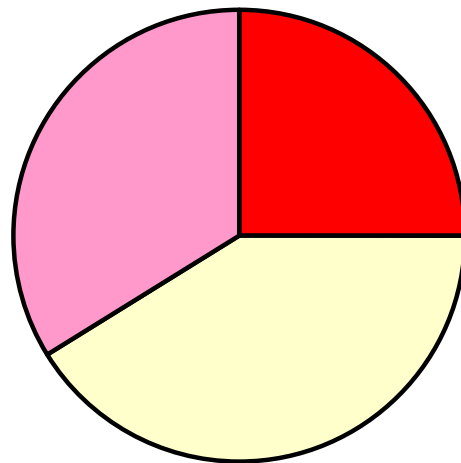
- ◆ Over the last 10 years the share of red wines in the U.S. market has increased dramatically.
- ◆ In 1991 white wines had about half the market.
- ◆ In 2001 sales of red and white wine were about equal.

## Table Wine volume shipments by color, 1991



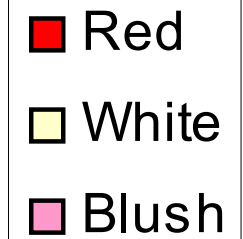
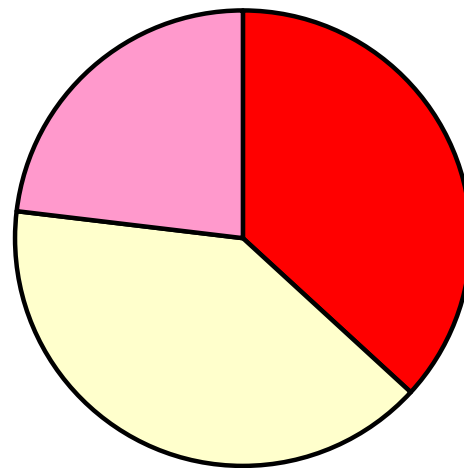
- Red
- White
- Blush

## Table Wine volume shipments by color, 1995



- Red
- White
- Blush

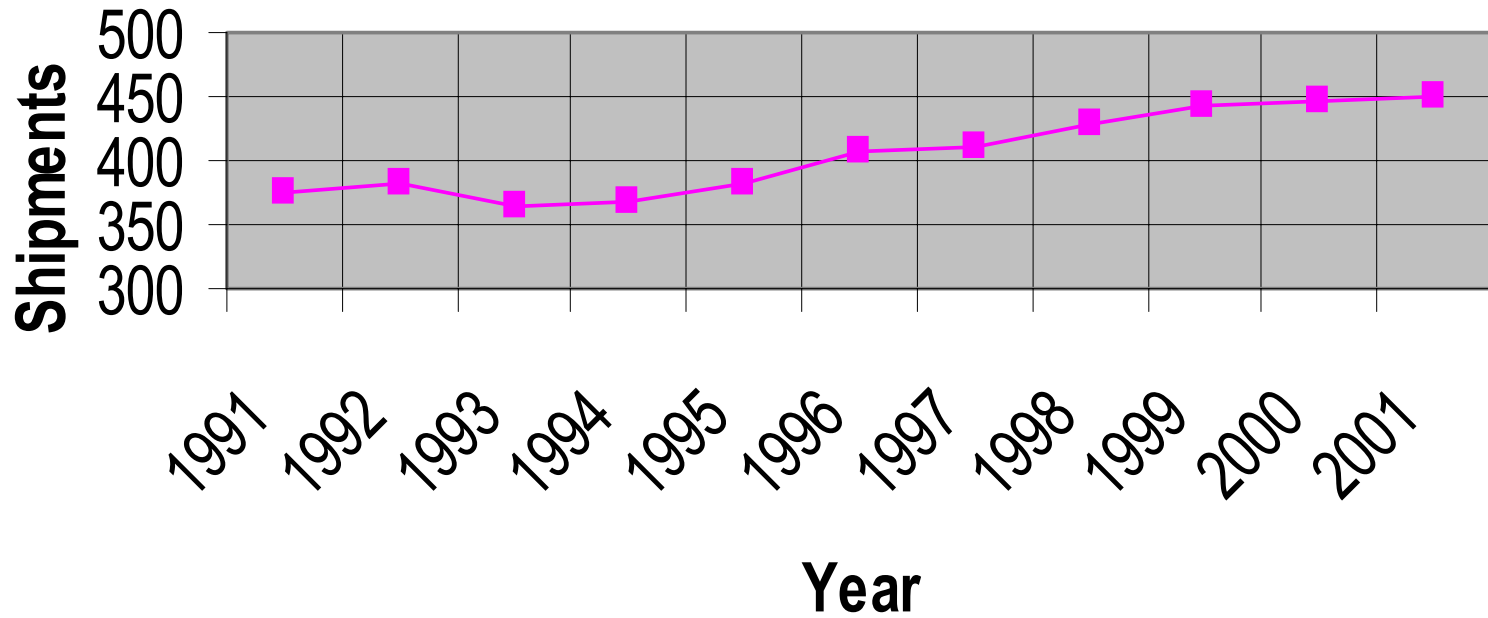
## Table Wine volume shipments by color, 2001



# California Wines

- ◆ Shipments of California wines have increased by about 20 percent over the last ten years.

## All California Winery Shipments (million gallons)



# California Wine Facts: Totals

- 500,000 acres of wine grapes.
- 500 million gallons of wine annually.
- California produces about 90 per cent of all wine made in the US.
  - A large proportion comes from the hot, inland Central Valley where yields are higher and production costs are lower.



[http://winetoday.com/wineguide/encyclopedia/wg\\_encyclopedia\\_entry\\_391.html](http://winetoday.com/wineguide/encyclopedia/wg_encyclopedia_entry_391.html)

## 1997 CALIFORNIA WINE FACTS

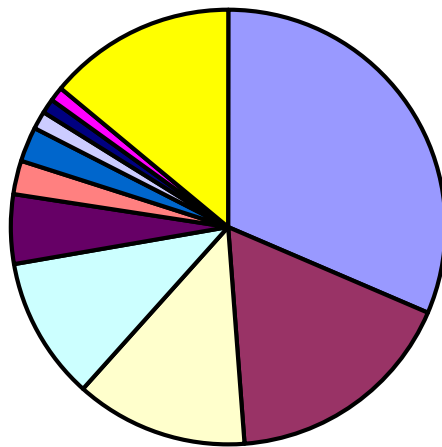
California Wine Shipments	410 million gallons
Estimated Retail Value of California Shipments	\$11.4 billion
California's Share of U.S. Wine Production	90 percent
Total U.S. Consumption	523 million gallons
Per Capita U.S. Consumption	1.95 gallons (based on resident population)
California's Share of the U.S. Market	71 percent
Number of Commercial Wineries in California	About 740
U.S. Wine Exports	60 million gallons, 90 percent from California

Source: The Wine Institute

# Wine Exports

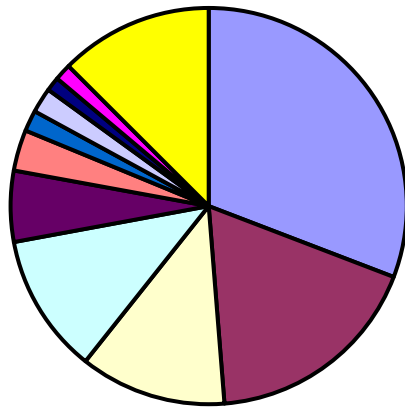
- ◆ The U.S. exports a lot of wine to other countries.
- ◆ Note that France is 8<sup>th</sup> on this list.

## U.S. Wine Exports by Country, dollar value (\$000), 2001



- 1. United Kingdom
- 2. Canada
- 3. Netherlands
- 4. Japan
- 5. Belgium
- 6. Germany
- 7. Ireland
- 8. France
- 9. Sweden
- 10. Denmark

## U.S. Wine Exports by Country, thousand gallons, 2001



1. United Kingdom
2. Canada
3. Netherlands
4. Japan
5. Belgium
6. Germany
7. Ireland
8. France
9. Sweden
10. Denmark



# Characteristics of the Wine Market

# Product Differentiation

- ◆ White or red
- ◆ Grape varietal
- ◆ Growing region (Napa Valley) and/or viticultural area
- ◆ Wine “quality”
- ◆ Wine blend (e.g., red meritage)

# Economies of Scale

- ◆ The larger the winery, the lower the cost per gallon *holding everything else constant* (especially the price of grapes).
- ◆ Lowest cost per gallon in the U.S. is Gallo's Modesto winery.
- ◆ But grape costs are a major factor.

# Wine Production

- ◆ Wine has a long production cycle, several years from the harvest to actually selling the wine at retail.
- ◆ That creates two categories of problems:
  - Cash flow (since the winery must spend a great deal of money before seeing any revenue)
  - Changes in tastes (which can happen overnight like merlot and white zinfandel)

# Winery Cash Flow

“...if you release wines in the fall, you will go all year with no income.”

Mike Robbins,  
Spring Mountain Vineyards

Source: Kirby S. Moulton (ed.) *The Economics of Small Wineries*  
University of California, Berkeley, June, 1981

## ***Estimated Operating Costs for a 25,000 Case Capacity Premium Winery***

<b><i>Operating Costs</i></b>	<b><i>\$ per case 1978</i></b>	<b><i>\$ per case 1998</i></b>
<b>Salaries and payroll taxes, supplies, maintenance, utilities, promotion, entertainment</b>	<b>\$10.00</b>	<b>\$20.42</b>
<b>Grapes (\$800 - \$900 per ton)</b>	<b>\$15.00</b>	<b>\$30.63</b>
<b>Packaging (bottles, corks, capsules, cases)</b>	<b>\$5.00</b>	<b>\$10.21</b>
<b>Packaging labor</b>	<b>\$0.50</b>	<b>\$1.02</b>
<b>Freight out</b>	<b>\$2.50</b>	<b>\$5.10</b>
<b>Wine taxes and related charges</b>	<b>\$0.75</b>	<b>\$1.53</b>
<b>Professional fees</b>	<b>\$0.25</b>	<b>\$0.51</b>
<b>Insurance</b>	<b>\$1.00</b>	<b>\$2.04</b>
<b>Real estate and property taxes</b>	<b>\$0.75</b>	<b>\$1.53</b>
<b>Total</b>	<b>\$35.75</b>	<b>\$72.99</b>

Source: Kirby S. Moulton (ed.) *The Economics of Small Wineries*  
University of California, Berkeley, June, 1981. Updated to 1998 by Tony Lima

## Estimated Capital Costs for a 25,000 Case Capacity Premium Winery

Item	\$ per case 1978	\$ per case 1998
Land	\$4.00	\$8.17
Site	\$3.00	\$6.13
Building	\$30.00	\$61.25
Equipment	\$30.00	\$61.25
Total	\$67.00	\$136.79

Source: Kirby S. Moulton (ed.) *The Economics of Small Wineries*  
University of California, Berkeley, June, 1981. Updated to 1998 by Tony Lima





# Changes in Tastes

- ◆ Wine consumers are a fickle bunch.
- ◆ Tastes and preferences can shift in a very short time period.
- ◆ This leaves grape growers and wineries with a problem when they're geared to produce white zinfandel and the market shifts toward merlot.

# Production and Tastes

- ◆ You can't just rip out zinfandel vines and plant merlot. It takes several years for a newly-planted vine to start bearing fruit.
- ◆ Thus the wine industry is characterized by long production planning cycles and a relatively short planning horizon for marketing.

# The Demand for Wine

- Like almost every good and service, when you increase the price of a wine people will buy less of it as long as you carefully make sure no other factor affecting demand has changed.
- Economists call this the *first law of demand*.
  - We often just say “demand curves slope downward.”

# What Are Other Factors Affecting Demand?

- Income
- Tastes and preferences
- Population (and its age distribution)
- Perceived quality
- Product reputation

# Reputation

- Some recent research on Bordeaux wines has shown that a wine's reputation has about six times the impact on demand as actual wine quality.

# How Will We Measure Quality?

- ◆ Various methods have been proposed.
- ◆ My wine research page summarizes several of them, relying heavily on opinions of expert tasters.
- ◆ I need a measure that can be expressed in numbers.
- ◆ One proposal: Wine Spectator's ratings.
  - I haven't had time to pursue that suggestion.

# Prof. Ann Noble's Aroma Wheel

- ◆ Gives a multi-dimensional approach to wine evaluation.
- ◆ Unfortunately the Aroma Wheel is not used widely enough for results to be reported.
- ◆ Future research might look at employing a panel of experts to evaluate wines using the Aroma Wheel, then trying to quantify the results.
  - The aroma wheel is available from Dr. Ann C. Noble  
Telephone: 1-916-752-0387 FAX: 1-916-752-0382  
E-mail: [acnoble@ucdavis.edu](mailto:acnoble@ucdavis.edu)



Aroma Wheel deleted to protect copyright

# Combris, Lecocq, and Visser's 1997 Paper

- Combris, Lecocq, and Visser use individual characteristics of each wine as evaluated by expert tasters in blind tastings.
- There are 16 sensory characteristics evaluated, including aromatic intensity, suppleness, flatness, fat, finish, and keeping in vault needed.

# Combris et. al. Used Expert Tasters

- The authors studied Bordeaux wines.
  - They purchased two bottles of each wine from the winery, then asked their experts to evaluate each wine in a blind tasting.
- They then quantified the results.
- The authors conclude that the “market price of Bordeaux wine can be explained primarily by the objective characteristics appearing on the label of the bottle.”

# The Field Stone Winery (Alexander Valley, Sonoma)



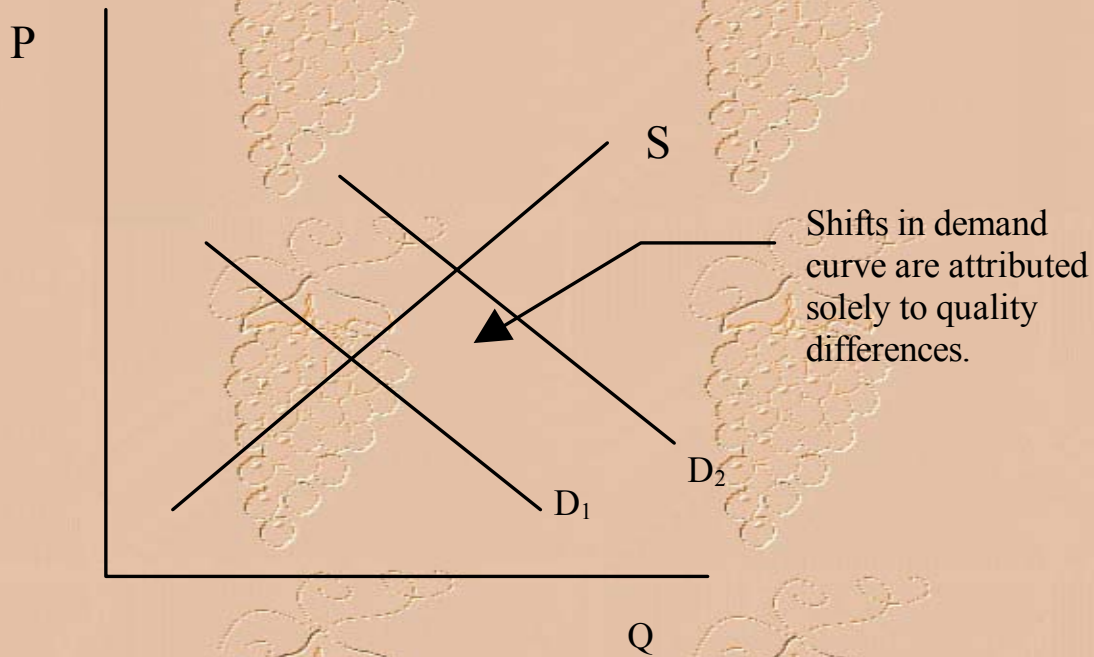
# An Index of Quality

- While these efforts are heroic, I wondered if it would be possible to find an appropriate index of quality.
- This would collapse the entire measure of “quality” into a single variable (or perhaps several variables).
- Medals won in various tasting competitions is one such index.

# The Data Source

- Varietal Fair in Sebastopol, California (Sonoma county) publishes a small volume every year titled *California Wine Winners*.
- It lists all medals won by California wines in each of nine major tastings.
- The owners of Varietal Fair were kind enough to give me access to some of their data on disk.

# The Basic Model



# The Data

- Data from the 1995 tastings was used.
- There were 18 wine types entered in tastings that year.
- Of all wines entered, 1,745 wines won at least one medal in one tasting.
  - Entry information required by the tasting includes estimated retail price; The suggested retail price for each wine is listed in California wine winners (Devine and Devine, 1996). Unfortunately, no quantity data is included in the California wine winners data.

# Gathering Data on Quantity

- In the fall of 1996 the wineries in the data set were surveyed, asking for information on the quantity of each wine originally bottled, as well as the quantity released in 1995.
- Quantity bottled data was received for 804 wines.
  - Quantity released data was not useful because different wineries interpreted the question in different ways.

# The Ideal Quantity Measure

- The best quantity measure would be the flow supply to the market.
  - This corresponds to unit retail sales in 1995.
  - Gathering this data would be quite costly.
- Wholesale sales from the winery would be a good second best.

# An Argument In Favor of Quantity Bottled

- Quantity bottled can serve as a legitimate proxy for the flow supply if flow supply is proportional to the stock quantity bottled.
- 46 percent of the wines that won at least one medal are represented in this study with quantity bottled data.

# Bias in the Data?

- There is most likely some bias in this data in favor of larger wineries.
  - Larger wineries usually have a larger staff, making it less costly for them to complete the questionnaire.
  - However, it is commonly believed in the wine industry that there is no correlation between winery size and wine quality.
  - Therefore, even though there may be some bias in responses to the questionnaire, the direction of the bias this introduces into the empirical results is uncertain.

# Another Bias?

- The tastings themselves are a possible source of bias.
  - Tastings begin in January and end in July.
  - Many wines entered in the early competitions are sold out by the time the later competitions begin.
- While this undoubtedly introduces a bias in the data, the only way we can know the direction of this bias is to know which competitions are the best predictors of quality.

<u>Wine Type</u>	<u>Number</u>
Chenin Blanc	14
Cabernet Franc	11
Chardonnay	145
Cabernet Sauvignon	158
Gewurtztraminer	23
Johannisberg Riesling	28
Merlot	71
Petite Sirah	16
Pinot Blanc	10
Pinot Noir	55
Red Meritage	29
Sauvngnon Blanc	72
Semillon	9
Sparkling Wine	42
Syrah	18
White Meritage	5
White Zinfandel	10
Zinfandel	91

# Cost of Entering Competitions

- Entering a competition is costly for the winery.
  - Obvious direct costs include entry fees and the time and effort expended on getting wine to the tasting.
  - Less obvious is the cost of the wine itself. In many competitions, winning entries must donate a quantity of wine to the fair.
  - For example, the San Francisco Fair requires gold medal winners to reserve up to 10 cases to sell to the fair. This means smaller wineries are less likely to enter the San Francisco tasting, biasing the sample for that tasting somewhat.

# Small Wineries

- *As California Wine Winners* notes, “many of these small producers sell out all their wines every year.”
- There is little incentive for a winery in that fortunate situation to bother entering any competitions at all, especially smaller wineries with limited production available for sale.

# The “Best” Winery in 1995?

- Varietal Fair also calculates a point total for each wine.
- Points are assigned as follows: double gold, 7; gold, 5; silver, 3; and bronze, 1.
- Point totals for each winery are also calculated:
  - Kendall-Jackson (291 points)
  - Geyser Peak (281 points)
  - Fetzer (273 points)

# Chardonnay

Chardonnay (n=145). The estimated equation is

$$\text{PRICE} = 13.15 - 0.00000684 \text{ QBOTTLED} + \\ (0.00000319)$$

$$2.20 \text{ SFMEDAL} + 2.49 \text{ WCMEDAL} \\ (0.98) \quad (0.82)$$

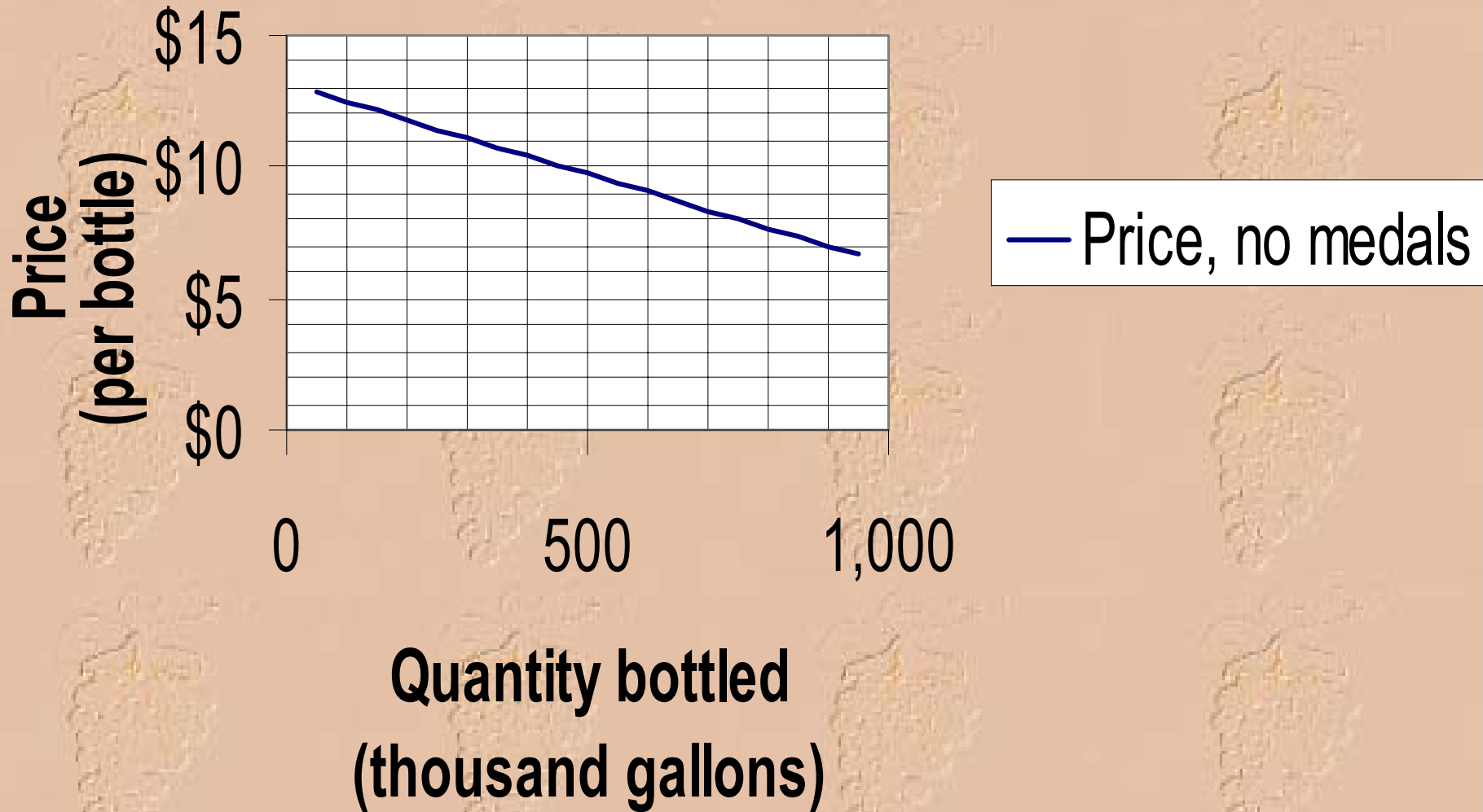
$$R^2 = 0.126 \quad F = 6.79$$

(Numbers in parentheses are standard errors of the coefficients.)

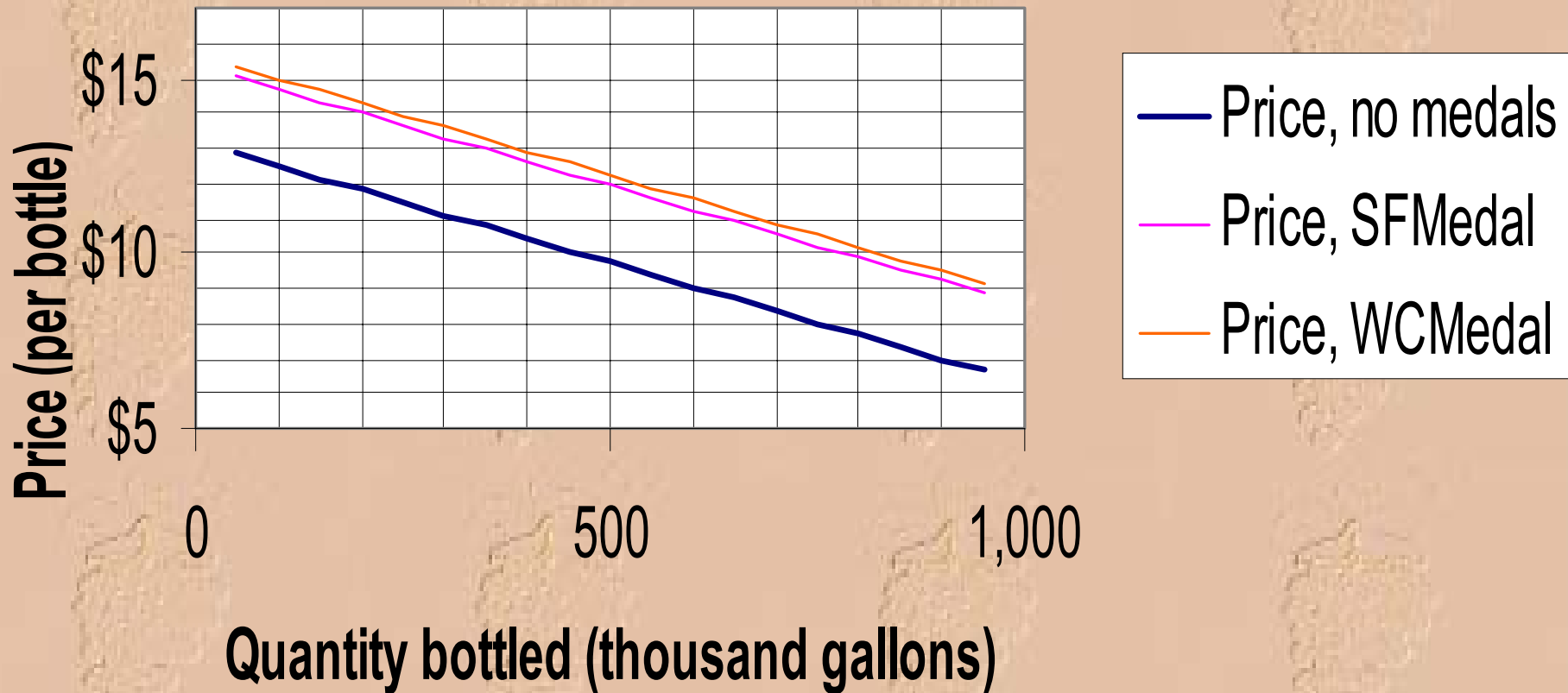
SFMEDAL: Medal, San Francisco

WCMEDAL: Medal, Reno West Coast

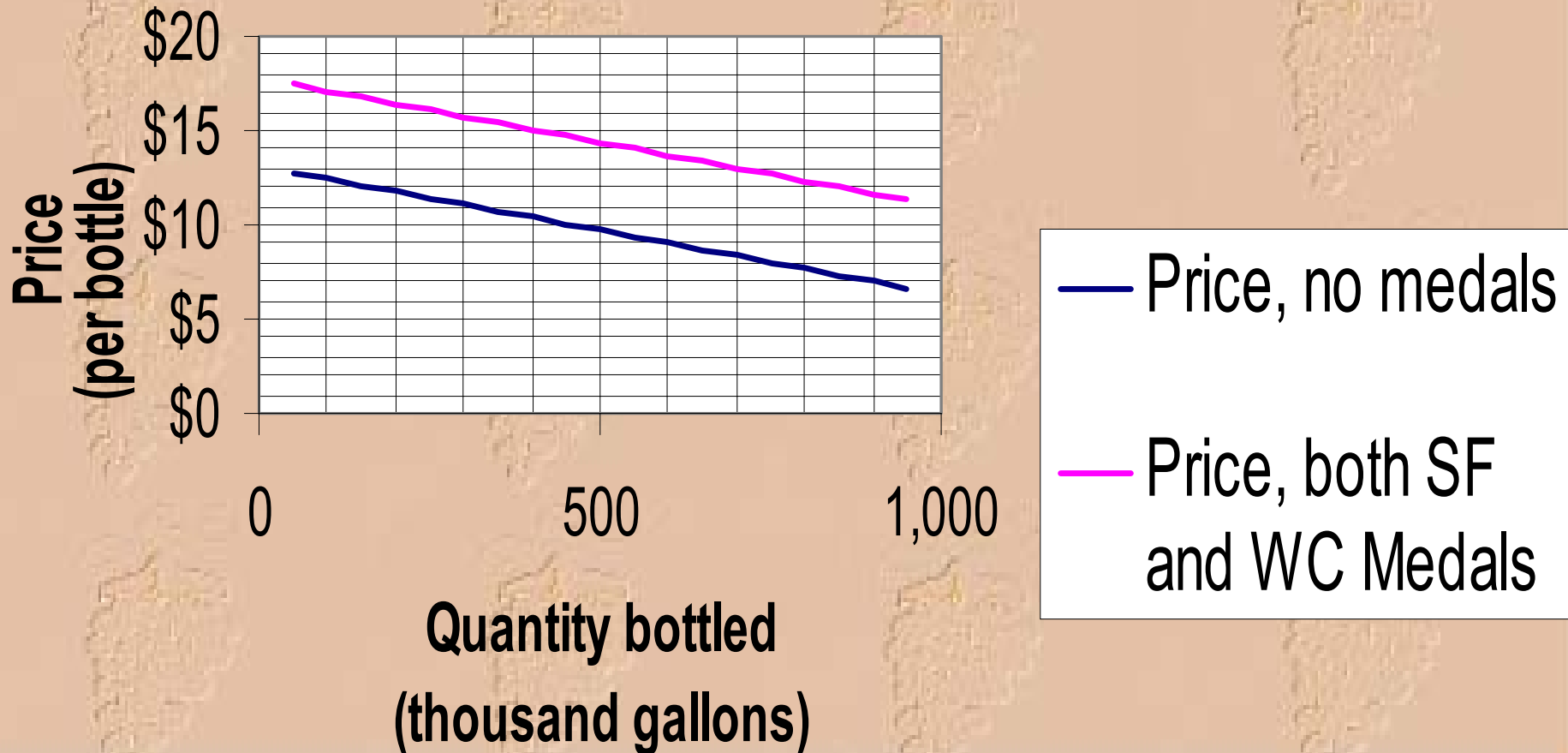
# Demand for Chardonnay, no medals



# Winning a Medal in San Francisco or Reno (West Coast) Shifts the Demand Curve Up



# Winning Medals in Both SF and Reno Shifts the Demand Curve WAY Up



# Cabernet Sauvignon

Cabernet Sauvignon (n=158):

$$\begin{aligned} \text{PRICE} = & 18.66 - 0.000037 \text{ QBOTTLED} + 7.78 \text{ SFMEDAL} \\ & (0.000020) \qquad \qquad \qquad (1.92) \\ & - 3.31 \text{ RIVMEDAL} - 3.36 \text{ NWIMEDAL} \\ & (1.97) \qquad \qquad \qquad (1.88) \end{aligned}$$

$$R^2 = 0.154 \qquad \qquad \qquad F = 6.94$$

(Numbers in parentheses are standard errors of the coefficients.)

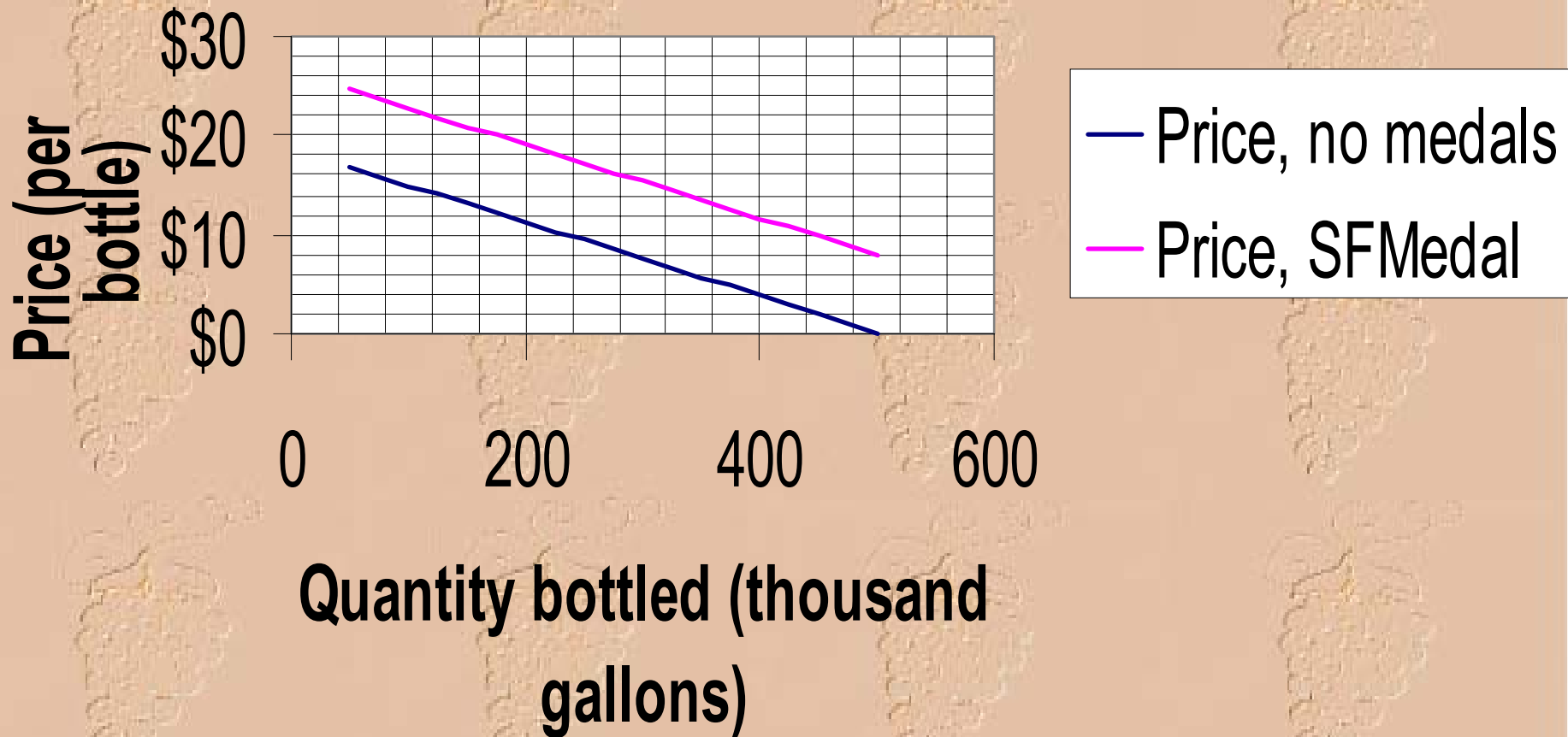
Dummy variables included in this model:

SFMEDAL: Medal, San Francisco Fair

RIVMEDAL: Medal, Riverside

NWIMEDAL: Medal, New World International

# Winning a Medal in San Francisco Shifts the Demand Curve Up



# Winning a Medal at the Farmer's Fair (Riverside) Shifts the Demand Curve

## Down

