The Sideways Effect:
A Test for Changes in the Demand for Merlot and Pinot Noir Wines*

Steven S. Cuellar[a], Dan Karnowsky[b] and Frederick Acosta[c]

Abstract

This paper examines the effect of the movie *Sideways* on US wine consumption. Specifically, we examine the affects of the movie on the consumption of Merlot, which is derided in the movie and the affect on Pinot Noir, which is praised. We examine the trends in consumption before and after the movie and perform statistical tests for structural changes in consumption. We also test for changes in consumption of each varietal by price point. (JEL Classification: C22)

I. Introduction

This paper investigates the power of popular culture to influence consumer behavior. Specifically, we test the so-called "Sideways Effect." In the movie *Sideways*, there is a memorable scene in which the lead character adamantly refuses to drink Merlot. The same character goes on to praise Pinot Noir in other scenes. While the line refusing to drink Merlot in the movie is memorable and has often been mimicked by wine consumers, the effect of the movie has become folklore in the wine industry. For example, George Schofield in the April 2008 issue of *Wine Business Monthly* refers to the "debacle following the release of the *Sideways* motion picture" when discussing the affects of the movie on Merlot. Unfortunately, much of the conventional wisdom surrounding the "Sideways Effect" is supported by scant anecdotal evidence at best. Our approach is simple: changes in the

[a] Department of Economics, Sonoma State University, 1801 East Cotati Avenue, Rohnert Park, CA 94928, tel. (707) 664-2305, email: steve.cuellar@sonoma.edu (corresponding author)
[b] President, Sonoma Research Associates, Glen Ellen, CA. 95442, tel. (707) 935-1210, email: dan.karnowsky@sonoma-research.com
[c] Sonoma Research Associates, Glen Ellen, CA 95442, tel. (707) 935-1210, email: fred.acosta@sonoma-research.com

demand for either Merlot or Pinot Noir should be reflected in the price, quantity sold or both of each varietal. Thus we examine the trends in price and cases sold of Merlot and Pinot Noir for periods before and after the movie's release. We also analyze the data by price to test for any differential effects of the movie.

Sideways was released on October 22, 2004, nominated for 5 Academy Awards on January 25, 2005, winning one (best adapted screenplay), and closed in theaters on May 19, 2005. In the 30 weeks the movie was in theaters, gross domestic ticket sales were over $70 million with worldwide sales reaching just over $100 million, making it the 40th highest grossing movie of the year.[1] The movie was released on DVD in the USA and Canada in April 2005.

II. The Data

To examine the effect of the movie on wine consumption, we use Nielsen Scantrack data (Nielsen, 1999–2008), which measure point of sale purchases of wines from major U.S. retail chains. We combine national sales data for the years 1999 through early 2008 which results in a sample containing approximately 100,000 observations of all wines, foreign and domestic, purchased from major retail chain stores, defined as those with over 2 million dollars in sales, across the U.S. The data are aggregated for all markets and includes the price paid, quantity sold and varietal of each purchase. For uniformity, we concentrate on wine purchases of standard 750 ml glass bottles (approximately 84% of all purchases) and exclude boxed or larger 1.5 liter bottles. We use annual data because it allows us to examine a period sufficiently prior to the release of the movie in late 2004. While monthly or weekly data would allow for a more detailed examination of the time trends, this data were not available for periods long enough to examine the trends in wine consumption prior to 2004. The benefit of scan data is that it represents actual purchases of wine by consumers and is reflective of the demand for wine. The drawback of scan data is that it only reflects purchases in major U.S. retail chains and does not represent wine sold on premise at wineries, purchases through wine clubs or purchases at restaurants. As such, while a majority of wine sales are made through the retail sector, our results have implications for wines sold through the retail channel and may not be reflective of wines sold direct to the consumer.[2]

While our analysis is concerned mainly with Merlot and Pinot Noir, we also examine a subset of "non-Sideways" red wines consisting of Cabernet Sauvignon and Syrah as controls.[3]

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[1] According to the web site Boxofficemojo.com. For comparison, the number one grossing movie of the year was Shrek 2, which grossed over $440 million and nearly a billion dollars worldwide that same year.

[2] According to the *Handbook Advance* (2008), approximately 80% of wine sales are made through the retail channel.

[3] We also controlled for promotional activity, but these did not significantly alter our conclusions and are thus excluded for brevity.

III. Analysis

As noted above, we rely on economic theory to hypothesize that any changes in the demand for either Merlot or Pinot Noir caused by the movie *Sideways* should be reflected in the price, quantity or both of each varietal. For Merlot, in the absence of a perfectly elastic supply curve, a reduction in demand resulting from the negative portrayal in the movie is expected to reduce price and/or quantity. Conversely, for Pinot Noir, in the absence of a perfectly elastic supply curve an increase in demand is expected to increase price and/or quantity. Thus we examine the trends in price and cases sold of Merlot and Pinot Noir for periods before and after the movie's release. We chose the end of 2005 as the period in which we expect the effects, if any, of the movie *Sideways* to begin to manifest themselves on wine consumption. Recall that the movie was released in October 2004, nominated for an Academy Award in January of 2005 and was released on DVD in April 2005. Furthermore, as Table 1 shows, the number of theaters the movie was shown in nearly doubled once the Academy Award nominations were announced.[4] Because the wine data are end of year data, we feel that the end of 2005 is the most reasonable choice.

Table 1
Sideways Theater Showings and Ticket Sales

	Pre-Nomination 10/22/04 – 1/25/05	*Post Nomination* 1/25/05 – 5/19/05
Number of Theaters	699	1,229
Gross Domestic Ticket Sales	$32,428,941	$39,074,652

Source: Boxofficemojo.com

A. *Case Volume*

We begin by examining annual case volume of the three groups: Merlot, Pinot Noir and the control group of non-Sideways red wines consisting of Cabernet Sauvignon and Syrah. The largest selling red wine varietal by volume in the U.S. is Merlot, followed by Cabernet Sauvignon, Syrah and Pinot Noir with Merlot and Cabernet Sauvignon selling almost twice as much as Syrah and Pinot Noir. While sales of Merlot are nearly twice as large as sales of Pinot Noir, the average bottle of Pinot Noir is significantly more expensive.[5] For example, in our data set, the average price of glass 750ml bottle of Merlot is approximately $10, while the average price of a bottle of Pinot Noir is approximately $15. To adjust for the differences in volume we index annual case volume to zero in 1999 thus allowing us to

[4] Boxofficmojo.com. (2008)
[5] This is briefly discussed in *Sideways*. For a price analysis of American pinot noir wines see Haeger and Storchmann (2006).

examine the relative growth rate of each group. Figure 1 shows indexed average annual case volume of Merlot, Pinot Noir and the control group from 1999–2007. Because the data set is for year end annual case volume we include only up to 2007. Figure 1 shows an interesting pattern of growth of the three groups. Prior to 2004, the three groups appear to move similarly, with Pinot Noir consistently at a higher growth rate than Merlot and the control. However, after 2003, and especially after 2004, the patterns of growth appear to diverge. While it is difficult to attribute any change in the growth rate of case volume to the movie, we do observe relative growth of Pinot Noir and a stagnant and even declining growth in case volume of Merlot since 2004.

To investigate further, we estimate the following equation:

$$\text{Cases}_{it} = \beta_0 + \beta_1 Time_{it} + \beta_2 Time^2_{it} + \beta_3 D2005_{it} + \beta_4 D2005T_{it} + u_{it} \qquad (1)$$

where: Cases_{it} represents the annual case volume of wine i sold in year t.
        $Time_i$ is a linear time variable representing the years 1999–2008.
        $Time^2$ represents the square of time.
        D2005 represents a dummy variable which equals one for the years 2005–2008 and zero for years prior.
        D2005T is the interaction of D2005 and time.

Figure 1
Indexed Case Volume 1999–2008
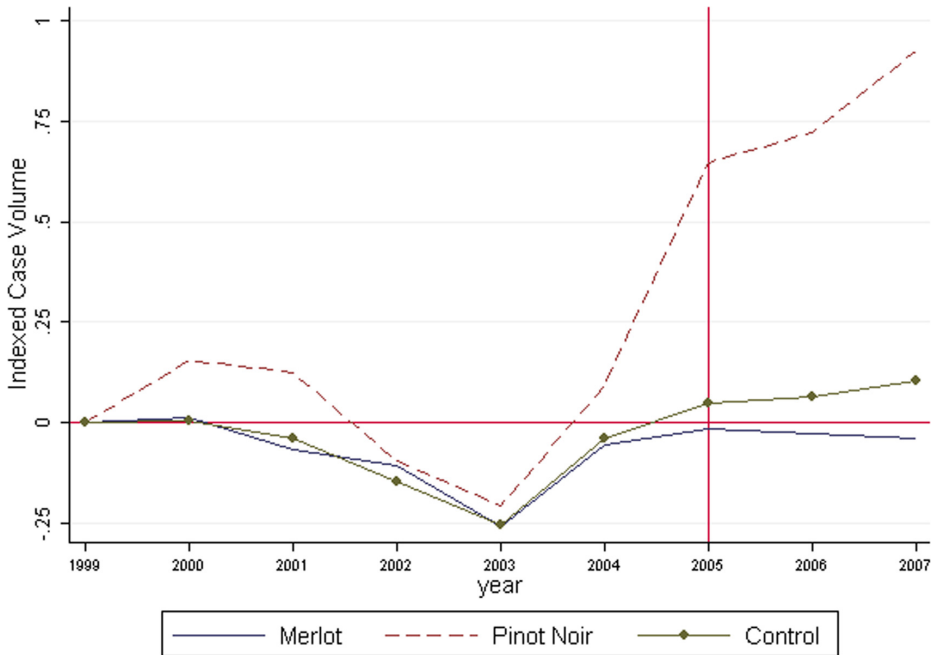
Thus the time and time squared variables in Equation 1 examine the time trend in cases sold before the movie while the dummy and interaction variables account for differences in the trend in sales after the movie. Because the trends in sales prior to 2005 were non-linear, we include the square of time. Table 2 shows the regression results for indexed case volume. The regression results are generally consistent with Figure 1 and support the hypothesis that the movie *Sideways* did have a statistically significant negative impact on the growth rate of annual sales of Merlot. However, contrary to our hypothesis, the regression results also indicated a negative but statistically insignificant effect on Pinot Noir. Likewise, for the control group, the regression results indicate a small statistically significant decrease in annual case volume.

Following Chow (1960), we test for a structural change in the growth rate of case volume by performing an F-test of joint significance on the post *Sideways* subset of dummy and interaction terms. These results are shown in Table 2 as the Sideways Effect F-statistics.

Based on the F-tests, we see that all three groups show a statistically significant structural change in the growth rate of case volume following the movie *Sideways*. The *Sideways* effect F-tests indicates that Pinot Noir increased in case volume, while Merlot and the control group experienced small but statistically significant declines in their respective growth rates.

While the results so far appear to coincide with conventional wisdom regarding the affect of *Sideways* on wine consumption, it is possible that much of the growth in annual wine sales is confounded by the increased coverage of the Nielsen scan data since 1999.

Table 2
Regression Results-Case Volume

	Merlot	*Pinot Noir*	*Control*
Time	−0.137	−0.157	−0.164
	(60.42)**	(26.44)**	(99.02)**
Time Squared	0.015	0.019	0.02
	(48.22)**	(23.69)**	(90.68)**
D2005	0.83	0.572	0.806
	(44.45)**	(12.13)**	(61.35)**
D2005*Time	−0.112	−0.005	−0.116
	(38.01)**	(0.73)	(55.75)**
Constant	1.174	1.27	1.158
	(321.68)**	(130.59)**	(427.41)**
Observations	7845	3809	15012
R-squared	0.55	0.95	0.76
Sideways Effect F-Statistic	7490.88	26355.75	1826.73
p-value for F-statistics	(0.000)	(0.000)	(0.000)

Absolute value of t-statistics in parentheses. * significant at 5% level; ** significant at 1% level.

To correct for this we construct three new variables examining the ratio of case volume among the three groups. We analyze the ratio of Merlot to Pinot Noir, Merlot to the control group and Pinot Noir to the control group. Figure 2 shows a graph of all three ratios. Once again, we index the ratios for ease of interpretation.

Figure 2
Indexed Ratio of Case Volume Sold
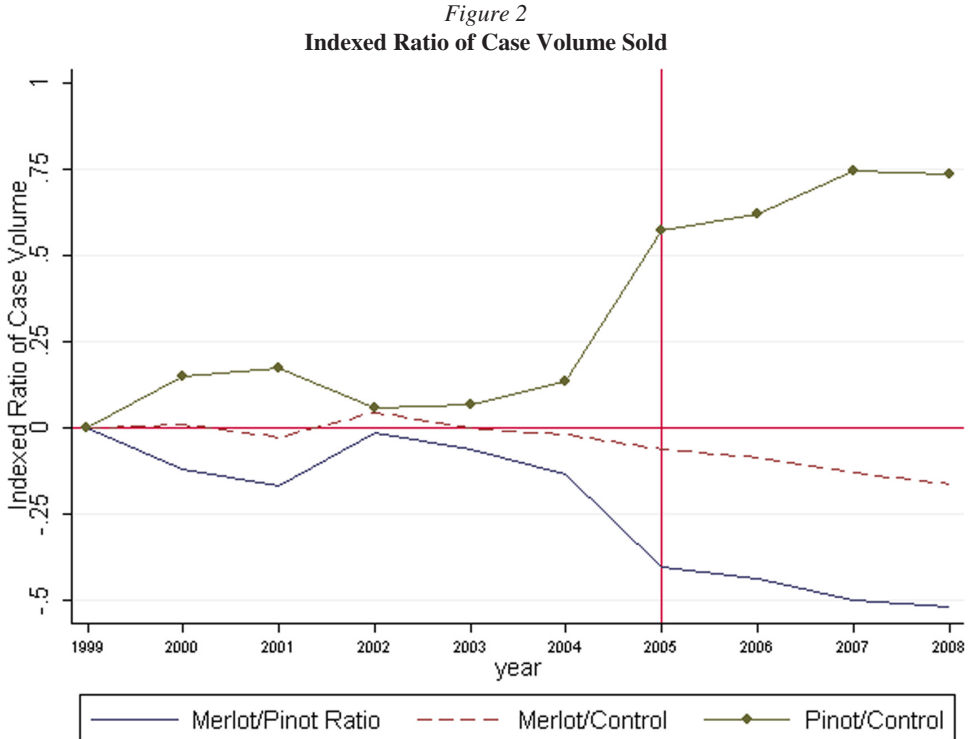
Consider first the ratio of Merlot to Pinot Noir. If the movie *Sideways* induced a decrease in Merlot consumption while simultaneously increasing Pinot Noir consumption, then we would expect the ratio of the two to decrease. This is in fact what we observe in Figure 2 for case volume. The ratio of Merlot to the non-Sideways control appears to be relatively stable prior to the movie, then decreases slightly after.

Conversely, the growth in the ratio of Pinot Noir to the control group increases pre-cipitously after the movie's release. Table 3 provides the regression results for the three series and in general confirms our graphical interpretation. The regression results show a small and statistically significant decrease in the Merlot/Pinot Noir ratio. However, Table 3 also indicates a small increase in the Merlot/Control. Consistent with a *Sideways* effect, Table 3 does show a large and statistically significant increase in the Pinot Noir/ Control ratio.

Table 3
Regression Results for Case Volume Ratios

	Merlot/Pinot	*Merlot/Control*	*Pinot/Control*
Time	−0.018	0.024	0.053
	(23.80)**	(84.40)**	(68.69)**
Time Squared	0.001	−0.004	−0.006
	(11.39)**	(96.56)**	(60.28)**
D2005	0.007	−0.043	−0.306
	(1.02)	(17.75)**	(46.25)**
D2005*Time	−0.043	0.003	0.115
	(40.93)**	(7.87)**	(110.35)**
Constant	0.963	0.974	1.006
	(759.97)**	(2122.49)**	(799.77)**
Observations	45997	45997	45997
R-squared	0.96	0.95	0.98
Sideways Effect F-Statistic	59863.36	3740.98	160000
p-value for F-statistics	(0.000)	(0.000)	(0.000)

Absolute value of t-statistics in parentheses. *significant at 5% level; **significant at 1% level.

B. *Price*

Our analysis of price is once again based on the conventional economic theory that as long as supply is not perfectly elastic, any change in demand should result in a price change.

If the demand for Merlot fell due to the negative publicity surrounding the movie *Sideways*, then we would expect to observe a decrease in the price of Merlot. Similarly, if the demand for Pinot Noir rose as a result of the movie *Sideways*, we expect to observe an increase in the price of Pinot Noir. Of course this analysis ignores any changes in consumption within varietals that may occur as a result of the movie. For example the average price of Pinot Noir will also increase if consumers "trade up" and buy more expensive Pinot Noirs as a result of the movie. We address these effects in the next section when we examine consumption by price segment.

Figure 3 shows the real price of Merlot, Pinot Noir and the non-Sideways red wine control group of Cabernet Sauvignon and Syrah, indexed for ease of interpretation. Figure 3 suggests that indeed both the price of Merlot and Pinot Noir move in directions consistent with a predicted *Sideways* effect. For Merlot, price falls while for Pinot Noir price rises following the release of *Sideways*.

The test used to examine the effects of the movie on price is analogous to what we used to examine the effect on quantity, but here we replace cases in equation (1) with price and estimate the follow equation by OLS:

$$\text{Price}_{it} = \beta_0 + \beta_1 Time_{it} + \beta_2 Time^2_{it} + \beta_3 D2005_{it} + \beta_4 D2005T_{it} + u_{it} \qquad (2)$$
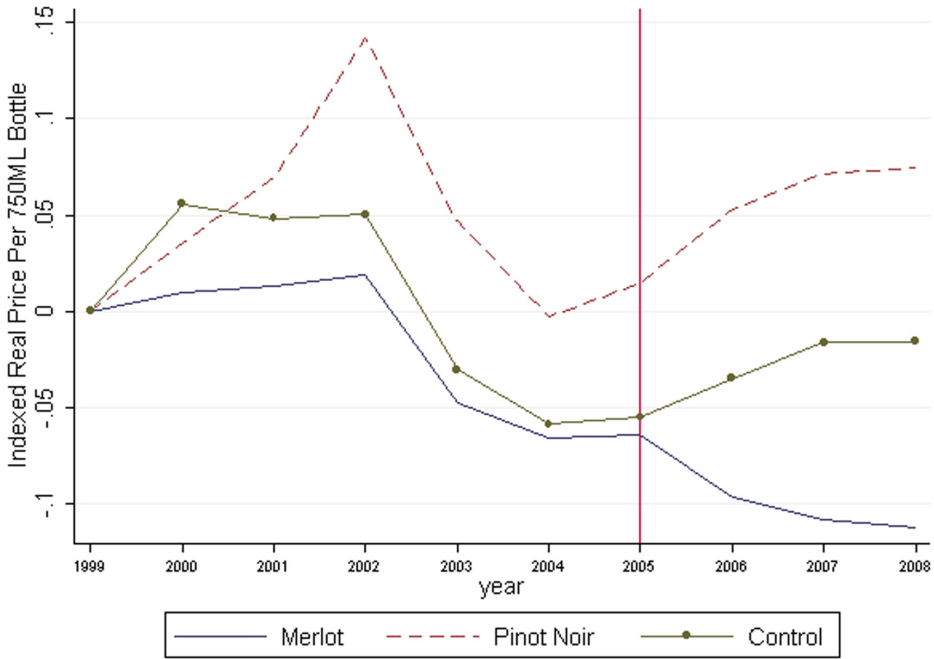
Figure 3
Indexed Real Price

Table 4 summarizes the regression results and indicates that for all three groups, the movie *Sideways* induced statistically significant changes. While all the coefficients move in the expected direction, the magnitude of the changes differs significantly. While the price of Merlot continues a decline that started in 2003, well before the movie began, there does appear to be a small but statistically significant decrease in price. For Pinot Noir, however, the price increase at the end of 2005 reverses a downward trend that began in 2003.

Consistent with an overall increase in the demand for wine following the movie, the results so far indicate that the movie *Sideways* resulted in a small but statistically significant increase in the price of the control group wines.

C. *Analysis by Price Segments*

The analysis above is based on the assumption that consumption switches from Merlot to Pinot Noir. In this section we look for changes in consumption within each varietal by price segment. The wine industry is not only categorized by color and varietal but by price point within varietals.[6] As a result, we want to know if the consumption of low priced wines was

[6] See for example, Costanigro, McCluskey and Mittelhammer (2007) for an elaboration of this point. Cuellar and Huffman (2008) also estimate demand functions for wine by varietal and price point.

Table 4
Regression Results for Price

	Merlot	Pinot Noir	Control
Time	0.023	0.115	0.059
	(42.88)**	(107.19)**	(163.59)**
Time Squared	−0.005	−0.016	−0.011
	(74.58)**	(112.39)**	(223.05)**
D2005	−0.328	−1.15	−0.876
	(70.95)**	(125.58)**	(285.25)**
D2005*Time	0.052	0.179	0.137
	(71.47)**	(123.74)**	(283.47)**
Constant	0.989	0.892	0.967
	(1140.60)**	(499.46)**	(1609.09)**
Observations	8832	4441	17238
R-squared	0.93	0.79	0.91
Sideways Effect F-Statistic	2553.86	7931.76	40684.89
p-value for F-statistics	(0.000)	(0.000)	(0.000)

Absolute value of t-statistics in parentheses. *significant at 5% level; **significant at 1% level.

more affected by *Sideways* than the consumption of high priced wines This might be true if low priced wine is consumed by entry level drinkers who are not as well informed about wine as core consumers. As such, these consumers may be more susceptible to popular perceptions of wine. Likewise, if high end wines are consumed by core consumers who are more informed about wine than low end wine consumers, they may be less susceptible to events such as movies and promotion. If this is true, then we would expect *Sideways* to have a larger effect on the consumption of lower priced wines.

To analyze the effect of the movie by price point we segment the price data into three categories: Less than $10, $10-less than $20, and $20–$40.[7] Figure 4 and Table 5 show the results for the ratio of annual cases sold of Merlot over Pinot Noir, the ratio of Merlot over the control group wines and the ratio of Pinot Noir over the control group for the lowest price segment of wines under $10. As can be seen from the graph, the trends in the ratio of case volume of Merlot/Pinot Noir and Merlot/Control remain relatively flat. Graphically there appears to be little effect of the movie on the ratios of case volume of Merlot/Pinot Noir and Merlot/Control shown in Figure 4. However, the regression results in Table 6 do indicate a negative and statistically significant decrease in the growth rate of Merlot after the release of *Sideways*. For Pinot Noir, the results illustrated in Figure 4 indicate a large increase in the growth rate of case volume. The regression results in Table 5 confirm that there was a positive and statistically significant increase in the growth rate in the ratio of Pinot Noir/Control group cases sold after the movie.

[7] We exclude wines over the price of $40 per bottle (less than 2% of the sample) for brevity.

Figure 4
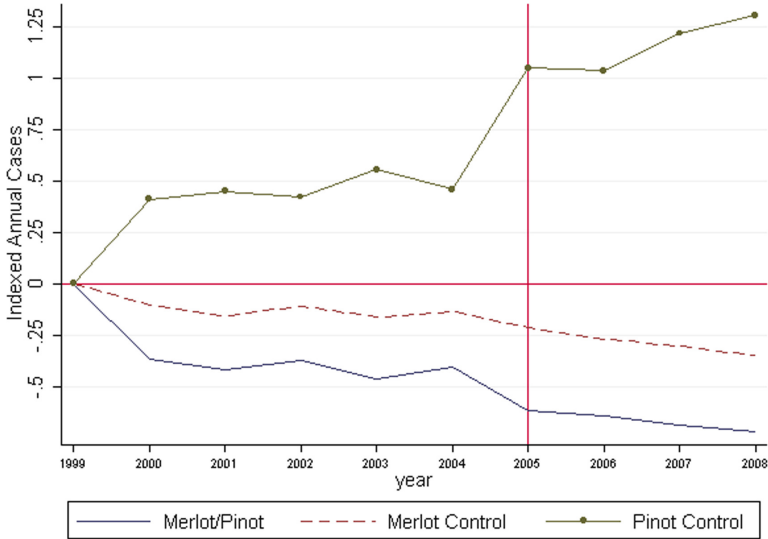**Indexed Ratio of Case Volume: Under $10 per Bottle Price Segment**

Table5
Regression Result for Relative Case Volume
Under $10 per Bottle Price Segment

	Merlot/Pinot Noir	Merlot/Control	Pinot Noir/Control
Time	−0.263	−0.093	0.277
	(110.70)**	(105.73)**	(82.54)**
Time Squared	0.028	0.01	−0.029
	(87.95)**	(84.02)**	(63.13)**
D2005	1.485	0.739	−1.54
	(71.20)**	(96.01)**	(52.30)**
D2005*Time	−0.253	−0.121	0.306
	(77.02)**	(100.09)**	(65.91)**
Constant	0.156	0.063	−0.154
	(40.47)**	(44.08)**	(28.29)**
Observations	5743	5743	5743
R-squared	0.94	0.97	0.97
Sideways Effect F-Statistic	3964.84	5415.16	8344.44
p-value for F-statistics	(0.000)	(0.000)	(0.000)

Absolute value of t-statistics in parentheses. *significant at 5% level; **significant at 1% level.

Table 6
Indexed Ratio of Case Volume
$10-$20 per Bottle Price Segment

	Merlot/Pinot Noir	*Merlot/Control*	*Pinot Noir/Control*
Time	0.321	0.268	−0.072
	(124.57)**	(181.91)**	(58.44)**
Time Squared	−0.046	−0.037	0.013
	(133.52)**	(185.62)**	(76.61)**
D2005	−3.003	−2.008	0.965
	(134.53)**	(157.36)**	(90.13)**
D2005*Time	0.411	0.295	−0.082
	(116.90)**	(146.97)**	(48.83)**
Constant	−0.324	−0.255	0.091
	(76.49)**	(105.56)**	(44.67)**
Observations	12417	12417	12417
R-squared	0.95	0.95	0.99
Sideways Effect F-Statistic	19538.87	15646.58	66162.67
p-value for F-statistics	(0.000)	(0.000)	(0.000)

Absolute value of t-statistics in parentheses. *significant at 5% level; **significant at 1% level.

For the middle price segment, $10–$20 per bottle, shown graphically in Figure 5, we see a picture similar to the low priced segment. Once again, the regression results indicate that there was a small but statistically significant shift downward in the time trend of the ratio of Merlot/Pinot Noir and Merlot/Control while there was an upward and statistically significant shift in the Pinot Noir/Control case volume.

For the highest price segment examined, shown in graphically in Figure 6, the trends in the ratios Merlot/Pinot Noir and Merlot/Control case volume continue a downward trend that started before the release of the movie, while the trend in ratio of Pinot Noir/Control case volume reverses a downward trend. This is consistent with the idea posited earlier that Pinot Noir consumers "traded up" to higher priced Pinot Noirs. Interestingly, the regression results indicate that although Merlot continues a downward trend that began before the movie's release, the coefficient of the post-*Sideways* time trend variable indicates that there was a statistically significant decrease in the rate of slowdown after the movie's release. This is possible if, for example, some consumers increased consumption of high end Merlot in spite of the movie.[8]

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[8] This explanation was proposed to us at several of our presentation of the paper.

Figure 5
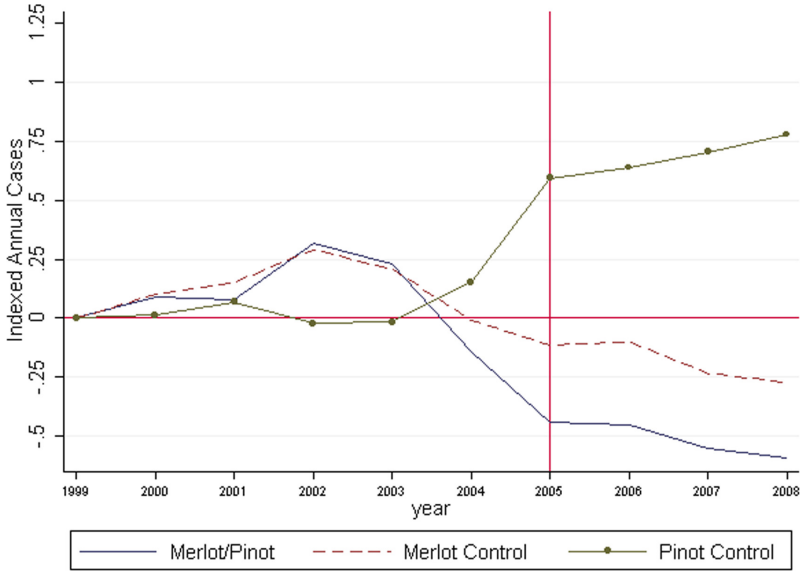**Indexed Ratio of Case Volume**
$10–$20 per Bottle Price Segment

Figure 6
Indexed Ratio of Case Volume
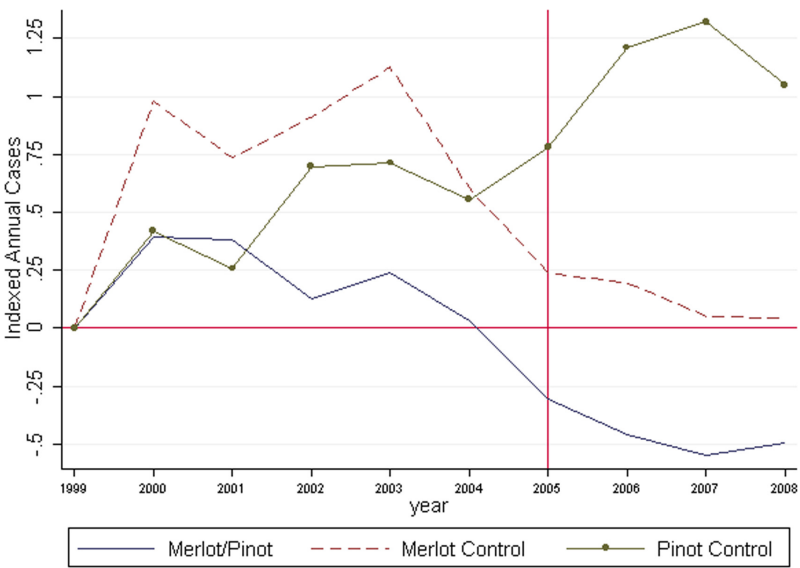$20–$40 per Bottle Price Segment

Table 7
Indexed Ratio of Case Volume
$20–$40 per Bottle Price Segment

	Merlot/Pinot Noir	Merlot/Control	Pinot Noir/Control
Time	0.189 (35.66)**	0.713 (83.99)**	0.566 (105.48)**
Time Squared	−0.029 (41.18)**	−0.087 (75.95)**	−0.063 (87.82)**
D2005	−1.949 (42.09)**	−4.96 (66.79)**	−3.646 (79.01)**
D2005*Time	0.244 (33.51)**	0.692 (59.24)**	0.607 (83.57)**
Constant	−0.018 (2.10)*	−0.446 (32.32)**	−0.579 (65.40)**
Observations	4749	4749	7668
R-squared	0.92	0.86	0.90
Sideways Effect F-Statistic (p value for F-statistics)	3302.78 (0.000)	3996.54 (0.000)	4120.10 (0.000)

Absolute value of t-statistics in parentheses. *significant at 5% level; **significant at 1% level.

IV. Conclusions

This paper tests the so called *Sideways* effect. Specifically we investigate whether or not the movie *Sideways* had a significant effect on the consumption of Merlot, Pinot Noir and overall wine consumption as represented by a control group of wines. Our results suggest that *Sideways* did have a small negative impact on the consumption of Merlot while increasing the consumption of Pinot Noir. However, far from having a "devastating" affect, the positive impact on Pinot Noir appears greater than the negative impact on Merlot. For example, while the sales of Merlot slow following the movie, sales of Pinot Noir increase significantly. Despite the changes in consumption, Pinot Noir still constitutes roughly half the market share of Merlot. We observe a similar effect with respect to price. Following *Sideways*, the price of Merlot continues an already decreasing trend, while the price of Pinot Noir reverses a decreasing trend and increases following the movie.

We also examined whether the effects of *Sideways* differed by price point. Our results show that the negative effects of the movie on Merlot were confined mostly to the lower priced segment, under $10 per bottle, while at the higher price points, the movie may have had a positive impact or at least slowed the rate of decline. The effects on Pinot Noir, on the other hand, were positive across all price points, with the largest impact being on the highest price point of $20–$40 per bottle.

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