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The Wheel on the Road Keeps on Turning.

AN ANALYSIS OF LONGBOARD RACE PARTICIPATION ON SALES OF WHEELS

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Abstract

This paper examines the impact of sponsoring longboard athletes participating in races has on sales of longboard wheels. Sales data is obtained from the company Venom, a longboard wheel manufacturer. I use two time series models, a distributed lag model and an ARDL model regression to examine if there is a post-race sales effect from Venom sponsored athletes participating in race events. I find no effect on sales from Venom riders participating in race events.

Introduction:

Does a longboarding company receive a sales boost from sponsoring athletes who participate in competitions? The question is interesting and unique because no research has been done on the longboard industry. Studies have shown large companies sponsoring athletes in mainstream sporting events do receive a sales boost, but little has been done to show if the effects carry over to small companies.

To explore this question, I examine sales data from a longboarding company, Venom, and participation in longboard race events by athletes sponsored by Venom that occur over the same sales periods. I use unit sales of Venom wheels sold as a measure of the effectiveness of sponsoring athletes in downhill longboarding races. Unit sales of wheels are a good measure as they are an integral part of a longboard. Unit sales are highly correlated with dollar sales (see 4a.) which allows for substitution.

The more races a Venom athlete participates in the more exposure Venom's wheels receive, which is a driver of sales. I expect to find that participating in a race is associated with a slight increase in unit sales of wheels.

Lit Review

One type of time series model this paper uses is a Distributed Lag model. This model permits the measurement of shocks over time. For example, advertising dollars is the shock and sales of goods is more evenly distributed across time. Clarke (1976) uses a Distributed Lag model to estimate that 90% of the measureable advertising effect on product sales occurs within 3 to 9 months.

Research done by Seno and Lukas (2007) show that when acclaimed athletes endorse a product it has a positive effect on brand sales and consumer perception. Chung, Derdenger, and Srinivasan (2013) examine the sponsorship effect on sales by looking at Nike's sponsorship of Tiger Woods. They conclude that sponsoring Tiger Woods generated an additional profit of $103 million on Nike golf ball sales alone.

Agrawal and Kamakura (1995) find the effect of a celebrity endorsement on sales to be immediate and persistent through time. These effects are leading more companies to spend a larger share of their advertising budgets on sponsoring athletes and less on more traditional advertising as documented by Cornwall (2008).

Authenticity is also considered to be important to consumers. Papers published by Lockwood and Kunda (1997) as well as Bush, Martin and Bush (2004) show consumers will emulate the characteristics of their favorite athlete. An athlete's influence is positively related to consumers' brand loyalty and word of mouth communication. Venom has a nonconformist image in longboarding in comparison to its competitors. This attracts a more loyal customer base, boosting sales.

Sponsoring an event is a third avenue which can increase the awareness of consumers to the sponsor's product. Bennett, Henson, and Zhang (2002) surveyed high school and college

aged groups to examine brand awareness at the X-Games. ESPN was correctly identified by more than half of high school and college age students as being the channel that hosted the X-Games. Brand awareness of Mountain Dew, the primary sponsor of the X-games, was significantly higher than other sponsors.

Other literature asserts sponsoring an event has little value to a company. According to Cornwall, Pruitt, and Van Ness (2001) winning a competition is more important than just participation. Contradicting that claim Ko, Park and Claussen (2008) downplay the importance of winning competitions and focus on other less competitive aspects of action sports that consumers might be more interested in. This paper attempts to answer the question of effect by comparing races participated in versus races won and their effects on sales.

Race attendance (spectatorship) positively affects brand awareness. Bennett, et al. (2009) finds spectatorship has a larger effect on consumer purchasing behavior than actual participation in a sport or other media types of media exposure (ie videogaming). When a consumer participates more in a sport, they are more likely to be a spectator at an event. The additional exposure to the event sponsor leads to increased levels of brand recognition.

Consumer goodwill towards a company also impacts its sales. Quoting Meenaghan (2001) “The perception of benefit, related appreciation, and goodwill effects are generally the greatest when the sponsorship benefits an activity with which the consumer is involved.” Levin, Beasly, and Gamble (2004) found fans of NASCAR are more likely to purchase goods from NASCAR sponsors because those companies are involved in motorsports sponsorship. Research from Koo, et al. (2006), Gwinner et al. (2008), and Dees et al. (2008) show consumer goodwill toward a sponsor is related to how involved a company is with the sport. Therefore, the more a company sponsors events the more goodwill it acquires from consumers.

Data

A. Venom Data

All sales data is from the longboarding company Venom. The regression includes the sales periods starting January 6, 2012 to November 27th, 2016. All sales periods measure North American sales only. Sales data consists of biweekly reports detailing unit sales of goods, dollar revenues from sales of goods, and costs of advertising. Goods reported sold by Venom include wheels, bushings, sunglasses, shirts, and stickers.

This paper focuses on unit sales of wheels. Wheels are sold four wheels to a pack, with a pack constituting one unit. Unit sales of wheels are over a two-week sales period and range from 0 to 844 units of wheels sold. Prices of wheels range from $40 to $58. On average Venom sold 222 units of wheels per sales period, with a standard deviation of 164.

Venom manufactures 21 different types of wheels. Wheels vary in color, durometer (hardness), size, and performance. For the average longboarder the performance difference among Venom wheels is small. Individual wheel types manufactured by Venom are not consistently manufactured. This variation in consumer availability does not allow for the measure of race participation effects on specific types of Venom wheels. Due to this lack of consistency I treat Venom wheels as a homogeneous good.

The majority of Venom's sales (70%) are online. The rest of the sales are to brick and mortar stores. However, these stores also sell Venom products within their respective online stores. This makes tracking sales by region within North America an impossibility using only the provided sales reports.

B. Race Data

Race data is from the International Gravity Sports Association (IGSA) and International Downhill Federation (IDF). Races include all officially sanctioned events by IGSA and IDF over the same time period as the sales data. Races that occurred outside of IGSA and IDF purview are not included in the data. Races took place in North America, South America, Asia, and Europe.

There is no exact data on levels of spectatorship at races. Instead athletes were asked their opinion on which races had the highest levels of spectatorship. Levels were measured on a scale from 1-5, with 5 being a heavily attended event. Their opinions were then corroborated by examining the number of race entrants.

There were a total of 96 IGSA/IDF sanctioned race events between January 2012 and September 2016. Venom had at least one sponsored rider participant in 43 of these races and of these 43 races, a Venom sponsored rider placed a top three finish in 11 of them.

Of the 96 IGSA/IDF sanctioned race events 39 were held in North American (USA, Canada, Mexico) countries. Venom had at least one sponsored rider participant in 24 of these races and placed a Venom sponsored rider in the top three finishers in 7 different races. Chart 2d. visualizes which months all races and North American races were held. I run regressions using all of the data and one using only the North American data.

Each IGSA and IDF race was given equal weight. The effect of a heavily attended event is captured by measuring the level of spectatorship at a race. It should be noted that not all participants at all races were professional racers representing brands.

Race data is incomplete. Although the IGSA and IDF are the most widely known event sponsors, many local communities also have their own races. These races are included because

they receive significant media exposure within the longboarding community in the form of magazine articles or online video releases.

Graphs 1a. and 1b. (all races participated vs unit sales of wheels and North American races participated vs unit sales of wheels respectively) visualize the unit sales of a period and the number of races that occurred in the same period. Graph 5a. shows unit sales and race participation with a fitted value line. There is a slight increase in unit sales for participating in more races. This was to examine if the hypothesis that participating in a race would have an effect on subsequent sales is visually true.

Summary statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
unitsales	124	222.4839	163.9954	0	844
magdollar	124	118.629	298.0297	0	1200
softgooddollar	124	379.7872	698.2696	0	3057.67
Total number of races	124	0.7741935	0.9946091	0	4
Total number of races participated	124	0.3387097	0.7312657	0	4
North American races	124	0.3064516	0.6138963	0	3
North American races parti	124	0.1774194	0.4946607	0	3
spectatorship	124	0.7580645	1.698258	0	9

Methodology

This paper performs two time series regressions on unit sales of Venom wheels with Venom athlete participation in sanctioned downhill longboard races. The variable of interest in the regression is unit sales of wheels by Venom. One sales period is two weeks in length.

The Dickey-Fuller test was employed to ascertain the appropriate number of lags for the model. A lag was added until stationarity of the model could not be shown at the 1% level. The

test showed that a 4-lag period would be ideal given the model and number of observations. (Table 3b.)

Finite Distributed Lag Model

A finite distributed lag model is an effective way to measure how a temporary shock affects the dependent variable over a period of time. In this paper, the shock on Venom's unit sales of wheels is a Venom sponsored athlete participating in a race. A distributed lag model assumes independent and identically distributed error terms.

The benefit from participating in a race on wheel sales is expected to decay over time. The lag in the regression is only four sales periods (two months). It is a shorter period than what Clarke has published because races occur frequently in the spring and summer months. The marginal effect of an individual race diminishes if more races occur in a shorter span of time.

As Dekimpe and Hanssens (1995) point out, a drawback of using the finite distributed lag model is that it does not allow for any permanent effects from race participation to affect the unit sales of wheels. Only measuring short term sales effects does not account for any long term positive or negative sales trends. This deficiency of the model to measure any long-term effects can lead to imprecise estimates in the regression.

ARDL Model

I also perform a regression using an Autoregressive Distributed Lag (ARDL) model. An ARDL model functions similarly to the distributed lag model, but it allows the dependent variable to change over time. The model assumes that the dependent variable depends on previous values the dependent variable had. This allows for a more robust regression to be performed.

The primary independent variable is race participation. Race participation (racepar) measures the total number of races Venom participated in. There were sales periods in which multiple races occurred, as such this number increased. Sales effects from race participation are not assumed to be immediate. Lags are introduced on race participation to see the effects from participation in previous sales periods. (lag1racepar, lag2racepar, lag3racepar, lag4racepar)

Controls

The total number of races that occurred during a sales period (numrace) are also included. This is to examine if race participation was significant. Graph 1b. contrasts unit sales of wheels and number of races in a sales period. As with race participation the number of races occurring was lagged to find any lagged effects from races being held in the previous periods. (lag1numrace, lag2numrace, lag3numrace, lag4numrace)

A binary top three finish variable (top3finish) was introduced to measure the effect on wheel sales of a Venom athlete finishing in the top three. Some papers have stated that winning a race is important and simply participating in one is not enough to have an effect on a company's stock valuation. This hypothesis can be tested using a more accurate measure of unit sales of goods. Since the effect of a top three finish is expected to be immediate it is not lagged.

Dollars spent on magazine advertising (magdollar) are included to examine sales effects resulting from advertising in longboarding magazines. Races are covered significantly in magazines along with trips, tours, and other events.

The term soft goods include goods that do not contribute to the functionality of a longboard. Soft goods are made up of shirts, stickers, sunglasses. Most soft goods (estimated 80%) purchased by Venom were used as promotional items given away at races events or tour events. Total dollars spent on soft goods is (softgooddollar).

Seasonal effects are controlled for due to the outdoor nature of longboarding. Table 2a. shows the average seasonal variation in unit sales. The table shows that unit sales of wheels hold steady except for the fall season. Fall is the base season chosen, with the other season (winter, spring, summer) being included in the regression to control for seasonal effects.

Individual months are another measure of control (Jan-Dec) for seasonality. This was to see if a difference existed between seasonal averages and monthly averages to increase the robustness of the regression. Months can account for specific holiday sales in a way seasons cannot. Average monthly sales can be examined in table 2b. The month of December is used as the base month.

After the year 2012, the longboarding industry as a whole experienced a decline in sales. The decline in wheel sales for Venom can be examined in table 2c. As such, yearly fixed effects had to be controlled for. The sales data is between the year 2012 and 2016. Each year was given a binary variable to control for yearly fixed effects.

North American Races

Sales data provided by Venom only included US sales of wheels. Thus, a separate regression was run limited to North American races and race participation. The North American race participation variable (naracepar) functions the same way as the race participation variable in the previous regression. Graph 2a. contrasts unit sales of wheels and North American race participation. North American race participation was lagged for the same reasons described above. (lag1naracepar, lag2naracepar, lag3naracepar, lag4naracepar)

North American race participation was compared to the total number of North American Races held (numnarace). Graph 2b. examines total unit sales of wheels and total number of North American races held. This variable was lagged as well to see any time effects from North

American races being held. The North American regression has all the same controls as the international regression.

Equations

Baseline Regression

$$unitsales_t = \alpha + \beta_1(racepart)_t$$

Distributed lag

All Races Regression
Seasonal & Monthly

$$unitsales_t = \alpha + \beta_1(racepart)_t + \beta_2(racepartlags)_{t-1,2,3,4} + \beta_3(numrace)_{t,t-1,2,3,4} + \gamma(controls) + \varepsilon$$

North America Races Regression
Seasonal & Monthly

$$unitsales_t = \alpha + \beta_1(naracep)_t + \beta_2(naracepartlags)_{t-1,2,3,4} + \beta_3(numnarace)_{t,t-1,2,3,4} + \gamma(controls) + \varepsilon$$

ARDL
All Races Regression
Seasonal & Monthly

$$unitsales_t = \alpha + \beta_1(unitsaleslags)_{t-1,2,3,4} + \beta_2(racepart)_t + \beta_3(racepartlags)_{t-1,2,3,4} + \beta_4(numrace)_{t,t-1,2,3,4} + \gamma(controls) + \varepsilon$$

North America Races Regression
Seasonal & Monthly

$$unitsales_t = \alpha + \beta_1(unitsaleslags)_{t-1,2,3,4} + \beta_2(naracept)_t + \beta_3(naraceplags)_{t-1,2,3,4} + \beta_4(numnarace)_{t,t-1,2,3,4} + \gamma(controls) + \varepsilon$$

Results:

Distributed Lag Results All Races

Without any controls race participation in all races has a positive effect on unit sales of wheels for Venom. When adding controls to this model this effect changes signs and becomes negative. This suggests that the regression is imprecisely estimated.

The total number of races held has a positive effect on unit sales of Venom wheels. As race participation and total number of races held are highly correlated (See table 4a.) it suggests that some of the positive effects from race participation are being incorrectly attributed to total number of races held.

A top three finish by a Venom team rider has a negative effect on unit sales of wheels. This is in contrast to previously published literature that says only a top three finish will have a statistically significant effect on a company's sales.

Money spent on magazine advertising and the use of soft goods as promotional items have very little effect on the unit sales of wheels. Depending on the regression run they were slightly positive or negative.

Distributed Lag All Races

VARIABLES	(1) unitsales	(2) unitsales	(3) unitsales	(4) unitsales	(5) unitsales	(6) unitsales
racepar	13.15	-11.22	-25.34	-8.058	-15.15	-8.513
	(20.27)	(26.68)	(26.16)	(28.55)	(29.91)	(30.68)
Sum of racepar lags	N/A	N/A	-9.03	-12.72	-40.77	-81.99
numrace		27.41	42.33**	40.85**	50.56***	53.30**
		(19.62)	-19.39	-19.38	-18.74	-21.84
Sum of numrace lags	N/A	N/A	-36.53	-28.04	18.24	9.81
top3finish				-87.92	-81.63	-112.3*
				(61.47)	(58.20)	(60.72)
magdollar				-0.0341	0.0243	-0.00114
				(0.0504)	(0.0507)	(0.0511)
softgooddollar				0.0253	0.0221	0.0182
				(0.0223)	(0.0211)	(0.0209)
Seasonal fixed effects	N	N	N	N	Y	N
Monthly fixed effects	N	N	N	N	N	Y
Yearly fixed effects	N	N	N	N	Y	Y
Constant	218.0***	205.1***	222.9***	214.9***	232.3***	296.3***
	(16.28)	(18.68)	(25.39)	(26.78)	(57.98)	(58.13)
Observations	124	124	120	120	120	120
R-squared	0.003	0.019	0.111	0.138	0.316	0.384

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Distributed Lag Results North American Races

Without any controls, North American race participation had a negative impact on unit sales of venom wheels. I think this happens because there is much less data on North American races than international ones. However, the number of races held over a period had a positive impact on unit sales of wheels and the two variables mostly cancel out one another.

A top three finish has a negative effect on unit sales of Venom wheels in this regression. Money spent on soft goods and magazine advertising also have little effect on the sales of wheels.

The fourth regression introduces the spectatorship variable. The spectatorship variable has a negative effect on unit sales of wheels. This is in contradiction to the literature which concludes that increased levels of spectatorship lead to higher sales of a sponsor's goods.

In regressions 5, 6, and 7 I introduce the interaction term between the variables spectatorship and number of races participated in. This term indicates that for every additional level of spectatorship Venom will sell an addition number of wheels. This is consistent in the additional regressions.

Distributed Lag North American Races

VARIABLES	(1) unitsales	(2) unitsales	(3) unitsales	(4) unitsales	(5) unitsales	(6) unitsales	(7) unitsales
naracep	-14.41	-36.72	-48.04	1.223	-65.49	-45.77	-27.27
	-29.99	-51.3	-50.04	-61.3	-90.26	-91.96	-93.17
Sum of naracep lags	N/A	N/A	-48.67	-48.18	-38.42	-123.72	-93.42
numnarace		22.19	36.49	78.32	96.40*	81.61	105.7*
		-41.33	-39.8	-49.9	-53.03	-51.5	-55.36
Sum of numnarace lags	N/A	N/A	38.06	51.41	49.39	133.49	130.64
spect				-31.14	-42.58*	-33.42	-50.49*
				-22.56	-25.26	-24.1	-25.84
spectatorship_naracep					14.84	9.816	10.42
					-14.73	-14.55	-14.98
top3finish						-51.49	-45.07
						-65.23	-67.02
magdollar						-0.0142	-0.0184
						-0.0521	-0.0525
softgooddollar						0.0233	0.016
						-0.0221	-0.0223
Seasonal fixed effects	N	N	N	N	N	Y	N
Monthly fixed effects	N	N	N	N	N	N	Y
Yearly fixed effects	N	N	N	N	N	Y	Y
Constant	225.0***	222.2***	209.8***	207.6***	208.7***	224.2***	288.7***
	(15.70)	(16.61)	(20.52)	(20.50)	(20.53)	(55.91)	(58.57)
Observations	124	124	120	120	120	120	120
R-squared	0.002	0.004	0.069	0.085	0.094	0.294	0.355

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

ARDL Results All Races

Allowing the dependent variable to shift over time shows a slight increase in overall unit sales over a 4-period lag. The total shift of unit sales variable was negligible.

A Venom sponsored rider participating in a race had a positive effect on unit sales of wheels without any control variables. In every subsequent regression, the variable had a negative effect.

The total number of races held over a period had a positive effect on unit sales of wheels. This effect in the ARDL model was considerably less than measured in the Distributed Lag model. Adding more terms to a regression will reduce the variation of parameters in the model and I think that is what happened here.

A top three finish had a significant negative effect on unit sales of wheels in this model. Once again money spent on magazine advertising and money spent on soft goods had almost no effect on the amount of unit sales Venom had.

ARDL All Races

VARIABLES	(1) unitsales	(2) unitsales	(3) unitsales	(4) unitsales	(5) unitsales	(6) unitsales
Sum of unitsales lags	0.44	0.48	0.49	0.49	-0.04	0.06
racepar	13.62	-23.32	-34.56	-13.54	-11.80	-3.466
	(18.64)	(24.07)	(24.70)	(26.85)	(29.69)	(30.35)
Sum of racepar lags	N/A	N/A	-39.15	-40.45	-59.13	-84.81
numrace		41.88**	51.10***	50.04***	51.73***	55.98**
		(17.75)	(18.27)	(18.22)	(18.47)	(21.26)
Sum of numrace lags	N/A	N/A	-23.78	-16.36	31.28	8.76
top3finish				-107.8*	-92.86	-118.6**
				(57.65)	(57.53)	(59.37)
magdollar				-0.00394	0.0129	-0.00704
				(0.0483)	(0.0502)	(0.0504)
softgooddollar				0.0208	0.0186	0.0143
				(0.0208)	(0.0207)	(0.0205)
Seasonal fixed effects	N	N	N	N	Y	N
Monthly fixed effects	N	N	N	N	N	Y
Yearly fixed effects	N	N	N	N	Y	Y
Constant	112.9***	84.02**	110.5***	98.85**	229.8***	281.5***
	(34.95)	(36.39)	(39.97)	(42.07)	(78.68)	(93.70)
Observations	120	120	120	120	120	120
R-squared	0.121	0.162	0.254	0.283	0.370	0.443

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

ARDL Results North American Races

Allowing the dependent variable to shift over time shows a slight increase in overall unit sales over a 4-period lag. These shifts were higher than in the previous ARDL model.

North American race participation had negative effects on the unit sales of wheels. This was with and without any controls.

The number of North American races held had a positive impact on unit sales of wheels. This outweighed any negative effect from participating in a race.

The level of spectatorship at a race had a negative impact on unit sales of wheels. The interaction term measuring race participation with levels of spectatorship remained positive.

ARDL North American Races

VARIABLES	(1) unitsales	(2) unitsales	(3) unitsales	(4) unitsales	(5) unitsales	(6) unitsales	(7) unitsales
Sum of unitsales lags	0.46	0.46	0.47	0.49	0.48	-0.07	0.02
naracep	-16.61	-46.79	-55.16	-2.738	-53.87	-38.48	-22.99
	(27.87)	(46.57)	(48.09)	(58.75)	(86.08)	(92.32)	(93.77)
Sum of naracep lags	N/A	N/A	-79.30	-79.24	-71.44	-143.20	-100.36
numnarace		30.65	39.42	84.76*	99.21*	71.33	97.34*
		(37.85)	(38.49)	(48.34)	(51.57)	(52.54)	(57.27)
sum of numnarace lags	N/A	N/A	55.87	69.59	67.77	162.26	149.68
spect				-33.64	-42.84*	-26.24	-45.49
				(21.93)	(24.71)	(25.01)	(27.37)
spectatorship_naracep					11.53	8.594	10.58
					(14.16)	(14.68)	(15.17)
top3finish						-58.80	-51.69
						(65.42)	(67.41)
magdollar						-0.0130	-0.0188
						(0.0522)	(0.0528)
softgooddollar						0.0193	0.0142
						(0.0222)	(0.0224)
Seasonal fixed effects	N	N	N	N	N	Y	N
Monthly fixed effects	N	N	N	N	N	N	Y
Yearly fixed effects	N	N	N	N	N	Y	Y
Constant	116.3***	111.6***	105.3***	99.19***	101.5***	227.9***	280.2***
	(34.83)	(35.36)	(37.27)	(37.25)	(37.42)	(84.49)	(92.64)
Observations	120	120	120	120	120	120	120
R-squared	0.119	0.124	0.185	0.203	0.208	0.326	0.380

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Note: 1) Regressions without the individual values of lagged variable are available in the appendix regression section
2) Regressions adding controls individually are available in the appendix regression section

Conclusions

Findings

My first key finding of this paper is that Venom team riders participating in a race has no discernable effect on unit sales of Venom wheels. None of the race participation values had a statistical significance in any of the regressions. This finding is in contradiction to established literature that has found athlete participation in an event has a positive effect on sales of goods

My second key finding was that the total number of races held did have an effect on Venom's unit sales of wheels. There are three different possible interpretations of my findings.

My first interpretation is it indicates that more races held generates more interest in longboarding. This leads to the effect of increasing unit sales of all companies involved in longboarding.

The second interpretation is that longboard participants would be gearing up for the spring and summer longboarding season anyway. The data does not necessarily support this conclusion, the variation in sales between the winter spring and summer seasons is small.

My final interpretation suggests if the total number of races was significant, it would hold that the number of North American races would have a significant effect on unit sales as well. Since it does not, it suggests the number of races has a positive bias. Most races are held during this time frame so the number of races held could be capturing something else that artificially boost its significance.

The main implication of this paper is that Venom does not receive a significant sales benefit from sponsoring athletes to participate in races. The data suggests that Venom is subject

to changes in consumer taste/trends and as a result experiences swings in sales. This would explain the significant drop in sales over the sales periods.

Shortcomings

This analysis is limited because there is no available data from other time periods. Venom has only been selling wheels since January 2012, so the time frame from which to draw data is small.

The lack of length in time is a shortcoming of this paper. Graph 5a. illustrates a slight increase in unit sales from race participation. This graph includes all times race participation did and did not occur ie the data is represented in the regressions run for this analysis. Graph 5b. drops all times Venom did not participate in a race. This removed 96 observations from the data.

The elimination of races that Venom didn't participate in a race shows higher levels of race participation are associated with higher levels of unit sales. Given a longer length of time to collect more observations suggests that this model would be accurate. However, given that only 28 observations remain there is not enough data to reliably uncover any positive effects from race participations impact on Venom's unit sales of wheels.

Many races that occurred were not included. Tallying the number of official and unofficial races that occur both in the US and worldwide is a near impossible task. Not including any effect from these races may be responsible for the significance on the number of races variable in the regression.

The variable measuring the effect of a top 3 finish may also be misleading. The pool from which to draw data surrounding this variable is shallow at best. Many of the races that Venom had an athlete place in the top three were during periods of industry turmoil and declining industry sales, which leads to a negative bias.

Another shortcoming of this analysis is the fact that there is no available sales data of Venom's competitors in the longboard wheel market. Panel data would allow the measurement of unit sales of wheels across a number of firms over a large period of time. Comparing other companies with would expand the data set allowing for a more robust regression.

Continuation of Research

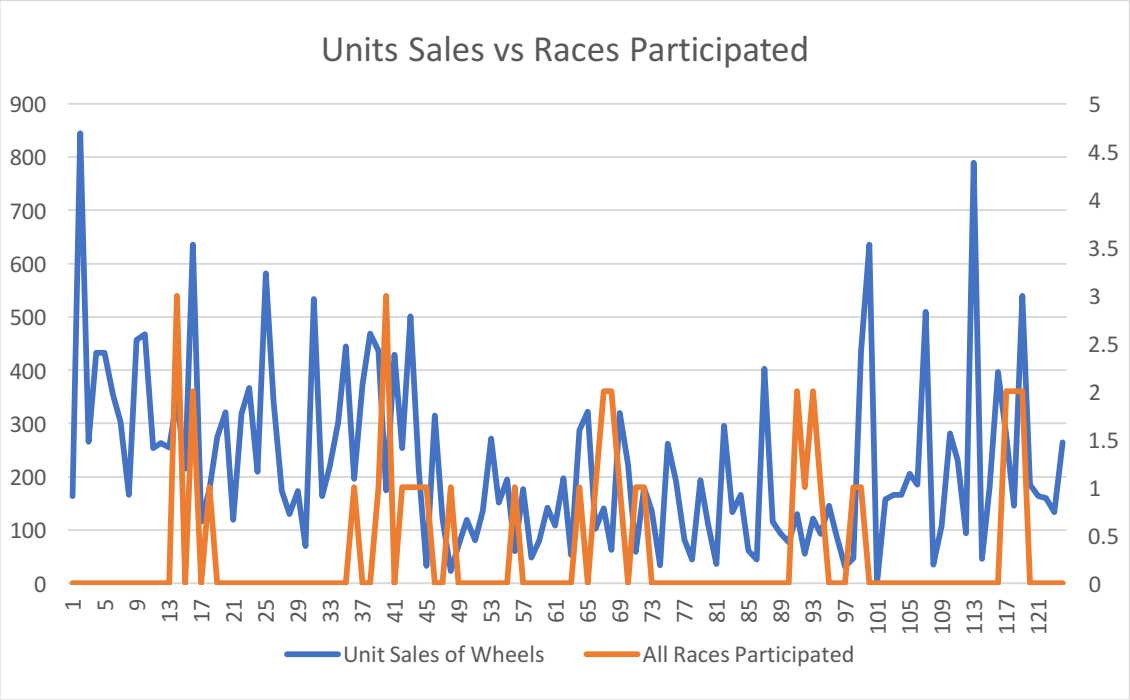
There are many avenues that can be explored to further research the effects of longboard race participation on unit sales of wheels. Acquiring sales additional data from other longboarding manufacturers would significantly increase the robustness of the regression by adding more data and a longer period of time measured.

There is likely a greater effect from promotional material that wasn't accounted for. The brand recall from promotional material wasn't accurately measured in this analysis. A shirt received at a race can last years, influencing consumer decisions for longer than the time frame estimated by established literature.

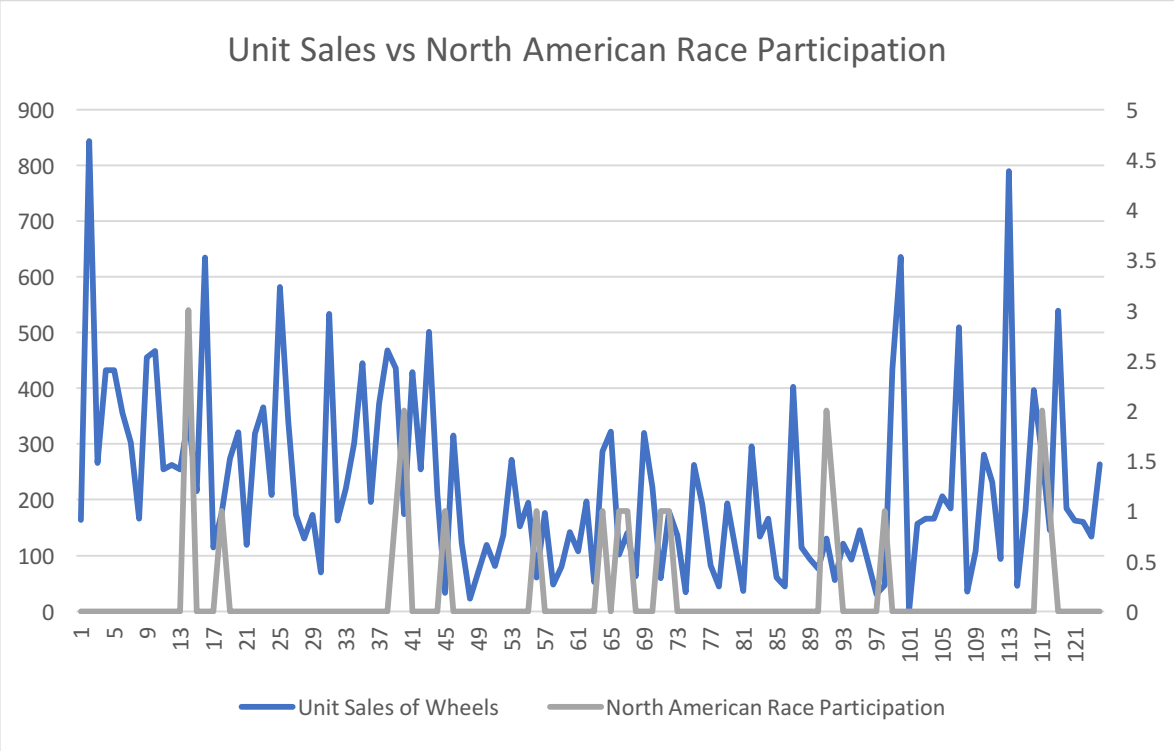
Finally, knowing the geographical locations of wheel sales would also be of great benefit. The examination of any spikes in wheel sales within a region that held a recent race event would improve measurement of race participation effects on unit sales of wheels.

Graphs, Tables, and Results

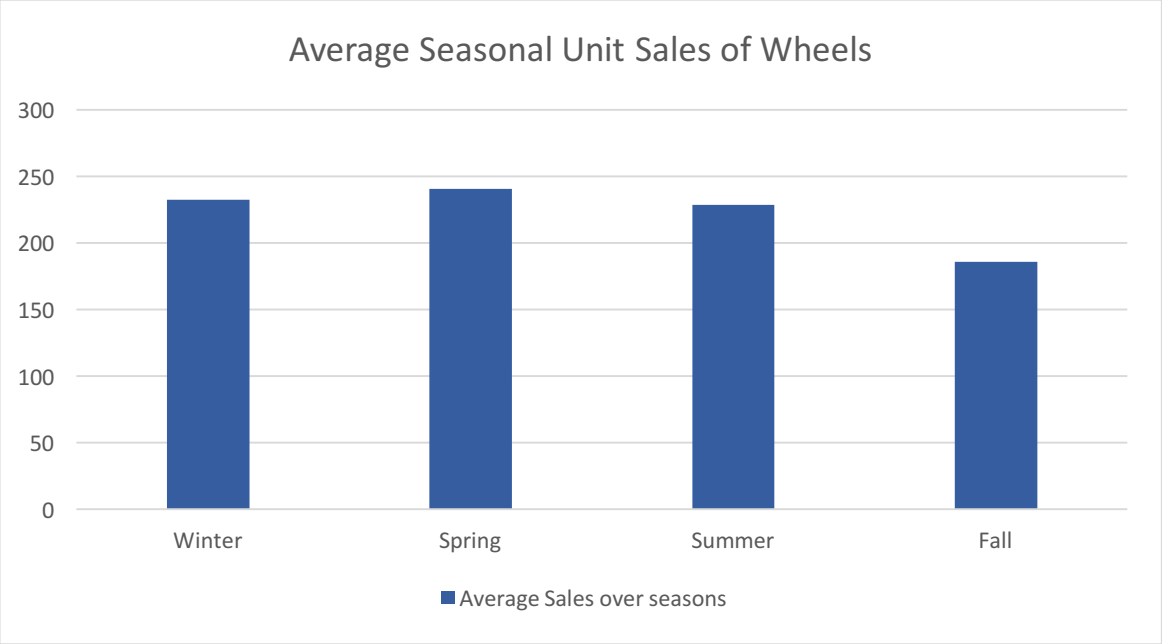
1a.



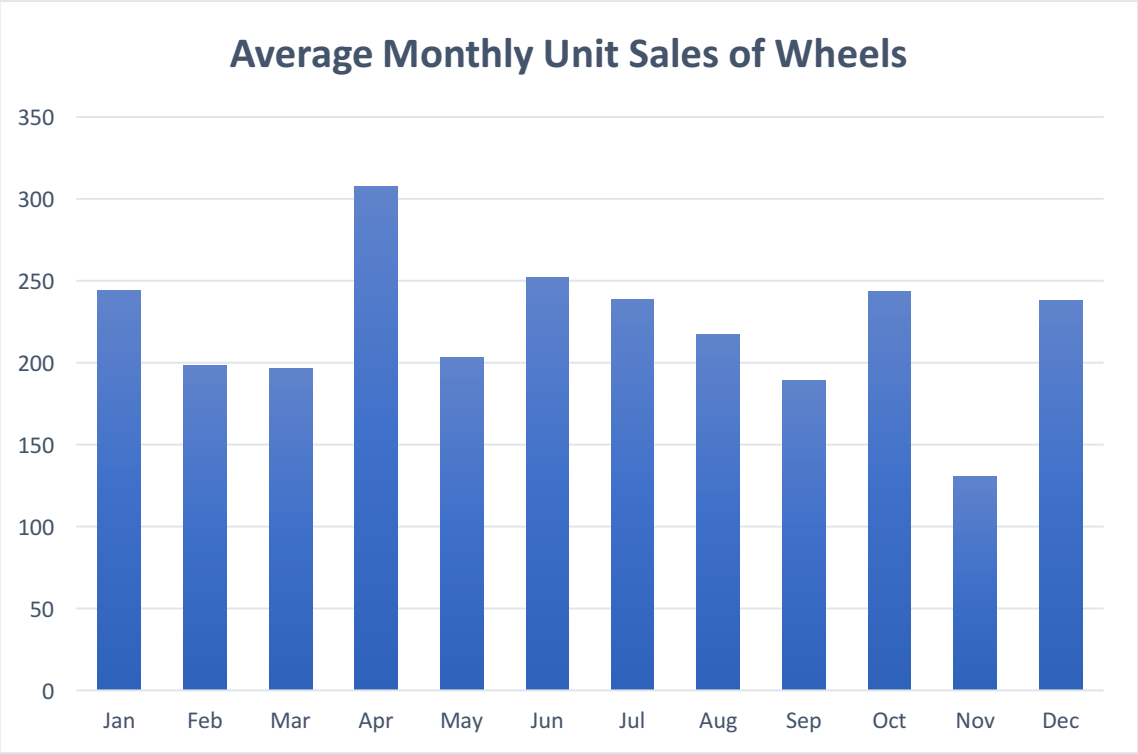
1b.



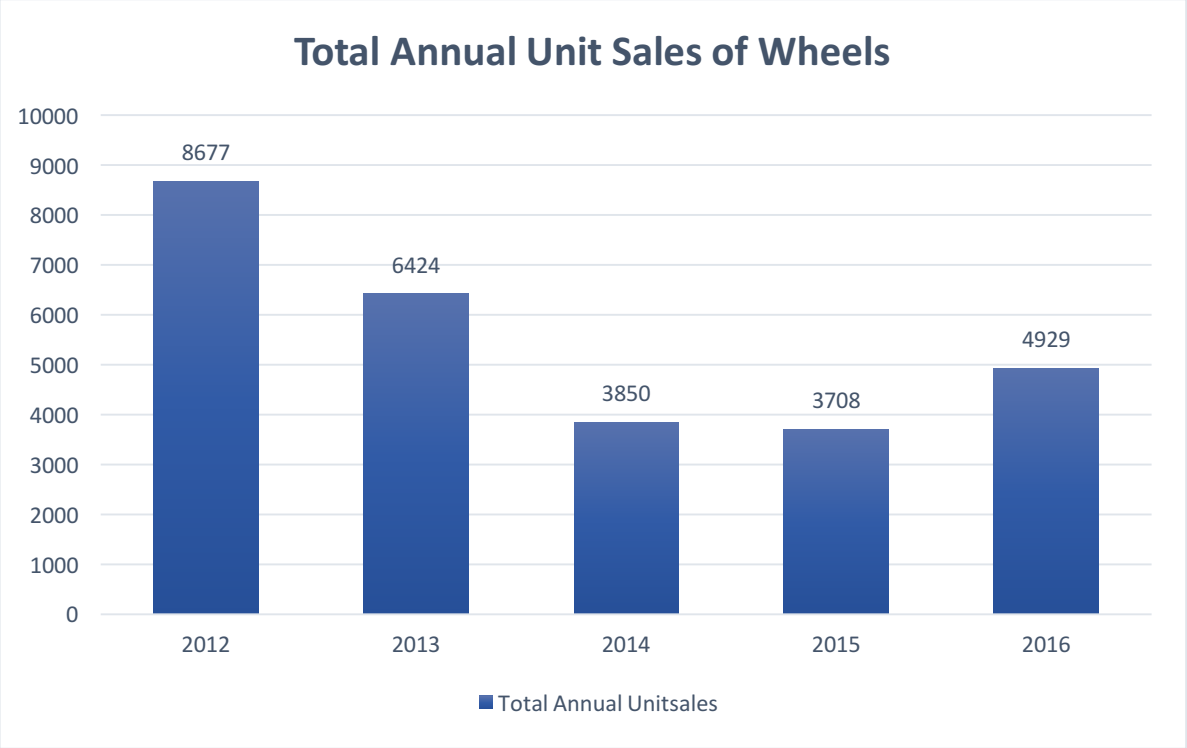
2a.


Average Seasonal Unit Sales of Wheels
300
250
200
150
100
50
0
Winter
Spring
Summer
Fall
Average Sales over seasons

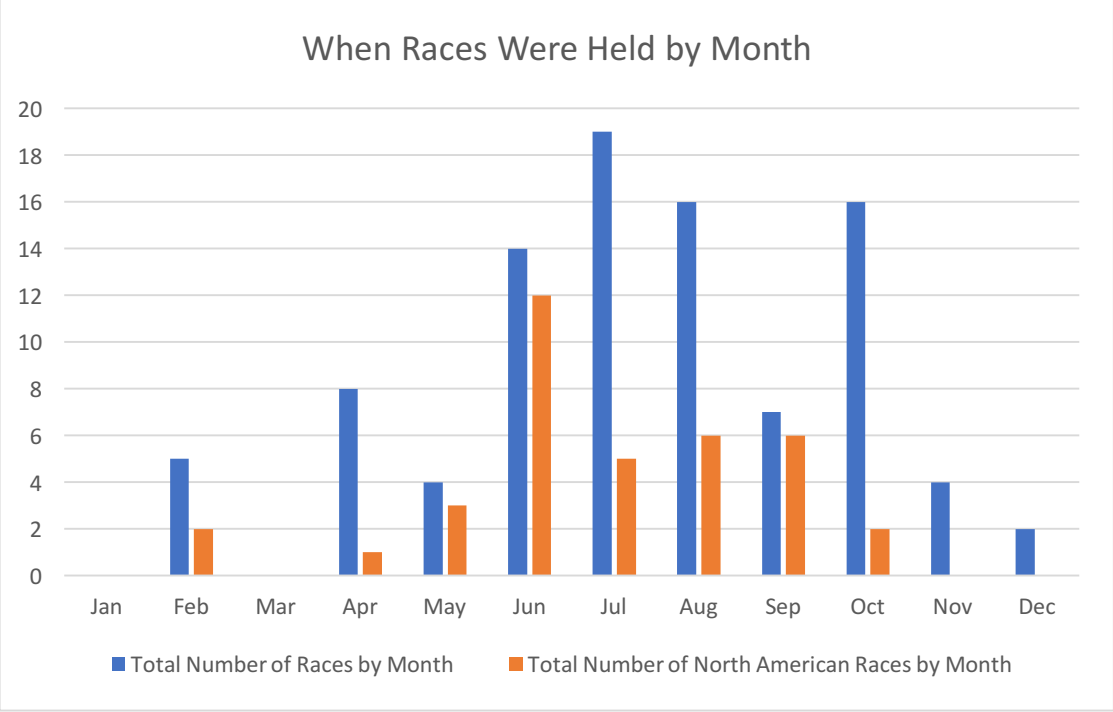
2b.


Average Monthly Unit Sales of Wheels
350
300
250
200
150
100
50
0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec

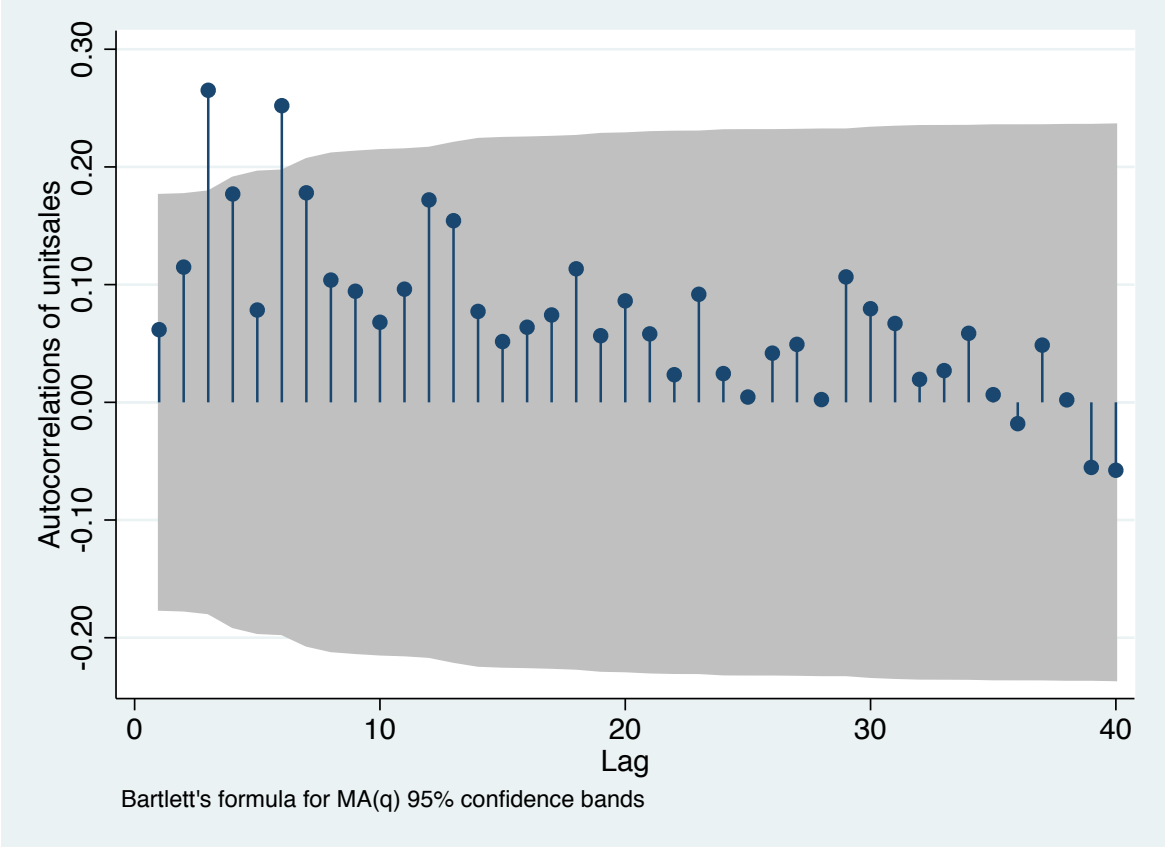
2c.


Total Annual Unit Sales of Wheels
10000
9000
8000
7000
6000
5000
4000
3000
2000
1000
0
8677
6424
3850
3708
4929
2012
2013
2014
2015
2016
Total Annual Unitsales

2d.


When Races Were Held by Month
20
18
16
14
12
10
8
6
4
2
0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Total Number of Races by Month
Total Number of North American Races by Month

3a. Correlogram of first 40 time periods



3b.

Dickey-Fuller Test Results

Dickey-Fuller test for unit root Number of obs = 123

	Test Statistic	1% Critical Value	5% Critical Value	10% Critical Value
		---------- Interpolated Dickey-Fuller ---------		
Z(t)	-10.343	-3.502	-2.888	-2.578

MacKinnon approximate p-value for Z(t) = 0.0000

Augmented Dickey-Fuller test for unit root Number of obs = 122

	Test Statistic	1% Critical Value	5% Critical Value	10% Critical Value
		---------- Interpolated Dickey-Fuller ---------		
Z(t)	-7.035	-3.503	-2.889	-2.579

MacKinnon approximate p-value for Z(t) = 0.0000

Augmented Dickey-Fuller test for unit root Number of obs = 121

	Test Statistic	1% Critical Value	5% Critical Value	10% Critical Value
		---------- Interpolated Dickey-Fuller ---------		
Z(t)	-4.550	-3.503	-2.889	-2.579

MacKinnon approximate p-value for Z(t) = 0.0002

Augmented Dickey-Fuller test for unit root Number of obs = 120

	Test Statistic	1% Critical Value	5% Critical Value	10% Critical Value
		---------- Interpolated Dickey-Fuller ---------		
Z(t)	-3.809	-3.503	-2.889	-2.579

MacKinnon approximate p-value for Z(t) = 0.0028

Augmented Dickey-Fuller test for unit root Number of obs = 119

	Test Statistic	1% Critical Value	5% Critical Value	10% Critical Value
		---------- Interpolated Dickey-Fuller ---------		
Z(t)	-3.549	-3.504	-2.889	-2.579

MacKinnon approximate p-value for Z(t) = 0.0068

Augmented Dickey-Fuller test for unit root Number of obs = 118

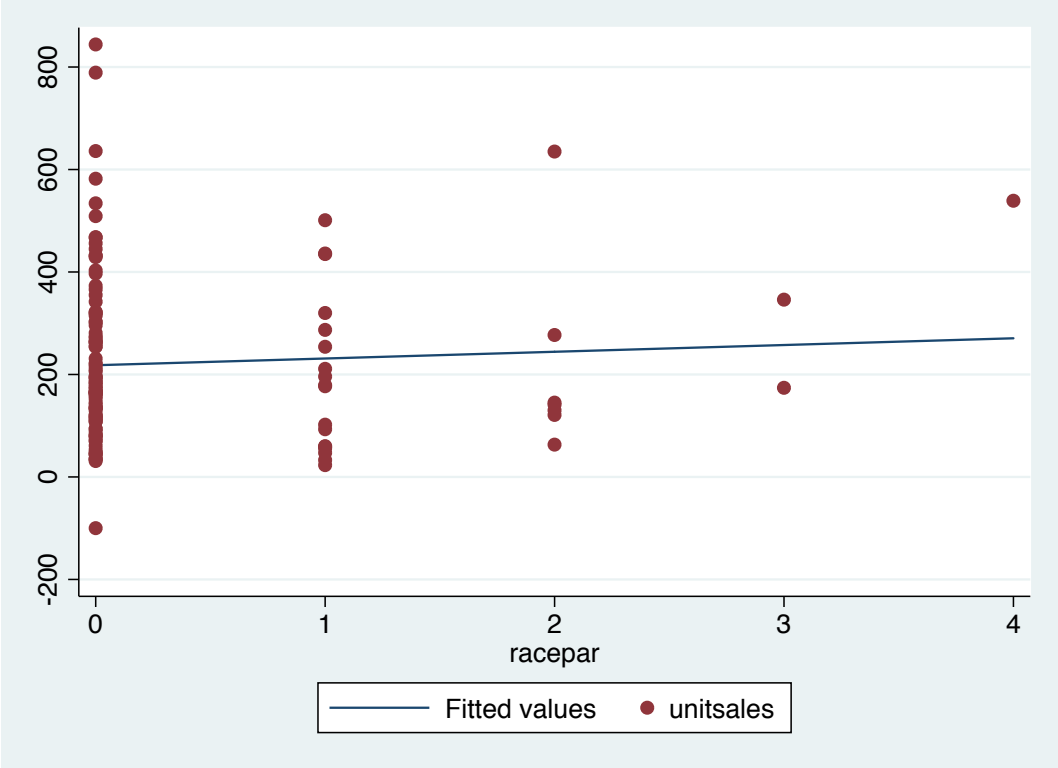
	Test Statistic	1% Critical Value	5% Critical Value	10% Critical Value
		---------- Interpolated Dickey-Fuller ---------		
Z(t)	-2.946	-3.504	-2.889	-2.579

MacKinnon approximate p-value for Z(t) = 0.0402

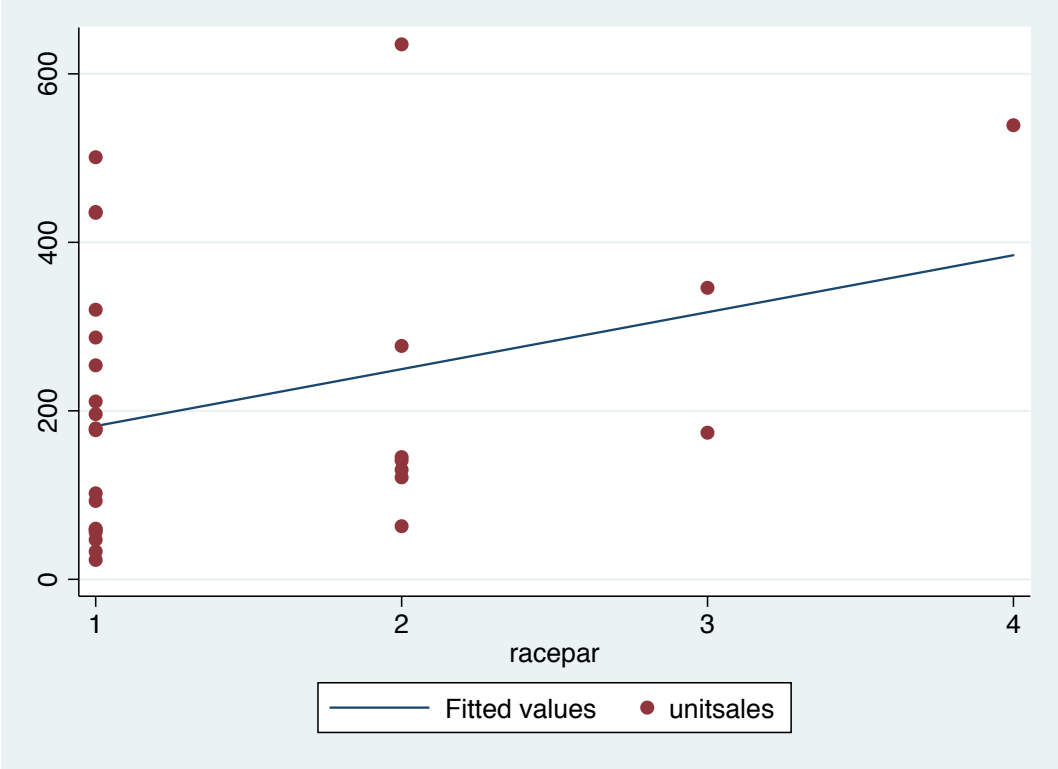
4a. Correlation between race participation and number of races held
(obs=124)

	racepar	numrace
racepar	1	
numrace	0.6537	1

5a.



5b.



Results Appendix Section

Distributed Lag All Races

VARIABLES	(1) unitsales	(2) unitsales	(3) unitsales	(4) unitsales
racepar	-10.41	-11.09	-24.53	-17.09
	(28.33)	(28.47)	(32.09)	(32.43)
lag1racepar	3.181	2.722	-4.078	-1.830
	(26.91)	(27.03)	(28.18)	(31.41)
lag2racepar	33.47	30.71	18.96	0.684
	(27.37)	(28.11)	(29.43)	(31.29)
lag3racepar	-38.43	-38.08	-45.17	-61.58*
	(27.83)	(27.94)	(29.64)	(32.96)
lag4racepar	-7.917	-7.597	-16.83	-32.64
	(27.24)	(27.35)	(28.17)	(32.33)
numrace	41.97**	41.76**	43.42**	46.30*
	(19.32)	(19.39)	(20.24)	(23.37)
lag1numrace	9.783	10.25	11.08	17.54
	(19.30)	(19.40)	(20.48)	(23.35)
lag2numrace	-19.57	-16.78	-12.20	-7.552
	(19.26)	(20.24)	(21.34)	(26.06)
lag3numrace	0.491	-0.440	2.248	-12.58
	(18.81)	(18.98)	(20.65)	(22.96)
lag4numrace	-21.60	-21.84	-16.53	-42.76*
	(18.89)	(18.97)	(20.08)	(22.37)
top3finish	-81.59	-79.36	-89.19	-116.3*
	(60.68)	(61.09)	(61.80)	(63.08)
magdollar		-0.0231	-0.0507	-0.0669
		(0.0495)	(0.0518)	(0.0519)
softgooddollar			0.0303	0.0238
			(0.0228)	(0.0223)
Seasonal fixed effects	N	N	Y	N
Monthly fixed effects	N	N	N	Y
Yearly fixed effects	N	N	N	N
Constant	220.5***	222.8***	195.5***	216.6***
	(25.36)	(25.92)	(59.42)	(50.20)
Observations	120	120	120	120
R-squared	0.126	0.128	0.156	0.258

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Distributed Lag North American Races

VARIABLES	(1) unitsales	(2) unitsales	(3) unitsales	(4) unitsales	(5) unitsales
naracep	-62.57	-75.51	-80.00	-96.46	-81.33
	(90.33)	(90.84)	(90.87)	(90.60)	(92.38)
lag1naracep	4.008	3.522	12.76	-12.03	3.725
	(51.64)	(51.54)	(52.23)	(53.64)	(56.97)
lag2naracep	20.46	11.96	9.736	-14.93	-9.116
	(50.80)	(51.22)	(51.23)	(52.87)	(56.21)
lag3naracep	-47.94	-41.34	-36.29	-66.33	-77.30
	(50.24)	(50.46)	(50.65)	(53.06)	(56.87)
lag4naracep	-14.54	-14.90	-18.73	-52.01	-41.12
	(50.18)	(50.09)	(50.19)	(52.73)	(59.63)
numnarace	89.04*	92.19*	85.70	86.02	111.6*
	(53.58)	(53.55)	(53.85)	(54.01)	(58.40)
lag1numnarace	3.752	0.713	-4.744	7.235	4.299
	(41.97)	(41.98)	(42.26)	(43.62)	(46.97)
lag2numnarace	46.67	55.37	57.52	68.64	67.82
	(40.93)	(41.52)	(41.54)	(43.13)	(45.19)
lag3numnarace	6.146	-2.491	-5.100	7.477	23.90
	(41.11)	(41.69)	(41.73)	(45.30)	(46.90)
lag4numnarace	3.773	2.954	5.709	25.44	21.13
	(40.49)	(40.43)	(40.48)	(42.21)	(44.14)
spect	-41.28	-39.80	-38.31	-39.30	-56.71**
	(25.30)	(25.29)	(25.31)	(25.24)	(27.02)
spectatorship_naracep	17.84	18.42	20.30	19.86	20.94
	(15.06)	(15.04)	(15.13)	(15.00)	(15.52)
top3finish	-65.16	-56.67	-67.80	-76.05	-69.20
	(66.91)	(67.18)	(67.93)	(67.42)	(69.12)
magdollar		-0.0582	-0.0683	-0.0844	-0.0882*
		(0.0495)	(0.0504)	(0.0510)	(0.0515)
softgooddollar			0.0247	0.0311	0.0225
			(0.0231)	(0.0234)	(0.0236)
Seasonal fixed effects	N	N	N	Y	N
Monthly fixed effects	N	N	N	N	Y
Yearly fixed effects	N	N	N	N	N
Constant	208.7***	216.5***	209.3***	166.4***	188.5***
	(20.53)	(21.55)	(22.56)	(50.45)	(48.32)
Observations	120	120	120	120	120
R-squared	0.102	0.113	0.123	0.165	0.232

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

ARDL All Races

VARIABLES	(1) unitsales	(2) unitsales	(3) unitsales	(4) unitsales	(5) unitsales
lag1unitsales	-0.0661	-0.0645	-0.0636	-0.0804	-0.0871
	(0.0931)	(0.0948)	(0.0948)	(0.0974)	(0.0955)
lag2unitsales	0.0488	0.0499	0.0539	0.0463	0.0588
	(0.0882)	(0.0892)	(0.0893)	(0.0907)	(0.0890)
lag3unitsales	0.312***	0.313***	0.306***	0.297***	0.314***
	(0.0820)	(0.0828)	(0.0830)	(0.0845)	(0.0846)
lag4unitsales	0.196**	0.195**	0.197**	0.199**	0.211**
	(0.0863)	(0.0867)	(0.0867)	(0.0886)	(0.0872)
racepar	-15.93	-15.86	-13.54	-22.48	-9.394
	(26.62)	(26.76)	(26.85)	(30.30)	(30.27)
lag1racepar	-13.52	-13.41	-11.63	-16.74	-0.547
	(25.38)	(25.52)	(25.58)	(26.81)	(29.11)
lag2racepar	25.31	25.93	23.32	17.20	7.539
	(25.70)	(26.45)	(26.58)	(28.01)	(29.07)
lag3racepar	-36.06	-36.21	-32.72	-39.57	-61.86**
	(26.09)	(26.25)	(26.47)	(27.90)	(30.59)
lag4racepar	-16.56	-16.63	-19.42	-22.05	-39.25
	(25.72)	(25.85)	(26.00)	(26.88)	(30.24)
numrace	50.77***	50.89***	50.04***	52.21***	52.55**
	(18.08)	(18.20)	(18.22)	(19.09)	(21.58)
lag1numrace	23.84	23.71	22.99	25.97	26.36
	(18.65)	(18.78)	(18.80)	(20.05)	(22.25)
lag2numrace	-10.34	-11.00	-9.257	-5.947	-13.21
	(18.41)	(19.44)	(19.52)	(20.76)	(24.62)
lag3numrace	-5.835	-5.596	-6.446	-2.589	-17.98
	(17.89)	(18.10)	(18.12)	(19.78)	(21.64)
lag4numrace	-24.19	-24.08	-23.65	-20.74	-46.83**
	(18.06)	(18.18)	(18.18)	(19.26)	(20.89)
top3finish	-100.6*	-101.0*	-107.8*	-108.6*	-123.1**
	(56.82)	(57.26)	(57.65)	(58.35)	(58.46)
magdollar		0.00524	-0.00394	-0.0168	-0.0231
		(0.0474)	(0.0483)	(0.0507)	(0.0503)
softgooddollar			0.0208	0.0233	0.0162
			(0.0208)	(0.0215)	(0.0207)
Seasonal fixed effects	N	N	N	Y	N
Monthly fixed effects	N	N	N	N	Y
Yearly fixed effects	N	N	N	N	N
Constant	106.4***	105.1**	98.85**	82.06	129.1**
	(39.64)	(41.61)	(42.07)	(65.09)	(54.39)
Observations	120	120	120	120	120
R-squared	0.276	0.276	0.283	0.290	0.396

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

ARDL North American Races

	(1)	(2)	(3)	(4)	(5)
VARIABLES	unitsales	unitsales	unitsales	unitsales	unitsales
lag1unitsales	0.00647	0.00249	0.00418	-0.0367	-0.0228
	(0.0966)	(0.0973)	(0.0974)	(0.1000)	(0.103)
lag2unitsales	0.0943	0.0901	0.0930	0.0743	0.123
	(0.0937)	(0.0944)	(0.0945)	(0.0958)	(0.0992)
lag3unitsales	0.271***	0.267***	0.260***	0.246***	0.247***
	(0.0854)	(0.0861)	(0.0866)	(0.0881)	(0.0921)
lag4unitsales	0.110	0.106	0.106	0.119	0.112
	(0.0918)	(0.0924)	(0.0925)	(0.0933)	(0.0969)
naracep	-50.30	-55.94	-59.85	-72.07	-48.29
	(85.99)	(87.03)	(87.23)	(87.87)	(89.37)
lag1naracep	-13.42	-13.37	-5.726	-25.36	0.541
	(49.77)	(49.96)	(50.74)	(52.74)	(55.19)
lag2naracep	7.048	3.732	2.265	-16.83	-0.0881
	(48.53)	(49.16)	(49.23)	(51.25)	(54.07)
lag3naracep	-46.58	-43.50	-39.80	-63.57	-72.52
	(48.31)	(48.87)	(49.10)	(51.91)	(55.37)
lag4naracep	-19.05	-19.33	-22.18	-46.11	-39.95
	(48.05)	(48.23)	(48.39)	(51.64)	(57.85)
numnarace	89.97*	91.07*	86.03	84.88	110.9*
	(52.11)	(52.34)	(52.70)	(53.17)	(57.70)
lag1numnarace	11.32	9.813	5.618	20.65	17.60
	(40.90)	(41.16)	(41.47)	(43.29)	(46.13)
lag2numnarace	57.63	61.18	62.51	75.59*	67.12
	(39.43)	(40.19)	(40.26)	(42.16)	(43.86)
lag3numnarace	9.454	5.677	3.724	21.89	31.66
	(39.80)	(40.65)	(40.75)	(44.89)	(45.84)
lag4numnarace	2.571	2.368	4.370	24.00	12.86
	(38.74)	(38.88)	(38.99)	(41.10)	(42.86)
spect	-41.03	-40.31	-39.31	-37.59	-55.65**
	(24.72)	(24.85)	(24.90)	(25.17)	(27.20)
spectatorship_naracep	14.85	15.20	16.75	16.33	16.91
	(14.43)	(14.50)	(14.62)	(14.63)	(15.11)
top3finish	-73.84	-70.30	-78.88	-85.64	-73.43
	(63.95)	(64.57)	(65.35)	(65.43)	(66.66)
magdollar		-0.0244	-0.0327	-0.0463	-0.0496
		(0.0485)	(0.0494)	(0.0512)	(0.0513)
softgooddollar			0.0198	0.0233	0.0165
			(0.0222)	(0.0227)	(0.0228)
Seasonal fixed effects	N	N	N	Y	N
Monthly fixed effects	N	N	N	N	Y
Yearly fixed effects	N	N	N	N	N
Constant	101.7***	108.6***	103.5**	65.98	99.44*
	(37.36)	(39.91)	(40.36)	(60.06)	(55.86)
Observations	120	120	120	120	120
R-squared	0.218	0.220	0.226	0.252	0.322

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Distributed Lag All Races

VARIABLES	(1) unitsales	(2) unitsales	(3) unitsales	(4) unitsales	(5) unitsales	(6) unitsales
racepar	13.15	-11.22	-25.34	-8.058	-15.15	-8.513
	-20.27	-26.68	-26.16	-28.55	-29.91	-30.68
lag1racepar			2.57	4.536	0.924	2.877
			-27.01	-27.04	-26.06	-29.52
lag2racepar			33.78	27.45	25.4	10.97
			-27.47	-28.21	-27.18	-29.59
lag3racepar			-34.03	-33.6	-47.80*	-63.61**
			-27.74	-28.18	-27.39	-31.27
lag4racepar			-11.35	-11.11	-19.29	-32.23
			-27.22	-27.49	-26.11	-30.84
numrace		27.41	42.33**	40.85**	50.56***	53.30**
		-19.62	-19.39	-19.38	-18.74	-21.84
lag1numrace			7.263	9.446	18.61	28.2
			-19.28	-19.38	-18.92	-22.03
lag2numrace			-22.85	-14.33	-9.975	-0.353
			-19.18	-20.32	-19.66	-24.58
lag3numrace			-2.045	-1.793	17.17	9.291
			-18.78	-18.99	-19.26	-22.24
lag4numrace			-18.9	-21.36	-7.569	-27.33
			-18.85	-18.95	-18.59	-21.22
top3finish				-87.92	-81.63	-112.3*
				-61.47	-58.2	-60.72
magdollar				-0.0341	0.0243	-0.00114
				-0.0504	-0.0507	-0.0511
softgooddollar				0.0253	0.0221	0.0182
				-0.0223	-0.0211	-0.0209
Seasonal fixed effects	N	N	N	N	Y	N
Monthly fixed effects	N	N	N	N	N	Y
Yearly fixed effects	N	N	N	N	Y	Y
Constant	218.0***	205.1***	222.9***	214.9***	232.3***	334.9***
	(16.28)	(18.68)	(25.39)	(26.78)	(57.98)	(74.67)
Observations	124	124	120	120	120	120
R-squared	0.003	0.019	0.111	0.138	0.316	0.384

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Distributed Lag North America

VARIABLES	(1) unitsales	(2) unitsales	(3) unitsales	(4) unitsales	(5) unitsales	(6) unitsales	(7) unitsales
naracep	-14.41	-36.72	-48.04	1.223	-65.49	-45.77	-27.27
	-29.99	-51.3	-50.04	-61.3	-90.26	-91.96	-93.17
lag1naracep			-6.022	2.109	11.6	-8.806	8.818
			-50.02	-50.16	-51.03	-51.15	-54.24
lag2naracep			30.35	18.01	13.4	-1.627	7.782
			-49.46	-50.06	-50.27	-51.08	-54.22
lag3naracep			-44.36	-51.69	-47.62	-72.89	-82.66
			-49.99	-50.07	-50.23	-50.86	-54.32
lag4naracep			-28.64	-16.61	-15.8	-40.4	-27.36
			-49.59	-50.15	-50.15	-51.41	-57.77
numnarace		22.19	36.49	78.32	96.40*	81.61	105.7*
		-41.33	-39.8	-49.9	-53.03	-51.5	-55.36
lag1numnarace			-1.963	-1.082	-6.543	14.61	10.08
			-40.41	-40.25	-40.61	-41.5	-44.62
lag2numnarace			31.72	39.76	46.22	62.11	57.57
			-40.15	-40.41	-40.91	-41.57	-43.38
lag3numnarace			-0.948	9.342	4.641	28.28	41.76
			-40.28	-40.8	-41.07	-43.36	-44.75
lag4numnarace			9.255	3.393	5.075	28.49	21.23
			-40.37	-40.43	-40.46	-41.19	-42.65
spect				-31.14	-42.58*	-33.42	-50.49*
				-22.56	-25.26	-24.1	-25.84
spectatorship_naracep					14.84	9.816	10.42
					-14.73	-14.55	-14.98
top3finish						-51.49	-45.07
						-65.23	-67.02
magdollar						-0.0142	-0.0184
						-0.0521	-0.0525
softgooddollar						0.0233	0.016
						-0.0221	-0.0223
Seasonal fixed effects	N	N	N	N	N	Y	N
Monthly fixed effects	N	N	N	N	N	N	Y
Yearly fixed effects	N	N	N	N	N	Y	Y
Constant	225.0***	222.2***	209.8***	207.6***	208.7***	224.2***	288.7***
	(15.70)	(16.61)	(20.52)	(20.50)	(20.53)	(55.91)	(58.57)
Observations	124	124	120	120	120	120	120
R-squared	0.002	0.004	0.069	0.085	0.094	0.294	0.355

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

ARDL All Races

VARIABLES	(1) unitsales	(2) unitsales	(3) unitsales	(4) unitsales	(5) unitsales	(6) unitsales
lag1unitsales	-0.0154	-0.00399	-0.0622	-0.0636	-0.191*	-0.187*
	-0.0916	-0.09	-0.0941	-0.0948	-0.0989	-0.102
lag2unitsales	0.0363	0.0441	0.0636	0.0539	-0.1	-0.0711
	-0.0889	-0.0872	-0.0887	-0.0893	-0.0971	-0.103
lag3unitsales	0.260***	0.281***	0.305***	0.306***	0.151	0.190*
	-0.0828	-0.0817	-0.0827	-0.083	-0.0918	-0.0982
lag4unitsales	0.157*	0.154*	0.180**	0.197**	0.0962	0.131
	-0.0863	-0.0846	-0.0867	-0.0867	-0.0906	-0.0921
racepar	13.62	-23.32	-34.56	-13.54	-11.8	-3.466
	-18.64	-24.07	-24.7	-26.85	-29.69	-30.35
lag1racepar			-13.76	-11.63	-11.89	-0.6
			-25.63	-25.58	-25.99	-28.82
lag2racepar			26.62	23.32	18.53	11.13
			-25.95	-26.58	-27.06	-28.95
lag3racepar			-30.95	-32.72	-40.69	-57.51*
			-26.19	-26.47	-26.98	-30.85
lag4racepar			-21.06	-19.42	-25.08	-37.83
			-25.85	-26	-26.08	-30.56
numrace		41.88**	51.10***	50.04***	51.73***	55.98**
		-17.75	-18.27	-18.22	-18.47	-21.26
lag1numrace			20.38	22.99	31.12	38.10*
			-18.74	-18.8	-19.38	-22.63
lag2numrace			-15.32	-9.257	2.086	3.562
			-18.37	-19.52	-20.15	-25.8
lag3numrace			-8.864	-6.446	10.42	0.515
			-17.98	-18.12	-19.42	-23.07
lag4numrace			-19.98	-23.65	-12.35	-33.42
			-18.09	-18.18	-18.71	-21.33
top3finish				-107.8*	-92.86	-118.6**
				-57.65	-57.53	-59.37
magdollar				-0.00394	0.0129	-0.00704
				-0.0483	-0.0502	-0.0504
softgooddollar				0.0208	0.0186	0.0143
				-0.0208	-0.0207	-0.0205
Seasonal fixed effects	N	N	N	N	Y	N
Monthly fixed effects	N	N	N	N	N	Y
Yearly fixed effects	N	N	N	N	Y	Y
Constant	112.9***	84.02**	110.5***	98.85**	229.8***	281.5***
	(34.95)	(36.39)	(39.97)	(42.07)	(78.68)	(93.70)
Observations	120	120	120	120	120	120
R-squared	0.121	0.162	0.254	0.283	0.370	0.443

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

ARDL North American Races

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
VARIABLES	unitsales	unitsales	unitsales	unitsales	unitsales	unitsales	unitsales
lag1unitsales	-0.0199	-0.0116	0.00978	0.0172	0.0157	-0.142	-0.125
	(0.0917)	(0.0924)	(0.0968)	(0.0963)	(0.0965)	(0.103)	(0.107)
lag2unitsales	0.0514	0.0482	0.0649	0.0917	0.0967	-0.0739	-0.0199
	(0.0890)	(0.0892)	(0.0924)	(0.0934)	(0.0938)	(0.104)	(0.110)
lag3unitsales	0.256***	0.260***	0.272***	0.270***	0.267***	0.122	0.135
	(0.0831)	(0.0834)	(0.0857)	(0.0852)	(0.0854)	(0.0944)	(0.0994)
lag4unitsales	0.171*	0.164*	0.124	0.111	0.104	0.0273	0.0322
	(0.0872)	(0.0877)	(0.0915)	(0.0912)	(0.0918)	(0.0962)	(0.101)
naracep	-16.61	-46.79	-55.16	-2.738	-53.87	-38.48	-22.99
	(27.87)	(46.57)	(48.09)	(58.75)	(86.08)	(92.32)	(93.77)
lag1naracep			-19.04	-11.41	-4.212	-20.77	2.163
			(48.38)	(48.33)	(49.21)	(52.06)	(54.88)
lag2naracep			14.39	2.560	-0.582	-8.542	8.178
			(47.60)	(47.93)	(48.16)	(51.25)	(54.46)
lag3naracep			-42.08	-49.92	-46.50	-65.57	-71.25
			(48.16)	(48.13)	(48.39)	(51.47)	(55.29)
lag4naracep			-32.57	-20.47	-20.15	-48.32	-39.45
			(47.69)	(48.04)	(48.12)	(51.81)	(58.41)
numnarace		30.65	39.42	84.76*	99.21*	71.33	97.34*
		(37.85)	(38.49)	(48.34)	(51.57)	(52.54)	(57.27)
lag1numnarace			1.575	3.450	-0.686	19.78	17.16
			(39.46)	(39.23)	(39.62)	(42.60)	(45.80)
lag2numnarace			43.99	52.13	57.07	72.00*	64.17
			(38.84)	(38.95)	(39.49)	(41.95)	(43.84)
lag3numnarace			0.731	11.20	7.347	34.43	42.62
			(39.13)	(39.48)	(39.83)	(44.31)	(45.60)
lag4numnarace			9.574	2.809	4.036	36.05	25.73
			(38.68)	(38.69)	(38.78)	(41.44)	(43.29)
spect				-33.64	-42.84*	-26.24	-45.49
				(21.93)	(24.71)	(25.01)	(27.37)
spectatorship_naracep					11.53	8.594	10.58
					(14.16)	(14.68)	(15.17)
top3finish						-58.80	-51.69
						(65.42)	(67.41)
magdollar						-0.0130	-0.0188
						(0.0522)	(0.0528)
softgooddollar						0.0193	0.0142
						(0.0222)	(0.0224)
Seasonal fixed effects	N	N	N	N	N	Y	N
Monthly fixed effects	N	N	N	N	N	N	Y
Yearly fixed effects	N	N	N	N	N	Y	Y
Constant	116.3***	111.6***	105.3***	99.19***	101.5***	227.9***	280.2***
	(34.83)	(35.36)	(37.27)	(37.25)	(37.42)	(84.49)	(92.64)
Observations	120	120	120	120	120	120	120
R-squared	0.119	0.124	0.185	0.203	0.208	0.326	0.380

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

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