The Value of the Pole: Evidence from NASCAR

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Abstract

This paper investigates the value of the pole-position over the history of NASCAR. Early in the sport's history, the pole-sitter enjoyed a considerable advantage over other racers both in terms of the probability of winning a race and in the percentage of a race's purse won. Over time, however, the probability of the pole-sitter winning a particular race has declined considerably, especially in the so-called modern era of NASCAR during which time the sport has intentionally pursued parity amongst drivers and teams. While the odds that the pole-sitter wins a race have declined over time, the expected value of winning the pole has increased, caused by the increased popularity of NASCAR and the corresponding increase in race purses.
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Preliminary results: *Caveat Emptor*

Introduction

The pole position is the most venerated starting position in motor sports. The pole position is most often awarded to the driver with the fastest qualifying time and rewards the driver with explicit and implicit advantages. However, the value of the pole position varies across different types of racing. In Formula One, overtaking (passing) is relatively rare; in 2004 the pole sitter won sixty percent, eleven of eighteen, races. On the other hand, in NASCAR passing is much more common and in 2004 the pole-sitter won eleven percent, four of thirty-five, races. This paper focuses on the value of holding the pole position in a NASCAR race in as much as the pole position increases a driver's probability of winning the race. It is shown that during the modern era, that is, after 1972, the probability that the pole winner will actually win the race has steadily declined. This is in contrast to the pre-modern era where winning the pole often conveyed up to a thirty percent chance that a driver would win the particular race.

If the odds of a pole winner actually winning a race are not improving, why do drivers still chase after the pole position? This paper shows that although the odds that the pole position wins a particular race has been decreasing over time, the expected value of the pole position as measured in real dollars has been increasing over time.

The Pole Position in NASCAR

The typical National Association of Stock Car Automobile Racing (NASCAR) race has forty-three starting positions. In recent years, up to thirty-five of these positions have been guaranteed to owners in the top of the owners' points rankings. This is ostensibly aimed at encouraging owners to race the same cars (and drivers) week after week. The remaining slots are awarded on a performance-based system: the fastest qualifiers are allowed to start the race

and the remaining contenders are not allowed to race that week (the forty-third slot is often reserved for the Champions Slot, which is awarded to any previous NASCAR champion who wishes to race but did not qualify on owners points or on time; otherwise, the last position is awarded to the eighth fastest non-guaranteed qualifier).

Whether a driver's slot is awarded through guarantee or not, each driver's starting position (one through forty-three) is determined during qualifying. The order of qualifying is determined by random draw before each race. During the predetermined qualifying period, each driver is given roughly one lap to obtain their top speed and then are given two laps "under green" during which time the driver attempts to post his fastest time possible. Each car is slated from one to forty-two according to their time; the forty-third slot possibly reserved for a non-qualifying previous NASCAR champion.

It is possible for cars that qualify for one position to start in another. If a driver or car is found to be in violation of any NASCAR rules, the driver cannot start the race, or the car undergoes any alteration between qualifying and the start of the race, e.g., an engine or transmission is replaced, the car is relegated to the forty-third position and the appropriate cars are moved up one spot on the starting grid.

The NASCAR starting grid is most often comprised of twenty-one rows of two vehicles each, the forty-third car comprising its own row. The fastest qualifier is awarded the inside of the first row, the so-called "pole position." The pole is a vaunted position in NASCAR, often associated with cash bonuses from the race sponsor, the driver's sponsor and, perhaps, the car's owner. Beyond the cash prize associated with the pole position, there are considerable advantages to the driver and team in that position.

The driver in the pole position holds the inside position on the first turn, ostensibly reducing the length of a particular lap and, on many tracks, allowing the driver to enter and exit the four turns on an oval track at a higher speed. Furthermore, because the pole winner is at the front of the starting grid, the driver is able to drive in "clean air," whereas drivers in the pack must attempt to draft other cars in order to avoid the speed-reducing turbulence created by the other cars (Ronfeldt, 2000).

There are also practical reasons for the pole position award; it is safer for all drivers for the fastest qualifiers to start in the front. This reduces the need for faster cars to pass slower cars early in the race, thereby reducing the potential for race-ending crashes for many of the drivers in the race. The fans are also served by having the starting grid determined by the time of qualifying so that neighboring drivers are at or near parity, thereby creating any number of "races within the race."

Notwithstanding the background of the pole position, there seems to be no research investigating whether the value of the pole has been changing over time, whether in NASCAR or any other racing circuit. The question is pertinent for several reasons. If the odds of winning a race are not substantially improved by holding the pole position, this might reduce the incentive for drivers to seek the pole. On the other hand, if the odds of finishing a race are improved by winning the pole, this would increase the incentives for securing the quickest qualifying time. Notwithstanding the various specific cash incentives provided to drivers, it is not immediately clear that winning the pole position is nearly as important as it is in other racing circuits, most notably Formula One.

There are several reasons to suspect that the pole position is of less importance in winning a modern NASCAR race, including the standardization of the cars, relative parity of

driver and team quality (at least amongst the top fifty percent of teams), the long length of most races, the nature of the race tracks typically used in NASCAR, and the resultant frequency of "overtaking," or passing. Therefore, the question asked in this paper is two fold. First, what is the average dollars won by the pole winner over time, after controlling for driver specific heterogeneity (namely undocumented incentives). Second, what is the conditional probability that the pole-winner will actually win a particular NASCAR race? To preview the empirical results, since the so-called modern era of NASCAR began in 1973, the odds of the pole winner actually winning the race have steadily declined; this is in contrast with the pre-modern trend in which the pole winner had an up to thirty percent increase in the odds of winning a race. However, over time the expected value of the pole position, as reflected in the average winnings of the race winner (and not the other positions of finish), has been steadily increasing over time.

The Value of the Pole Position: Empirical Models and Data

To determine the value of the pole, data describing every driver outcome for NASCAR's premier racing circuit (Grand National, Winston Cub, and Nextel Cup) and data describing every race are employed. The empirical model entails a two-step process. First, I estimate a probit model relating a dummy variable that estimates the odds that a particular driver will win a NASCAR race. This model is used to determine the conditional marginal probability that the pole sitter wins a particular race in a particular year. The second stage of the analysis estimates the average real earnings for each race winner during the sample period. The results of the second stage suggest how much money the average race winner earned in during a given year.

The results from the two stages are combined to estimate the expected value of the pole position *with respect to winning.* Earning the pole position conveys more advantages than simply increasing the odds of winning, including increasing the odds of finishing, and so forth. Therefore, the estimated value of the pole in this exercise is biased down because I do not consider the value of the pole position with respect to the average earnings of finishing second, third, fourth, and so on.

The data were obtained from NASAR and describe 70,845 driver-outcomes from 1949 through 2005, and 2,102 race outcomes during the same time period. The descriptive statistics of the two samples employed are provided in Table 1. During the sample period, the pole winner won approximately 22% of all races and the race winner averaged $70,185 in real earnings. However, average race-winner earnings can be misleading as the overall average includes a considerable period of time during which NASCAR drivers did not receive large compensation. In the pre-modern era (before 1973), the 1,074 race winners averaged $4,393 in real earnings, while in the modern era (post 1972), the 1,028 race winners averaged $111,984 in real earnings, reflecting the dramatic increase in the popularity and revenue-potential of NASCAR races. In the full sample of driver outcomes, 56% of the observations correspond to the modern era and 25% of all observations correspond to driver owners.

Table 2 provides three selected cross-tabulations. The first indicates the number of owner-drivers in the modern and pre-modern eras. Before the rules were standardized, owner-drivers accounted for approximately 35% of all driver-outcomes, whereas during the modern era the number of driver-owners increased to approximately 44%. The second cross-tabulation shows that of 2,102 races held between 1949 and 2005, 480 pole-sitters won or

approximately 23% of all races but represent only one-half of one percent of all driver outcomes.,

The first stage probit analysis uses the 70,845 driver-outcome observations. For each race, a year indicator variable is interacted with a dummy variable that takes a value of one for the pole sitter. These interactions reveal the average marginal advantage a pole-sitter enjoys during a given year. I also include a dummy variable that takes a value of one if the race occurs in the modern era and a dummy variable that takes a value of one if the driver is also the car owner. The modern era dummy variable is included to control for the increased parity and competitive balance in NASCAR in the modern era, which should correspond with a decrease in the odds that the pole sitter would win a particular race. The driver-owner dummy variable is included to control for team and driver quality; those drivers who own their own car may be of lower quality than those who are hired by third-party team owners.

The first column of Table 2 reports the probit estimation results. The vast majority of the estimated parameters are statistically significant and positive, suggesting that the pole-sitter does have an additional advantage in NASCAR. However, this advantage has been changing over time and was systematically reduced after NASCAR standardized the rules under which cars, drivers and owners operated, as reflected in the negative parameter estimate on the modern era dummy variable. Finally, driver-owners have reduced odds of winning a particular race.

The estimated parameters from the probit analysis do not reflect the actual marginal probability, although the signs are indicative of the qualitative impact of a variable on the odds that a driver will win a race. The second column of Table 3 reports the estimated marginal effect, where the marginal impacts of the dummy variables are calculated by taking

the difference between the estimated probabilities that a driver wins a race when the particular variable takes a value of zero and when it takes a value of one. As can be seen, the marginal probability that the pole-sitter wins a race has been rather steadily declining over time. Figure 1 plots the estimated marginal probability that the pole-sitter wins a NASCAR race in each year for 1950-2005; the downward trend is clearly visible.

Even if the odds of the pole-sitter winning a particular race are dropping, it does not necessarily indicate the overall expected value of the pole position is dropping. The second part of the analysis entails estimating the average real earnings for each race winner in 2,102 races over the sample period. These results are reported in column 3 in Table 3; for comparison purposes, column 4 reports the average real earnings for all drivers over the sample period. The real earnings by race winners have been increasing over time, especially in the latter years of the sample, reflecting the increased popularity and revenue potential of NASCAR races.

The expected value of the pole position, in as much as the pole position provides an added advantage in winning the race, is calculated by multiplying the marginal probability that a pole-sitter will win during a given year by the average race-winner earnings during that same year. The fourth column in Table 3 reports the expected value of the pole position. Indeed, although the odds of a pole-sitter winning a particular race has been declining over time, the expected value of the pole-position has been increasing. This positive trend is depicted in Figure 2.

The final column of Table 2 reports estimation results for a specification in which the dependent variable is the percentage of the total race purse won by the pole. This dependent variable normalizes the winnings of each position by the overall size of the purse; essentially

controlling for the changes in the popularity of NASCAR races over time. The results suggest that the percentage of the overall purse won by the pole has been steadily declining over time; the negative time trend is depicted in Figure 3.

The estimation results reported in Table 3 actually understate the actual expected value of holding the pole position. The pole position likely confers an increased probability of finishing the race on the lead lap and of finishing the race in the top ten. Therefore, the expected value of the pole position not only includes the expected value of winning but also the expected value of finishing second, third, and so forth. These additional marginal probabilities have not been calculated and therefore have not been included in the expected value calculation.

Conclusions

The pole position is the most venerated starting position in motor sports. The order of start conveys certain advantages to the individual driver and to all drivers as a group, including increased safety. This rather innocuous paper provides an initial estimation of the value of the pole position in the National Association for Stock Car Auto Racing (NASCAR). I do so by taking an admittedly naïve two-step approach. The first is to estimate the annual average odds that a pole-sitter wins a particular race. Combining the estimated advantage the pole-position conveys with the estimated average real earnings of race winners in a given year, the expected value of the pole-position is calculated.

This two-step approach is applied to 70,845 driver-outcomes from NASCAR races from 1949 through 2005. The odds that the pole-sitter wins have been steadily declining over time and the standardization which NASCAR introduced in 1973 systematically reduced the advantage enjoyed by the pole position. The reduction in the odds of winning might reduce

the incentives for individuals to pursue the pole position. However, the results suggest that the expected value of the pole position has been increasing over the sample period, especially during the latter years of the sample as NASCAR became much more popular and lucrative.

References

Ronfeldt, David (2000), Social Science at 190 MPH on NASCAR's Biggest Superspeedways," *First Monday*, 5(2), http://firstmonday.org/issues/issue5_2/ronfeldt/index.html, last accessed September 2007.

Table 1: Descriptive Statistics

Variable	Mean	Std. Dev.	Min	Max
Winner (1=Yes) [a]	0.029	0.169	0	1
Pole Sitter (1=Yes) [a]	0.029	0.169	0	1
Pole Sitter Wins (1=Yes) [b]	0.221	0.419	0	1
Modern Era (1=Yes) [a]	0.566	0.495	0	1
Driver Owner (1=Yes) [a]	0.250	0.433	0	1
Real Earnings of Race Winner [b]	70,185.47	116,922	548.24	1,511,584
Real Earnings of All Drivers [b]	20,056.73	39,331	0.00	1,511,584

Notes: [a] Sample size consists of 70,845 driver outcomes. [b] Sample size consists of 2,102 race outcomes. Driver earnings converted to 2005 dollars using the consumer price index.

Table 2: Select Cross-Tabulations

		Modern Era		
		No	Yes	Total
Owner Driver	No	19,875	33,241	53,116
	Yes	10,850	17,729	28,579
	Total	30,725	40,120	70,845
		Race Winner		
		No	Yes	Total
Pole Sitter	No	67,127	1,616	68,743
	Yes	1,622	480	2,102
	Total	70,365	480	70,845

Table 3: Estimation Results and Expected Value of Winning the Pole in NASCAR

Year	Winner (1=Yes)[a]	Marginal Effect (dWin/dX)	Real Earnings (Winners)	Real Earnings (All)	Expected Value of Pole	Percent of Purse Won by Pole
1950	1.072***	0.16	10,359***	1,078***	1,622.59	0.076***
	(0.32)		(2935)	(136)		(0.008)
1951	1.664***	0.35	7,567***	811.9***	2,646.88	0.114***
	(0.21)		(1194)	(59.5)		(0.005)
1952	1.545***	0.31	8,162***	967.5***	2,494.23	0.095***
	(0.23)		(1507)	(81.1)		(0.006)
1953	1.158***	0.18	7,099***	1,007***	1,278.16	0.090***
	(0.26)		(911)	(66.5)		(0.006)
1954	1.425***	0.26	7,511***	940.2***	1,979.01	0.092***
	(0.23)		(927)	(63.9)		(0.006)
1955	1.553***	0.31	7,269***	1,091***	2,244.00	0.104***
	(0.19)		(839)	(59.2)		(0.005)
1956	1.351***	0.24	7,977***	1,171***	1,905.10	0.086***
	(0.18)		(1129)	(65.5)		(0.004)
1957	1.228***	0.20	7,313***	1,267***	1,465.26	0.061***
	(0.20)		(1338)	(76.3)		(0.005)
1958	1.414***	0.26	7,185***	1,133***	1,865.05	0.058***
	(0.20)		(1411)	(71.8)		(0.005)
1959	1.131***	0.17	9,939***	1,403***	1,715.61	0.038***
	(0.23)		(2722)	(129)		(0.005)
1960	1.364***	0.24	18,609***	2,382***	4,525.15	0.068***
	(0.21)		(4471)	(215)		(0.005)
1961	1.125***	0.17	16,152***	2,273***	2,760.49	0.064***
	(0.20)		(3524)	(174)		(0.005)
1962	1.168***	0.18	16,495***	2,438***	3,015.16	0.069***
	(0.20)		(3763)	(194)		(0.005)
1963	1.074***	0.16	19,074***	2,912***	2,996.69	0.066***
	(0.19)		(3946)	(217)		(0.004)
1964	1.378***	0.25	18,258***	2,724***	4,522.26	0.083***
	(0.17)		(3718)	(187)		(0.004)
1965	1.427***	0.26	19,007***	2,851***	5,022.18	0.087***
	(0.18)		(3860)	(191)		(0.004)
1966	1.538***	0.30	23,358***	3,017***	7,082.61	0.079***
	(0.18)		(4515)	(202)		(0.005)
1967	1.588***	0.32	27,132***	3,486***	8,720.01	0.101***
	(0.18)		(5807)	(255)		(0.005)
1968	1.255***	0.21	26,370***	3,461***	5,495.39	0.082***
	(0.19)		(5475)	(246)		(0.005)
1969	1.440***	0.27	30,438***	4,375***	8,176.27	0.070***
	(0.18)		(4799)	(232)		(0.004)
1970	1.363***	0.24	35,724***	4,731***	8,672.28	0.066***
	(0.19)		(5666)	(261)		(0.005)
1971	1.451***	0.27	36,912***	4,642***	10,050.55	0.071***
	(0.19)		(5740)	(252)		(0.005)
1972	1.268***	0.21	53,766***	6,998***	11,431.64	0.093***
	(0.24)		(5327)	(322)		(0.006)
1973	1.589***	0.32	49,778***	7,035***	16,024.00	0.083***
	(0.25)		(5468)	(322)		(0.006)

1974	1.398***	0.25	48798***	7,484***	12,416.79	0.082***
	(0.25)		(3719)	(314)		(0.006)
1975	1.270***	0.21	47,486***	7,680***	10,121.40	0.073***
	(0.26)		(4293)	(332)		(0.006)
1976	1.339***	0.23	49,281***	8,539***	11,579.16	0.064***
	(0.25)		(4383)	(355)		(0.006)
1977	1.005***	0.14	51,672***	8,606***	7,219.40	0.061***
	(0.27)		(5855)	(380)		(0.006)
1978	0.862***	0.11	50,260***	8,818***	5,368.80	0.058***
	(0.29)		(4200)	(365)		(0.006)
1979	0.662**	0.07	49,410***	9,154***	3,413.40	0.056***
	(0.31)		(4652)	(382)		(0.006)
1980	1.209***	0.19	49,994***	8,923***	9,740.26	0.071***
	(0.25)		(5344)	(371)		(0.006)
1981	1.513***	0.29	48,259***	9,357***	14,206.04	0.062***
	(0.23)		(4586)	(385)		(0.006)
1982	1.120***	0.17	55,102***	10,610***	9,342.86	0.052***
	(0.26)		(5615)	(411)		(0.006)
1983	0.680**	0.07	53,697***	10,557***	3,877.18	0.041***
	(0.31)		(4914)	(408)		(0.006)
1984	1.339***	0.23	63,097***	11,492***	14,825.37	0.067***
	(0.25)		(6791)	(451)		(0.006)
1985	1.396***	0.25	123,227**	13,834***	31,265.56	0.101***
	(0.25)		(51788)	(1527)		(0.006)
1986	1.017***	0.14	80,878***	13,337***	11,533.43	0.048***
	(0.28)		(7731)	(542)		(0.006)
1987	0.733**	0.08	82,105***	13,467***	6,689.73	0.045***
	(0.31)		(7623)	(546)		(0.006)
1988	0.918***	0.12	85,420***	13,965***	10,177.22	0.046***
	(0.29)		(7457)	(546)		(0.006)
1989	0.207	0.01	88,596***	14,606***	1,245.82	0.035***
	(0.45)		(6539)	(578)		(0.006)
1990	1.156***	0.18	108,816***	16,149***	19,547.96	0.073***
	(0.26)		(12738)	(687)		(0.006)
1991	0.522	0.05	97,889***	16,587***	4,695.88	0.034***
	(0.36)		(8921)	(619)		(0.006)
1992	0.977***	0.13	108,636***	19,139***	14,415.33	0.049***
	(0.30)		(12109)	(692)		(0.006)
1993	1.120***	0.17	93,864***	20,417***	15,915.10	0.045***
	(0.26)		(8782)	(587)		(0.006)
1994	1.303***	0.22	117,695***	23,198***	26,293.59	0.040***
	(0.26)		(20603)	(823)		(0.006)
1995	0.885***	0.11	127,808***	28,852***	14,277.58	0.034***
	(0.29)		(19068)	(915)		(0.006)
1996	0.831***	0.10	145,444***	32,131***	14,596.23	0.035***
	(0.29)		(20219)	(936)		(0.006)
1997	0.842***	0.10	157,947***	37,404***	16,218.69	0.018***
	(0.28)		(19142)	(932)		(0.006)
1998	1.163***	0.18	198,126***	46,918***	35,941.82	0.027***
	(0.25)		(34419)	(1320)		(0.006)
1999	0.784***	0.09	206,426***	54,077***	18,807.96	0.018***
	(0.28)		(36017)	(1375)		(0.006)
2000	0.610**	0.06	215,134***	57,692***	13,085.51	0.013**
	(0.30)		(39309)	(1489)		(0.006)

2001	0.579*	0.06	233,581***	73,838***	13,101.42	0.011*
	(0.30)		(32800)	(1480)		(0.006)
2002	0.741***	0.08	234,471***	80,361***	19,451.59	0.008
	(0.28)		(34076)	(1506)		(0.006)
2003	0.876***	0.11	235,769***	87,123***	25,917.18	0.008
	(0.26)		(32631)	(1501)		(0.006)
2004	0.741***	0.08	283,209***	94,217***	23,494.91	0.011*
	(0.28)		(34139)	(1637)		(0.006)
2005	0.741***	0.08	292,076***	103,555***	24,230.52	0.010*
	(0.28)		(32816)	(1670)		(0.006)
Modern Era	-0.141***	-0.01				-0.007***
	(0.021)					(0.0003)
Driver Owner	-0.480***	-0.02				
	(0.029)					
Constant	-1.821***					0.032***
	(0.016)					(0.0002)
Observations	70,845		2,102	70,845		70,845
R-squared	0.091		0.58	0.59		0.10

Notes: [a] Year dummy variables are interacted with pole-sitter dummy variable; parameters represent marginal conditional probability that the pole sitter wins a race in a particular year. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Figure 1: Estimated Odds that Pole-Sitter Wins Race (Annual)

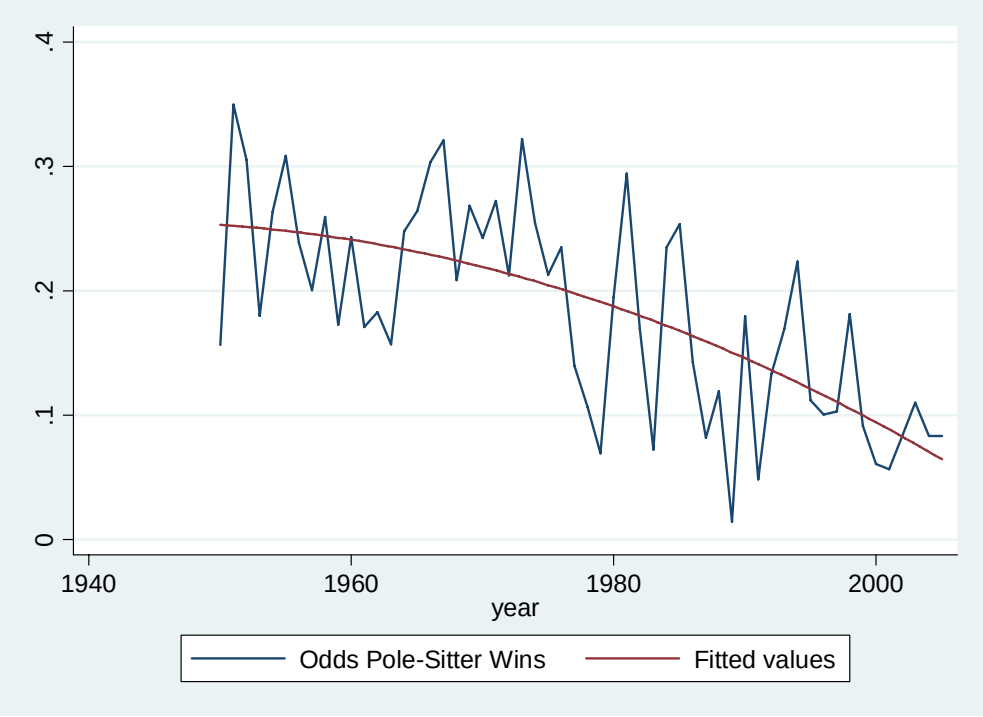

Figure 2: Estimated Expected Value of Pole Sitter Winning

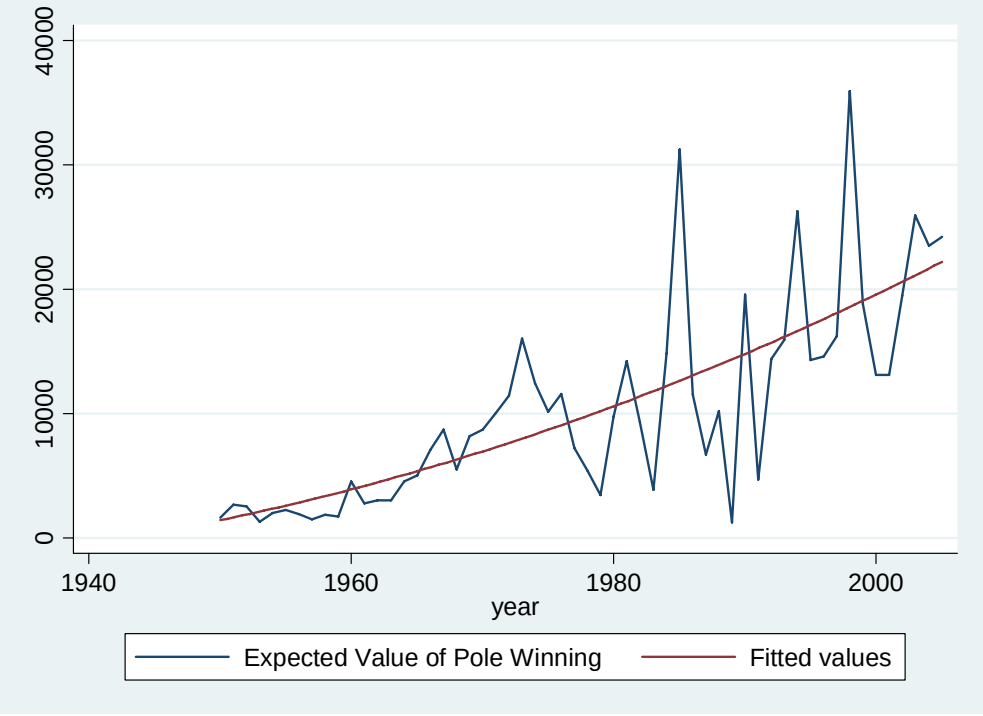

Figure 3: Percentage of Purse Won by Pole-Sitter