

Home Hill Advantage
in
Eastern Collegiate Ski Racing

by

Kellan M. Florio '05
Jacob A. Whitcomb '06
Paul M. Sommers

July 2005

MIDDLEBURY COLLEGE ECONOMICS DISCUSSION PAPER NO. 05-12



DEPARTMENT OF ECONOMICS
MIDDLEBURY COLLEGE
MIDDLEBURY, VERMONT 05753

<http://www.middlebury.edu/~econ>

**Home Hill Advantage
in
Eastern Collegiate Ski Racing**

by

Kellan M. Florio
Jacob A. Whitcomb
Paul M. Sommers

Department of Economics
Middlebury College
Middlebury, Vermont 05753
psommers@middlebury.edu

Home Hill Advantage in Eastern Collegiate Ski Racing

While many people have already studied the home field or home court advantage in various sports, we propose to analyze the home hill advantage in eastern collegiate ski racing. Each year, four schools — the University of Vermont (hereafter, UVM), Dartmouth College (in New Hampshire), Williams College (Massachusetts), and Middlebury College (Vermont) — host their own winter carnivals. Two additional carnivals rotate on an annual basis among other schools on the eastern college circuit.

Do schools score significantly more points at home than they do away? Is the home hill advantage stronger for men than for women? And, does the home hill advantage carry over to all contested events? The “Allen Trail” at the Middlebury College carnival, for example, is used for giant slalom competitions. A steep upper section opens up onto flats, where racers familiar with the trail know they should ride a “flat ski” to maintain speed from the upper pitch. Following the flat section, skiers face tricky fall-away turns with bumps and rolls often hidden by shadows as the finish line comes into sight. Skiers who train each day on the same slopes should have an edge in the winter carnivals they host not only because they are encouraged by a supportive crowd, but because they should be able to take advantage of their own hill’s peculiarities better than any visiting team can.

To test for a home hill advantage we begin by examining the results of six eastern collegiate carnivals each year, 2001 through 2005. NCAA points are awarded to the top 30 finishers in the men’s and women’s giant slalom and slalom.¹ All eastern collegiate winter carnival results are from www.eisaskiing.org.

Tables 1 through 4 summarize the NCAA team point totals for each of four schools (UVM, Dartmouth, Williams, and Middlebury) between 2001 and 2005 in four different Alpine

events: women's giant slalom (Table 1), men's giant slalom (Table 2), women's slalom (Table 3), and men's slalom (Table 4).² We note that Williams College did not hold any slalom races at its home carnival in 2003; rather, two giant slalom races were contested on consecutive days. And, that same year, St. Lawrence University did not hold any giant slalom races at its winter carnival; rather, two slalom races were contested on consecutive days.

To test the null hypothesis of no home hill advantage, we divided a school's team point total at its home carnival (one per year) by the same school's team point total at away carnivals (five per year), yielding five values per season. The assumption that there is no home hill advantage can be put in the form:

$$H_0: \mu = 1$$

$$H_1: \mu > 1$$

If H_0 is false, then the average ratio of a school's home carnival team score to an away carnival team score should be significantly greater than 1.0 (here, α is chosen to be .05).

Table 5 summarizes the results of the one-sample one-tailed t -tests on the average ratio of home carnival team scores to away carnival team scores. Over the last three (or even five) years, UVM (a dominant Division I school in alpine skiing) has not enjoyed a home hill advantage in any one of the four events. By contrast, Middlebury College has, an advantage that has become even stronger in the last three years examined. Between 2001 and 2005, Dartmouth's home hill advantage has been confined to slalom events.

Concluding Remarks

Like snowflakes, no two slalom (or giant slalom) courses are alike. By shifting a single pair of gates a few feet, one can dramatically alter a racer's run. Familiarity with the terrain of a particular slope surely helps host team racers to know how best to negotiate the turns in order to achieve the fastest possible speed.

A review of the eastern collegiate winter carnival race results for the period 2001 through 2005 shows that some colleges (notably, Middlebury College) do indeed benefit from a home hill advantage. The Middlebury College advantage has been statistically discernible for women racers in both slalom and giant slalom. This advantage raises the question whether it is fair for the Middlebury College carnival to double as the site of the Eastern Intercollegiate Ski Association (EISA) Championships. UVM made this argument in the 1980s and hosted the EISA Championships for one year, but questionable management led to reassignment of the competition back to Middlebury College.

Table 1. Women's Giant Slalom, 2001-

Year	Carnival Site	Away Carnivals				Home Carnivals			
		UVM	DAR	WIL	MIDD	UVM	DAR	WIL	MIDD
	<i>UVM</i>		142	25	176	214			
	<i>Dartmouth</i>	157		33	272		99		
	<i>Williams</i>	290	131		114			67	
	<i>Middlebury</i>	193	113	26					237
	Bates	235	182	17	129				
	St. Michaels	298	161	36	113				
2004	<i>UVM</i>		83	65	122	195			
	<i>Dartmouth</i>	321		65	102		142		
	<i>Williams</i>	190	89		138			102	
	<i>Middlebury</i>	231	79	86					218
	St. Lawrence	235	99	65	99				
	Colby	196	99	58	142				
2003	<i>UVM</i>		67	80	43	297			
	<i>Dartmouth</i>	335		93	69		69		
	<i>Williams</i>	303 ^a	62 ^a		57 ^a			76 ^a	
	<i>Middlebury</i>	294	58	47					155
	UNH	304	99	93	98				
	St. Lawrence ^b	---	---	---	---				
2002	<i>UVM</i>		120	37	135	258			
	<i>Dartmouth</i>	223		23	147		142		
	<i>Williams</i>	212	84		189			13	
	<i>Middlebury</i>	125	118	34					263
	Bates	202	128	31	156				
	St. Lawrence	184	178	66	87				
2001	<i>UVM</i>		99	104	67	312			
	<i>Dartmouth</i>	286		60	132		89		
	<i>Williams</i>	312	105		83			55	
	<i>Middlebury</i>	278	152	37					105
	Colby	270	152	72	108				
	St. Lawrence	350	125	69	54				

^aAverage giant slalom scores on two consecutive days.

^bNo giant slalom events were run.

Table 2. Men's Giant Slalom, 2001-

Year	Carnival Site	Away Carnivals				Home Carnivals			
		UVM	DAR	WIL	MIDD	UVM	DAR	WIL	MIDD
	<i>UVM</i>		192	90	83	99			
	<i>Dartmouth</i>	141		31	100		209		
	<i>Williams</i>	66	128		175			164	
	<i>Middlebury</i>	125	130	61					147
	Bates	142	212	63	116				
	St. Michaels	167	219	82	67				
2004	<i>UVM</i>		108	23	207	175			
	<i>Dartmouth</i>	217		47	188		169		
	<i>Williams</i>	223	148		169			73	
	<i>Middlebury</i>	154	100	34					326
	St. Lawrence	218	138	65	150				
	Colby	126	103	81	142				
2003	<i>UVM</i>		53	57	170	220			
	<i>Dartmouth</i>	173		53	123		198		
	<i>Williams</i>	286 ^a	98.5 ^a		113.5 ^a			55.5 ^a	
	<i>Middlebury</i>	212	173	47					174
	UNH	148	169	40	199				
	St. Lawrence ^b	---	---	---	---				
2002	<i>UVM</i>		93	86	220	160			
	<i>Dartmouth</i>	136		111	145		112		
	<i>Williams</i>	146	117		272			71	
	<i>Middlebury</i>	212	120	66					170
	Bates	243	89	27	199				
	St. Lawrence	236	127	50	157				
2001	<i>UVM</i>		129	60	85	281			
	<i>Dartmouth</i>	194		31	120		89		
	<i>Williams</i>	106	211		120			150	
	<i>Middlebury</i>	269	116	37					136
	Colby	155	198	20	24				
	St. Lawrence	226	230	58	47				

^aAverage giant slalom scores on two consecutive days.

^bNo giant slalom events were run.

Table 3. Women's Slalom, 2001-

Year	Carnival Site	Away Carnivals				Home Carnivals			
		UVM	DAR	WIL	MIDD	UVM	DAR	WIL	MIDD
	<i>UVM</i>		80	49	243	218			
	<i>Dartmouth</i>	297		53	116		109		
	<i>Williams</i>	252	195		129			46	
	<i>Middlebury</i>	204	82	68					234
	Bates	282	172	19	110				
	St. Michaels	275	157	34	137				
2004	<i>UVM</i>		101	52	129	156			
	<i>Dartmouth</i>	218		56	130		178		
	<i>Williams</i>	98	97		133			72	
	<i>Middlebury</i>	139	170	59					154
	St. Lawrence	137	145	84	114				
	Colby	224	167	39	81				
2003	<i>UVM</i>		123	34	64	220			
	<i>Dartmouth</i>	135		112	46		112		
	<i>Williams</i> ^a	---	---		---			---	
	<i>Middlebury</i>	215	91	77					45
	UNH	182	119	81	78				
	St. Lawrence	190 ^b	103 ^b	52 ^b	52 ^b				
2002	<i>UVM</i>		103	60	104	192			
	<i>Dartmouth</i>	188		16	160		170		
	<i>Williams</i>	186	141		194			64	
	<i>Middlebury</i>	169	110	9					183
	Bates	198	126	53	192				
	St. Lawrence	230	181	68	55				
2001	<i>UVM</i>		183	21	75	275			
	<i>Dartmouth</i>	282		24	110		178		
	<i>Williams</i>	285	166		108			20	
	<i>Middlebury</i>	253	234	20					45
	Colby	180	223	42	66				
	St. Lawrence	243	186	48	26				

^aNo slalom events were run.^bAverage slalom scores on two consecutive days.

Table 4. Men's Slalom, 2001-

Year	Carnival Site	Away Carnivals				Home Carnivals			
		UVM	DAR	WIL	MIDD	UVM	DAR	WIL	MIDD
	<i>UVM</i>		179	55	118	85			
	<i>Dartmouth</i>	178		90	156		171		
	<i>Williams</i>	100	143		88			169	
	<i>Middlebury</i>	108	155	126					121
	Bates	97	195	59	214				
	St. Michaels	87	117	70	171				
2004	<i>UVM</i>		194	55	116	76			
	<i>Dartmouth</i>	75		40	90		282		
	<i>Williams</i>	164	280		83			54	
	<i>Middlebury</i>	68	290	34					131
	St. Lawrence	66	196	41	155				
	Colby	119	145	26	116				
2003	<i>UVM</i>		239	28	37	204			
	<i>Dartmouth</i>	266		33	124		181		
	<i>Williams</i> ^a	---	---		---			---	
	<i>Middlebury</i>	218	171	35					128
	UNH	116	166	36	228				
	St. Lawrence	190.5 ^b	127 ^b	76 ^b	175 ^b				
2002	<i>UVM</i>		199	47	45	197			
	<i>Dartmouth</i>	141		104	88		235		
	<i>Williams</i>	177	230		95			44	
	<i>Middlebury</i>	96	235	78					147
	Bates	172	51	87	172				
	St. Lawrence	192	146	50	113				
2001	<i>UVM</i>		242	43	68	175			
	<i>Dartmouth</i>	227		48	85		200		
	<i>Williams</i>	114	155		109			76	
	<i>Middlebury</i>	239	152	69					59
	Colby	173	204	52	72				
	St. Lawrence	143	286	48	80				

^aNo slalom events were run.^bAverage slalom scores on two consecutive days.

Table 5. Home Hill Advantage?

Years: 2001-2005				
	<i>Giant Slalom</i>		<i>Slalom</i>	
	<i>Women</i>	<i>Men</i>	<i>Women</i>	<i>Men</i>
<i>UVM</i>	NO	NO	NO	NO
<i>Dartmouth</i>	NO	NO	YES^a	YES^a
<i>Williams</i>	NO	YES^c	NO	YES^b
<i>Middlebury</i>	YES^c	YES^b	YES^a	NO

Years: 2003-2005				
	<i>Giant Slalom</i>		<i>Slalom</i>	
	<i>Women</i>	<i>Men</i>	<i>Women</i>	<i>Men</i>
<i>UVM</i>	NO	NO	NO	NO
<i>Dartmouth</i>	NO	YES^b	NO	YES^a
<i>Williams</i>	YES^b	YES^b	NO	YES^b
<i>Middlebury</i>	YES^c	YES^c	YES^a	NO

^aSignificant at better than the .05 level.

^bSignificant at better than the .01 level.

^cSignificant at better than the .001 level.

Footnotes

1. Since 2002, the NCAA has awarded 100 points to first place, 80 to second, 60 to third, 50 to fourth, 45 to fifth, 40 to sixth, 36 to seventh, 32 to eighth, 29 to ninth, 26 to tenth, 24 to eleventh, 22 to twelfth, 20 to thirteenth, 18 to fourteenth, 16 to fifteenth, 15 to sixteenth, and one less point for each subsequent place finish. Prior to 2002, the NCAA awarded points only to the top 20 finishers (viz., 20 for first, 19 for second, and so forth). The NCAA's current point distribution (100-80-60-...) was used here for all five years.
2. Slalom is an Alpine or downhill form of competition. Pairs of flags or poles (called gates) are positioned along the course through which the racer must pass. Failure to do so results in disqualification. The giant slalom, another Alpine competition, has fewer gates, larger radius turns, and a larger vertical drop than a typical slalom which causes racers to reach higher average speeds.