

# Are Women Really Less Competitive Than Men? Career Duration in Nordic and Alpine Skiing

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## Motivation

Neither the massive underrepresentation of women in e.g. managerial positions nor the persistent gender pay gap has been convincingly explained yet. Recently, gender differences in mental attitudes and dispositions have been identified as a possible reason, assuming that men as well as women self-select in particular jobs and sectors. However, gender differences in mental attitudes and dispositions (as well as in actual decision-making) have so far only been investigated in laboratory experiments. The results are often inconclusive or even contradictory. In her extensive review of these experiments, Niederle (2014: 8) calls for *field evidence* complementing the available findings. Moreover, she calls for evidence that the documented differences in psychological traits do indeed account for “a significant fraction of gender differences in economic decisions relevant to (...) market (...) outcomes of women and men”, which would, in turn, document “the external relevance of gender differences in competition (...) and risk”.

Using field data from Nordic and Alpine skiing over an extended period of time (since the first World Cup season; 1967 in Alpine and 1982 in Nordic skiing) until the very last season 2016 we investigate career length of observationally similar men and women to analyze the time between entry into and exit from a highly competitive environment as a measure of risk preferences and competitive orientations. In this environment, men and women compete under identical rules (in the same type of competitions) and have identical returns to performance in terms of prize money as well as World Cup points. Moreover, the physical requirements are virtually identical and the opportunity costs of quitting are more or less the same.

Thus, the goal of our paper is to compare career length of men and women under virtually identical conditions. Since we study people who have self-selected into a highly competitive environment we do not expect to find statistically significant differences in the length of these athletes' careers. Moreover, since the returns to performance have changed over time in the same way for men and women, we can even address a second, closely related question: Do both genders respond in the same way or are less (more) successful women less (more) likely to continue?

Our final data set includes each individual that ever won at least one World Cup point over the period 1967 (1982) thru 2016, yielding a data set with 3,838 individuals and 17,637 observations (1,750 women and 2,088 men).

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Ideally, one would use monetary returns as the main determinant of career length (prize money is associated with higher opportunity costs of exiting). However, individual prize money is only available for the years 2012-2016 and only for Alpine skiing. Since prize money and World Cup points are highly correlated, the latter will be used as a proxy for the financial returns to performance (in separate analyses – available from the authors on request – we demonstrate that for the years where prize money information is available the impact of prize money on career length is identical to the impact of World Cup points).

### Descriptive Evidence

It appears from Table 1 that the careers of men in both sports are slightly longer than the careers of women. Perhaps surprisingly, career interruptions are not more likely among women than among men (Table 2).

Table 1  
Descriptive Statistics I

Gender and Sport	Individuals	Observations	Exits	Average Career Length <sup>1</sup>
Men, Nordic	920	4,077	768	4.43
Women, Nordic	760	3,049	659	4.01
Men, Alpine	1,168	5,818	1,006	4.98
Women, Alpine	990	4,693	860	4.74
Total	3,838	17,637	3,293	4.60

<sup>1</sup> Column 3/Column 2

Table 2  
Descriptive Statistics II

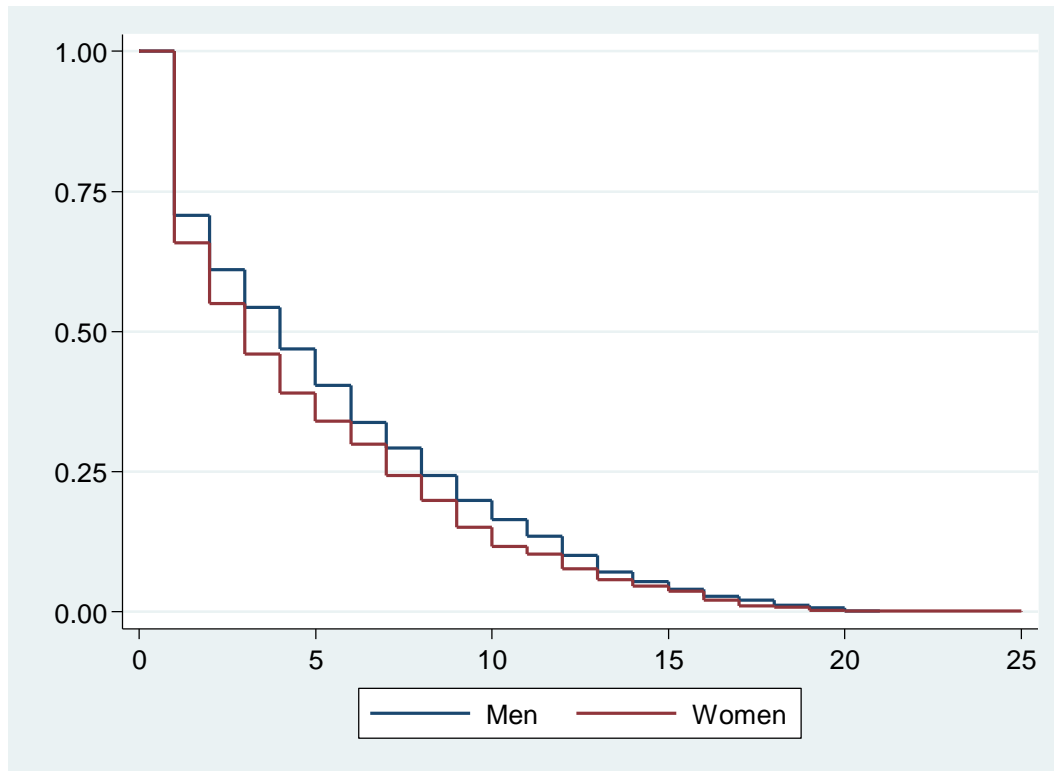
Gender and Sport	Individuals with Gap	Percent of Individuals <sup>1</sup>	Time on Gap (Years)	Average Time on Gap <sup>2</sup>
Men, Nordic	221	24.0	491	2.22
Women, Nordic	286	37.6	626	2.19
Men, Alpine	374	31.5	671	1.79
Women, Alpine	254	25.7	398	1.57
Total	1,135	29.6	2,186	1.93

<sup>1</sup> (Column 2/Column 2, Table 1) \* 100

<sup>2</sup> Column 4/Column 2

Kaplan-Meier survival estimates seem to suggest that the conditional probability of women to exit is higher than the respective probability of men (Figure 1 for Nordic and Figure 2 for Alpine skiing).

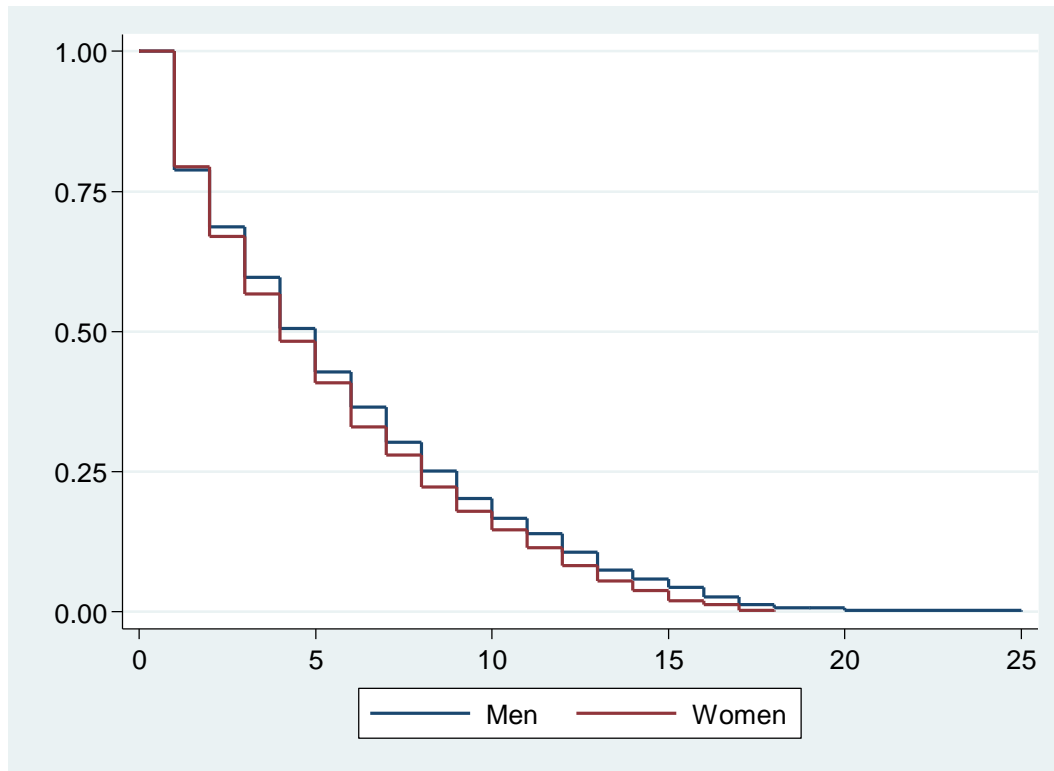
Figure 1  
Kaplan-Meier Estimation of Career Length in Nordic Skiing by Gender



Log-Rank Test for Equality of Survivor Function

Gender	Events Observed	Events Expected
Men	768	811
Women	659	616
Total	1,427	1,427
Chi2	6.73, p<.01	

Figure 2  
Kaplan-Meier Estimation of Career Length in Alpine Skiing by Gender



Log-Rank Test for Equality of Survivor Function

Gender	Events Observed	Events Expected
Men	1,006	1,044
Women	860	822
Total	1,866	1,866
Chi2	3.81, p<.10	

## Econometric Findings

However, it appears from Table 3 that the careers of female athletes are as long as the careers of male athletes (the coefficient of the female dummy fails to reach statistical significance at conventional levels in both sports).

Second, the careers of particularly successful women are shorter than those of equally successful men (the coefficient of the respective interaction term is statistically positive, indicating that more World Cup points contribute less to career length for women than for men).

Third, over time, career duration decreases in alpine skiing. This effect, however, is smaller for women than for men (the coefficient of the gender dummy interacted with the linear time trend is significantly positive, suggesting that career length of women decreases less than that of equally successful men).

Table 3  
The Impact of Gender on Career Length in Nordic and Alpine Skiing

	Model (1) Nordic Skiing	Model (2) Alpine Skiing
Female (1=yes)	0.149 (0.173)	-0.0898 (0.0947)
World Cup Points	-0.0130*** (0.00153)	-0.00861*** (0.00115)
Female * World Cup Points	0.00786*** (0.00174)	0.00299** (0.00137)
Time Trend	0.00523 (0.00425)	-0.0296*** (0.00409)
Female * Time Trend	-0.00665 (0.00474)	0.00570* (0.00326)
Nationality Dummies		Included
Points Regime Dummies		Included
<i>LL Null Model</i>	-9,239.13	-12,562.67
<i>LL Full Model</i>	-8,929.08	-12,107.86
<i>N of Observations</i>	7,126	10,511
<i>N of Individuals</i>	1,680	2,158
<i>N of Exits</i>	1,427	1,866

Standard errors (clustered at athlete level) in parentheses

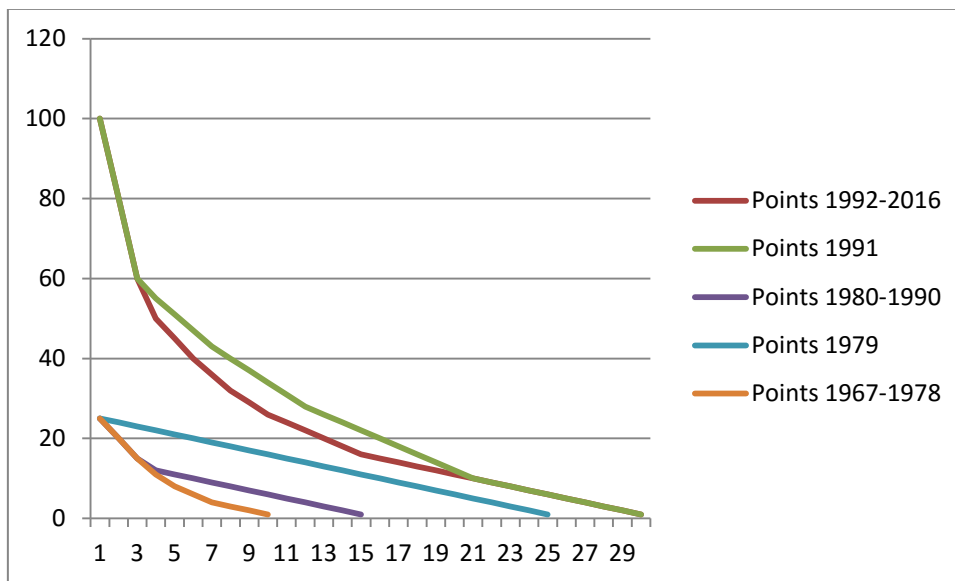
\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

Summarizing, our findings suggest that once self-selection is taken into account women are as competitive as men, i.e. career duration in a highly competitive environment seems to be independent of gender. Thus, the results of previous studies finding significant differences between men and women with respect to competitive orientations are likely to be biased due to inadequate controls for self-selection.

## Next Steps

In further analyses we will investigate whether the relationship between sporting success and an individual's exit probability is the same for men and women across the distribution of World Cup points. It may well be that less successful women are discouraged faster than equally unsuccessful men and, therefore, give up professional skiing earlier than comparable men.

Figure 3  
Changing Returns to Performance: The Points System in Nordic and Alpine Skiing, 1967-2016



Moreover, since the returns to performance (in terms of World Cup points) have changed considerably over time (Figure 3) we will also investigate whether the response to these changes is the same among men and women.

The managerial implications of our findings are straightforward: Controlling for self-selection is crucial when analyzing career durations of men and women particularly in highly competitive environments. Thus, we would expect not to find statistically significant differences in the career durations of male and female consultants, investment bankers or lawyers, although in all these jobs women continue to be massively underrepresented. However, women who self-select into one of these occupations are likely to have similar, if not identical aspirations, motivations, and mental dispositions than observationally similar men.

## Literature

- Childs, J. (2012): Gender Differences in Lying. *Economics Letters*, 114, pp. 147-149.
- Dreber, A. and M. Johannesson (2008): Gender Differences in Deception. *Economics Letters*, 99, pp. 197-199.
- Dreber, A., C. Gerdes and P. Gränsmark (2013): Beauty Queens and Battling Knights: Risk Taking and Attractiveness in Chess. *Journal of Economic Behavior & Organization*, 90, pp. 1-18.
- Fisman, R., S.S. Iyengar, E. Kamenica and I. Simonson (2006): Gender Differences in Mate Selection: Evidence from a Speed Dating Experiment. *Quarterly Journal of Economics*, 121, 673-697.
- Frick, B. (2011a): Gender Differences in Competitive Orientations: Empirical Evidence from Ultra-Marathon Running. *Journal of Sports Economics*, 12 (2011) 3, pp. 317-340.
- Frick, B. (2011b): Gender Differences in Competitiveness: Empirical Evidence from Professional Distance Running. *Labour Economics*, 18 (2011) 3, pp. 389-398.
- Gerdes, C. and P. Gränsmark (2010): Strategic Behavior across Gender: A Comparison of Female and Male Expert Chess Players. *Labour Economics*, 17, pp. 766-775.
- Gneezy, U., K.L. Leonard and J.A. List (2009): Gender Differences in Competition: Evidence from a Matrilineal and a Patriarchal Society. *Econometrica*, 77, pp. 1637-1664.
- Gneezy, U. and A. Rustichini (2004): Gender and Competition at a Young Age. *American Economic Review, Papers and Proceedings*, 94, pp. 377-381.
- Gong, B. and C.-L. Yang (2015) Gender Differences in Risk Attitudes: Field Experiments on the Matrilineal Mosuo and the Patriarchal Yi. *Journal of Economic Behavior & Organization*, 83, pp. 59-65.
- Guiso, L., F. Monte, P. Sapienza and L. Zingales (2008): Culture, Gender, and Math. *Science*, 320, pp. 1164-1165.
- Gyalfi, H.F., A.A. Arnardottir and K. Kristensson (2013): More on Gender Differences in Lying. *Economics Letters*, 119, pp. 94-96.
- Jurajda, S. and D. Münich (2011): Gender Gap in Performance under Competitive Pressure: Admissions to Czech Universities. *American Economic Review, Papers and Proceedings*, 101, pp. 514-518.
- Muehlheusser, G., A. Roider and N. Wallmeier (2015): Gender Differences in Honesty: Groups versus Individuals. *Economics Letters*, 128, pp. 25-29.
- Nekby, L., P.S. Thoursie and L. Vahtrik (2015): Gender Differences in Examination Behavior. *Economic Inquiry*, 53, pp. 352-364.
- Niederle, M. (2014): *Gender*, Working Paper 20788, Cambridge, MA: National Bureau of Economic Research.
- Niederle, M. and L. Vesterlund (2007): Do Women Shy Away from Competition? Do Men Compete Too Much? *Quarterly Journal of Economics*, 122, pp. 1067-1101.
- Ors, E., F. Palomino and E. Peyrache (2013): Performance Gender Gap: Does Competition Matter? *Journal of Labor Economics*, 31, pp. 443-499.