Journal of Economic Behavior & Organization 119 (2015) 96–108

Contents lists available at ScienceDirect

Journal of Economic Behavior & Organization

journal homepage: www.elsevier.com/locate/jebo

Game, set, and match: Do women and men perform differently in competitive situations?

Michael Jetter[a,*], Jay K. Walker[b,1]

[a] School of Business, University of Western Australia, Australia
[b] Department of Economics and Finance, Bisgrove Hall, Room 254J, Niagara University, Lewiston, NY 14109, USA

ARTICLE INFO

Article history:
Received 18 March 2015
Received in revised form 7 July 2015
Accepted 31 July 2015
Available online 8 August 2015

JEL classification:
D01
D83
D84
J16
J40
L83

Keywords:
Clutch player
Competition
Feedback
Gender gap
Hot hand
Tennis

ABSTRACT

This paper analyzes potential gender differences in competitive environments using a sample of over 100,000 professional tennis matches. Focusing on two phenomena of the labor and sports economics literature, we find robust evidence for (i) the hot-hand effect (an additional win in the most recent ten matches raises the likelihood of winning by 3.2–3.4 percentage points) and (ii) the clutch-player effect, as top players are excelling in Grand Slam tournaments, the most important events. Overall, we find virtually no gender differences for the hot-hand effect and only minor distinctions for the clutch-player effect.

1. Introduction

Do women and men behave differently in competitive situations? Recent research suggests the average woman to be reluctant to enter competitive situations (Gneezy et al., 2003; Niederle and Vesterlund, 2007, 2011) and differ in her attitude towards competitive situations (Byrnes et al., 1999; Eckel and Füllbrunn, 2015). However, we know little about whether women compete differently than men once they are in competitive environments. Especially when trying to explain the persistent gender wage gap – which is not expected to be closed for another 70 years (Topping, 2015) – noncognitive skills and attitudes are proving to be important factors (Grove et al., 2011).[2] Unfortunately, most studies analyzing potential

* Corresponding author. Tel.: +61 457 871 496.
E-mail addresses: mjetter7@gmail.com (M. Jetter), jwalker@niagara.edu (J.K. Walker).
URLs: http://www.michaeljetter.com (M. Jetter), http://www.jaykwalker.com (J.K. Walker).
[1] Tel.: +1 716 286 8311.
[2] Other important aspects include historical origins and societal norms (Alesina et al., 2013; Burda et al., 2013), as well as socialization in early childhood (Andersen et al., 2013).

http://dx.doi.org/10.1016/j.jebo.2015.07.017
0167-2681/

gender differences in competitive situations suffer from identification problems or lack information on other, potentially crucial characteristics. For instance, in most labor markets women work alongside men throughout their entire career and training, which makes it difficult to isolate performance measurements and disentangle behavior in the workplace from the influence of male colleagues.

Recently, labor markets in the sports world have become prominent laboratories for testing behavior in competitive situations. Reasons include the clear observability of outcomes (winning or losing) and a rich set of control and background information that is not normally available in business world environments (Kahn, 2000). Tennis provides an ideal testing ground in this context, as professional tours are separated by gender, yet prize money has been very comparable in the past and has recently been equalized in the biggest events (also see Wozniak, 2012). Another advantage comes from the fact that tennis is a single sport, where performance is much easier to observe than in team competitions.

This paper uses all tennis matches on the main tours of every male and female tennis player who was ranked in September 2014 to analyze two major phenomena of the labor and sports economics literature: the hot-hand and clutch-player effects. The hot-hand effect states that recent, strong performances may affect current outcomes, whereas the clutch-player effect argues performance to increase when stakes are higher. Overall, our sample includes 107,566 tennis matches of 853 professional tennis players (424 males and 429 females). Taking advantage of a rich set of available control variables, our results contribute to three distinct branches of the economics literature.

First, we find strong evidence for the hot-hand effect. Even after controlling for rankings (linear and squared), head-to-head characteristics of both players, and tournament-specific aspects, previously won matches are a positive and statistically meaningful predictor of winning the current match. In our most complete estimation, the marginal effect of having one additional winning encounter in the last ten matches raises the probability of winning by 3.2–3.4 percentage points. These results are in contrast to earlier findings by Gilovich et al. (1985) and further extend works by Abrevaya (2002), Livingston (2012), and Wozniak (2012).[3]

Second, the clutch-player effect emerges with force: top players perform their best in Grand Slam tournaments, arguably the most important dates of the tennis calendar. This confirms traditional theories of larger payoffs increasing incentives and therefore efforts (Lazear, 2000).

Third, we find virtually no gender differences for the hot-hand phenomenon and only very minor differences for the clutch-player effect. Both in terms of statistical importance and magnitudes, both men and women show evidence for the hot-hand effect in professional tennis matches. Regarding the clutch-player phenomenon, female top players actually appear *more* likely to compete well on big stages, although the effect is statistically meaningful for either gender. Only when looking at in-match performances do we find nuanced gender differences: top male players are more likely to win a tie-break when it matters most, whereas the respective result for the female sample remains statistically irrelevant.

These results are surprising given recent findings on gender differences in competitive environments (Niederle and Vesterlund, 2010, 2011; Niederle, 2014). A possible explanation could be the isolated, single-sex structure of tennis as a professional sport, as opposed to competing in mixed labor markets (see Gneezy et al., 2003). Thus, women may be as competitive as men when competing amongst themselves.

2. Data

Our sample data consists of all career matches of male and female tennis players who on September 21, 2014, were listed on the respective world rankings (ATP Tour for the men, WTA Tour for the women). Specifically, we focus on main ATP and WTA Tour matches, excluding tournaments on the minor Challengers and Futures Tours for lack of detailed data. On the ATP Tour this produces a total of 57,133 matches by 424 players, whereas the WTA sample includes 50,433 encounters and 429 players.[4] In order to test for the hot-hand phenomenon and allow for the creation of variables capturing previous performance, we only use observations (i.e., matches) where the respective player has at least played ten previous matches on the respective Tour (ATP or WTA).

In addition to the large and comprehensive size of our sample a major advantage can be found in the rich set of control variables that the professional tennis organizations are offering for every match. In this context, Livingston (2012) points out that the hot-hand effect may have been masked by a lack of relevant control variables in previous studies. Our data includes rankings of both participating players, head-to-head histories, and tournament specifics (tournament type, round, surface).[5] Table 1 displays our summary statistics, comparing each variable between the male and female Tours. It is interesting to

[3] Other studies analyze the hot-hand effect in the context of gambling, such as Croson and Sundali (2005) and Rabin and Vayanos (2010). Our approach is different as we are analyzing a skill-based sport, as opposed to gambling.

[4] The earliest match in our male sample took place in March 1997, whereas the first match of the female sample dates back to May 1989. The reason for such an early match in the female sample can be traced back to Kimiko Date-Krumm (from Japan, born 1970), who returned to professional tennis at the age of 37 in April 2008 and is still playing today at the age of 44. The last match in both samples comes from the week before our data collection (September 21, 2014). All data are derived from the ATP and WTA websites (http://www.atpworldtour.com/ and http://www.wtatennis.com/).

[5] In earlier estimations, we also included a binary variable indicating whether both competitors play for the same country. As compatriots are likely to know each other much better (they may have competed against each other in juniors or even practiced together), this information may theoretically influence the outcome of a match. However, the derived coefficients never came close to conventional levels of statistical relevance, so we excluded this control from the final version of the paper.