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Positive Feedback Shapes Gender Gaps in Adolescent Risk-Taking – Causal Evidence from Real-Risk Competitions

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Working Paper No. 2510
July 2025

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Abstract

This paper explores how positive feedback in a competitive setting shapes the evolution of gender differences in risk tolerance during adolescence. We use data from professional diving, a 'real life, real risk' environment where the notion of risk is very intuitive and associated with the height of the dive. We find that young divers are more engaged in high-risk (platform) competitions after their first win in a low-risk (springboard) competition. This effect is driven by individuals with no prior platform experience and is more pronounced for males: On average, male divers are 37% more likely to participate in platform diving after their first win compared to 10% for female divers. Additional findings indicate that the treatment intensity (for female divers) and the coach's gender (for male divers) are moderators of the effect.

JEL Classification: D01, D81, D91, J16
Keywords: risk-taking, positive feedback, gender, adolescence

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We are grateful to Alexander Ahammer, René Böheim, Thomas Dohmen, Franz Hackl, Rudolf Winter-Ebmer, Matthias Westphal, session participants at the 26th Colloquium on Personnel Economics, the 49th Conference of the International Association for Research in Economic Psychology, the 14th Conference of the European Sport Economics Association, and the 6th Sport Economics & Sport Management Conference, as well as attendees at the research seminars at the University of Trier for constructive feedback, comments, and suggestions. In addition, we thank Mathias Tirtasana and Houda Ben Said for their help with the data collection. Mario Lackner received generous funding by the *Anniversary Fund of the Austrian National Bank* (project number 18827). Financial support from the *FernUniversität in Hagen* is gratefully acknowledged. All remaining errors are our own.

1. Introduction

People routinely make decisions about the level of risk they are willing to take in various domains, such as career choices, health, and financial investments. As such, risk preferences play a critical role in shaping socioeconomic outcomes. In the labour market, high-paying jobs often involve competitive, high-stakes environments and require a greater tolerance for risk. Consequently, more risk-averse individuals may self-select out of these roles, contributing to disparities in earnings and career advancement. This mechanism has been proposed as one explanation for persistent gender gaps in wages, leadership positions, and social status (e.g., Blau & Kahn 2017, Bertrand 2018). While risk aversion is context-dependent, a broad literature finds that women – particularly in certain age groups – tend to be more risk-averse than men (e.g., Croson & Gneezy 2009, Filippin & Crosetto 2016). Risk preferences also influence the willingness to compete (Niederle & Vesterlund 2007), which in turn affects career choices and trajectories (Dohmen & Falk 2011, Buser et al. 2014, Flory et al. 2015, Reuben et al. 2017). As a result, the underrepresentation of women in leadership positions not only reflects individual preferences but also reduces the overall talent pool, posing a barrier to improved economic performance (Bertrand 2018). Understanding the mechanisms that shape gender differences in risk attitudes is key to addressing these disparities.

In textbook economics, a standard assumption is that risk preferences are stable over time. However, empirical evidence largely contradicts this assumption (e.g., Dohmen et al. 2017, Schildberg-Hörisch 2018). Risk preferences are typically found to evolve early in life, during the first stages of education (e.g., Sutter et al. 2019, Andreoni et al. 2020), are transmitted across generations (e.g., Dohmen et al. 2012, Alan et al. 2017), and are affected by contextual factors (e.g., Booth & Nolen 2012, Andersen et al. 2013). Thus, the evolution of the gender gap in risk-taking should be rooted in early childhood development and adolescence. Säve-Söderbergh & Sjögren Lindquist (2017) and Andreoni et al. (2020) find that girls (not boys) become more risk-averse when they grow older. The reasons could be the hormonal changes during puberty and the social environment (Andreoni et al. 2020).

Building on this, our study aims to explore further the factors contributing to the evolution of the gender gap in risk attitudes. Specifically, we investigate how positive feedback in competitive environments influences gender differences in risk tolerance from an early age. So far, little is known about how positive feedback connects to gender differences in risk behaviour. On the one hand, a strand of literature documents that men and women respond differently to positive feedback ('momentum') in terms of performance (e.g., Gauriot & Page 2019, Lackner & Weichselbaumer 2023) and contest entry decisions (e.g., Wozniak 2012, Buser 2016). On the other hand, several studies demonstrate that prior feedback can influence individuals' willingness to take risks, although they do not specifically focus on gender. For instance, Suhonen & Saastamoinen (2018) find that agents in the betting market take more risks after prior gains, among others. Our study brings together these two strands of literature by examining how gender-specific responses to positive feedback in competitive settings affect subsequent risk-taking behaviour.

We examine the causal effect of winning a low-risk competition on adolescents' willingness to compete in high-risk competitions. Our study takes place in a *real-life, real-risk* environment – professional diving – where the stakes involve tangible risks to health and physical well-being. This setting contrasts sharply with laboratory experiments, where the negative consequences of risky choices (e.g., small monetary losses in lotteries) are typically minor and abstract. This distinction may help explain why experimentally elicited risk preferences often fail to predict real-world adolescent behaviours such as smoking or drinking, as noted by Sutter et al. (2013).

In professional diving, the notion of risk is very intuitive and based on simple physics: health risks increase with the height of the dive, especially for young divers (Day et al. 2008). Depending on age restrictions, athletes can choose from heights between 1 and 3 metres (springboard) on the one hand and 5, 7.5, and 10 meters on the other hand (platform). However, since elite competitions such as World Cups and the Olympic Games include 3m springboard as well as 10m platform contests and the prize money (if there is any) does not differ, engagement in platform diving does not necessarily mean promotion but rather a broader portfolio. Our data come from (semi-)professional diving competitions organised by the national governing body of diving in the United States (USA diving). The sample includes complete career histories for a total of 5,185 divers between ages 10 and 18. This provides a unique opportunity to examine the development of individual risk preferences over time as agents engage in a gender-neutral task within their natural environment – an environment also characterised by strong incentives.

In line with our expectations based on the concept of self-efficacy (Bandura 1977), estimates from a two-way fixed effects model with staggered treatment indicate that divers are more engaged in high-risk competitions after their first win in a low-risk competition. This is true for both the extensive and intensive margins, and we provide evidence that this behavioural change improves career prospects. However, we find that this effect is more pronounced for males: On average, male divers are 37% more likely to participate in platform diving after their first win compared to 10% for female divers. Since the individuals in our sample are highly trained and monitored agents with high incentives to perform well, this may represent a lower bound for the population-wide effect differences.

In the second part of the analysis, we identify channels that account for the positive feedback effect and its different impact on the genders. First, it shows that the effect is entirely driven by individuals without prior platform experience, underpinning the idea that success in a springboard competition encourages individuals to take the risk of diving from greater heights. If any, age at treatment plays a minor role. Second, while the treatment intensity has little effect on males, it is crucial for females. That is, we document that the positive experience of winning a (low-risk) contest affects the risk preferences of females who are not used to achieving top results. In this way, we also contribute to the literature on shocks to risk preferences (e.g., Bellucci et al. 2020, Yi et al. 2022, Rice & Robone 2022). Finally, we examine the role of the coaches who can influence a diver's self-efficacy (and hence risk behaviour) through social persuasion. Our results suggest that the positive feedback effect for male divers is moderated by the coach's gender, being present only if the coach and the diver share the same gender. On the contrary, peers' risk preferences do not play a moderating role.

In the final part of our analysis, we examine outcome effects. Although diving from greater heights does not mean promotion but rather an expansion of the divers' portfolio, we show that divers who increase their engagement in high-risk platform competitions after an initial success are significantly more likely to reach national or international elite status. While this positive return to risk-taking holds for both genders, male divers tend to benefit more strongly in terms of subsequent (short-run) competitive success.

This study is structured as follows. Section 2 provides background information about competitive diving and the health risks involved. Section 3 outlines a simple conceptual framework to motivate our empirical analysis. Section 4 describes the dataset and introduces the empirical model. Section 5 presents the results, while Section 6 highlights mechanisms, channels, and outcome effects. Section 7 concludes the study.

2. Institutional background

Essentially, competitive diving involves athletes performing acrobatic routines, such as spins, twists, and somersaults, during their jump or as they fall into the water. While the everlasting interest in diving can be traced back to a ceiling fresco dated to the fifth century BCE ('*Tomba del Tuffatore*') and early forms are documented in Germany and Sweden in the 17th century, competitive diving has its origins in the 1880s when the first contests were held in England (Rubin 1999). Today, the sport is divided into *springboard* (1m, 3m) and *platform* diving (5m, 7.5m, 10m). Besides the height, a notable difference is that the springboard is flexible while the platform boards are rigid. Major competitions, such as the Olympics, use only the 3m springboard and 10m platform.

To win a contest, a diver must accumulate more points than others. Each dive has its own degree of difficulty (defined by the international governing body for aquatic sports) based on the starting position of the diver and the number and complexity of the routines. Judges evaluate each dive according to the difficulty of the dive and the accuracy of execution. Athletes submit a list of dives they intend to perform before the event.[1]

While there is a proximity to gymnastics due to the acrobatic routines, the entry into the water is what separates the sports. Moreover, it is the water entry stage of the dive where injuries occur because of the force on the body (Day et al. 2008). It is simple physics to say that the risk of an injury increases with height: The velocity at entry is 8.4 m/s for 1m springboard jumps

[1] Note that we are not the first to use data from diving contests for economic analysis. For instance, Genakos et al. (2015) document that the pressure to perform caused by an intermediate ranking near the top positions has an adverse effect on performance. Goller & Spath (2023) analyse how male and female divers react to a single deviating evaluation in the previous round by adjusting the dive's difficulty in the actual round.

but 16.4 m/s for 10m platform dives, associated with a force of around 400 kg/N (le Viet et al. 1993, Jones 2017). For this reason, Day et al. (2008) conclude that "[d]iving from a height at >1 m dramatically increased the odds of injury because of contact with the water only" (p.393). Common injuries can result from a traumatic cause and overuse. Affected are, among others, shoulders, wrists, elbows, and spine (Blanksby et al. 1997, Jones 2017). Severe injuries from platform diving have been subject to recent media reports, both on a personal and general level (e.g., Los Angeles Times 2021).

For this reason, overcoming negative emotions such as fears is essential to the divers' mental preparation (Post et al. 2014). Furthermore, there are age restrictions for protection: children below the age of 12 are not allowed to participate in 7.5m platform diving, and the 10m platform is restricted to athletes with a minimum age of 14.

Men and women compete separately for their own titles. Prize money is awarded to the top performers in major international competitions, with no differences regarding height (springboard, platform) and gender. Hence, diving from greater heights can be viewed as a variation of the sport rather than a promotion.

3. Conceptual framework

Why may positive feedback affect risk-taking? As early as the 1990s, studies like Krueger Jr & Dickson (1994) have pointed to (perceived) self-efficacy as a mediator. Self-efficacy, a concept developed by Albert Bandura within his social learning theory, refers to an individual's belief in his or her capability to achieve a specific goal or perform a particular task successfully (Heslin & Klehe 2006). Klein & Kunda (1994) argue that the belief in one's relative superiority in a domain can lead to a higher tolerance towards risks in that area because they appear more controllable. Furthermore, self-efficacy helps increase confidence and manage the fear of failure (e.g., Bandura 1997). A positive association between self-efficacy and risk-taking has been documented in different areas such as driving (Delhomme & Meyer 2004), positive risk-taking intentions of youth (Wong & Yang 2021), finance (Montford & Goldsmith 2016), and entrepreneurship (Macko & Tyszka 2009), but also in sports like rock climbing (Llewellyn et al. 2008), parkour and free-running (Merritt & Tharp 2013), freediving (Baretta et al. 2017), and ski racing (Rogers & Paskevich 2021).

Bandura (1977) identifies four sources that influence self-efficacy, three of which are the mastery experience, social persuasion, and the 'vicarious' experiences of social models.[2] For the mastery experience, which refers to the confidence in one's own ability gained from previous success, its relevance for diving can be easily illustrated: In a sport that is all about performing complex movements accurately and where accuracy helps to prevent accidents ('tight entry'), the experience of winning a contest can, therefore, increase the athletes' confidence, help them

[2]We do not focus on the fourth source affecting self-efficacy, the physiological and psychological states, because they cannot be identified in our data in a meaningful way.

to cope with fears, and eventually encourage them to take the next steps in their careers and add jumps from greater heights to their portfolio. In the words of T. S. Eliot, cited in Bandura (1997): "Only those who will risk going too far can possibly find out how far one can go." In addition, as noted in the previous section, high scores result not only from perfect execution but also from a high degree of difficulty. So, mastering a more complex (and hence riskier) dive may also increase self-efficacy in terms of handling risks.

This process can be reinforced by the social environment, particularly by coaches, peers, and family (Pattinson et al. 2017). For instance, positive encouragement and support from coaches after success in a low-height contest could inspire athletes to also try themselves in great-height contests. Furthermore, Heslin & Klehe (2006) stress the importance of role-modelling as another source of self-efficacy as it "can provide people with ideas about how they could perform certain tasks and inspire their confidence that they can act in a similarly successful manner" (p.706). If an athlete's peers are already active in platform diving, this could work as a catalyst for the effect of positive feedback on risk preferences ('If they can do it, I can do it as well'). We will consider these aspects in the empirical analysis.

There are reasonable grounds for assuming that success does not affect men and women in the same way. For instance, Dohmen et al. (2023) show that risk preferences are shaped by dispositional optimism, i.e. whether people focus more on favourable or unfavourable outcomes. Furthermore, the authors provide evidence favouring a gender difference in optimism, which translates into differences in risk preferences. Closely related, recent studies on (non-)Bayesian belief updating suggest gender differences in response to feedback (e.g., Coffman et al. 2024), whereas there is mixed evidence regarding the demand for feedback (Coffman & Klinowski 2025). Consequently, in our setting, if male divers gain a more optimistic view of their abilities from the experience of winning a contest, they may respond more strongly to success than female divers.

4. Data and empirical approach

The empirical analysis aims to identify the causal effect of positive feedback – winning a low-risk competition – on the willingness to take risks, specifically, participating in high-risk competitions. In our setting of elite diving, risk increases with height. We therefore define springboard competitions (1 and 3 metres) as low-risk and platform competitions (5, 7.5, and 10 metres) as high-risk competitions. Hence, our approach is to examine if treated divers, i.e., those who win a springboard contest for the first time, are more engaged in platform contests afterwards than the control group without such a win. As we want to contribute to understanding the dynamics of the gender gap in risk preferences, we focus on analysing the potentially different effects of the treatment on the genders.

4.1. The data set

We collected our data from the official *TEAM USA/USA Diving* website. They provide us with the universe of (mainly national) competitions between 2004 and 2021, including rankings and points. Moreover, we add data from international diving competitions listed on the international federation's official website (FINA - *Fédération internationale de natation*, now: *World Aquatics*).

To track divers over time, we restrict our sample to individuals with at least 20 contests in their records. This gives us 425,484 observations on the diver-contest level from 4,248 female and 2,467 male divers aged between 4 and 35. Given our focus on the development of gender differences in risk preferences – and consistent with evidence that such differences begin to emerge early in life – we further narrow the sample to divers aged 10 to 18 with complete information available. This age range represents a critical developmental window for risk attitudes and coincides with a formative period in which performance can significantly influence future career trajectories in the sport.

To facilitate comparisons of divers' career trajectories and strategic choices regarding competition types, we aggregate the diver-competition data to a diver-quarter panel (i.e., the unit of observation is the calendar quarter). The final data comprise 41,673 diver-quarter observations, covering 3,350 female and 1,835 male divers. Without the treatment period, the sample is reduced to 37,810 observations. Table 1 presents descriptive statistics for key variables for different subgroups in our sample.

Our analysis focuses on individuals who achieve their first victory in a low-risk springboard competition. These divers constitute our (quasi-)treatment group, while those without such a win form the control group. The control group comprises 9,194 diver-quarter observations, representing about 22.1% of the total sample. As shown in Table 1, the first springboard win typically occurs at age 13, with no significant difference between male and female divers. Additionally, treated and untreated divers exhibit similar characteristics across most variables, except for the number of wins. This difference is expected, as treated divers – by definition – already demonstrated talent and are likely to be more successful after their first win.

On average, treated male divers appear slightly more active and successful than their female counterparts, as measured by the total number of competition wins. We take this as the first suggestive evidence that the treatment may affect subsequent success through gender-differentiated changes in risk preferences. However, we do not observe a 'classical' gender gap in risk-taking behaviour prior to treatment. In fact, the likelihood of participating in high-risk platform competitions before the first springboard win is 2.4 percentage points higher for female divers than for males – a difference that is statistically significant at the 10% level. Moreover, the total number of platform competitions prior to treatment does not differ significantly between genders within the treatment group. Although the average age per quarter and the age at first win are statistically different between treated male and female divers, the differences are small in magnitude.

Since we have more female than male divers in our sample, a concern might still be that there could be differences between male and female contests, which would bias our analysis of potential gender differences. Besides the fact that we can see virtually no difference in the average age of the first springboard contest victory, Figure A.2 in the Appendix suggests that while the absolute number of competitions shows seasonality, the patterns are similar for male and female contests. Moreover, Figure A.1 in the Appendix adds to this by showing the distribution of two measures of contest intensity, i.e., the number of competitors and final scores. We conclude that there are no structural differences between male and female competitions that will bias our results.

Another potential challenge to our identification strategy is the argument that winning a competition reflects underlying talent and that more talented divers may perceive less risk when diving from greater heights. To address this concern, we proxy risk using the point spread, as very low scores typically indicate failed dives – events that carry a higher risk of injury, particularly from greater heights. If more talented divers were indeed better at managing the risks associated with increased height, we would expect the point dispersion in platform competitions to be lower – or at least comparable – to that in springboard events. Figure 1 presents the average standard deviations of scores for the top five male and female divers across all platform and springboard competitions in our dataset. It shows that the score dispersion for elite divers is significantly higher in platform events. We interpret this as evidence that platform diving is inherently more volatile due to reduced controllability, thereby confirming its higher risk profile.

Table 1 reveals that female divers are, on average, less than half a year younger than their male counterparts. They also participate in slightly fewer competitions. However, the proportion of female divers with at least one platform competition is marginally higher – by approximately 4.5 percentage points. These minor differences within the control group do not pose any concern for the validity of our identification strategy.

Figure 1 — Average standard deviation for top-5 competitors, by gender and competition type

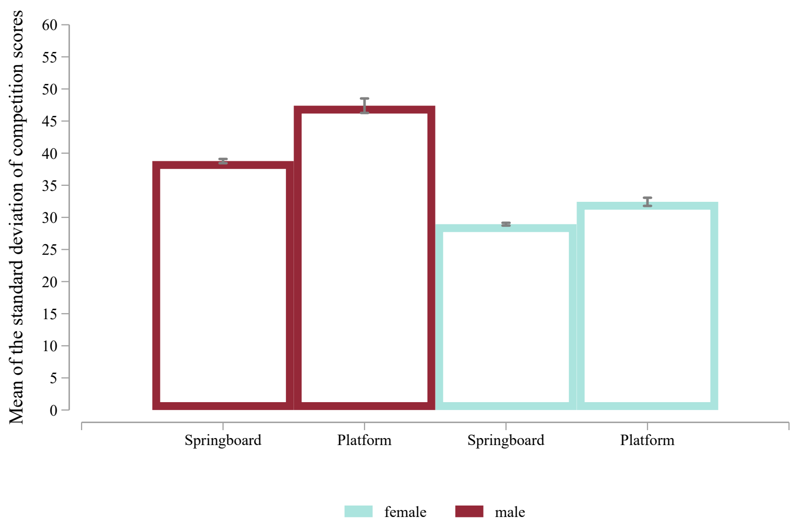


Table 1 — Descriptive statistics of key variables

	TREATED			NEVER TREATED		
	Female	**Male**	*Difference male-female*	**Female**	**Male**	*Difference male-female*
Age	13.593	13.675	0.082**	14.362	14.813	0.451***
	(2.395)	(2.503)		(2.430)	(2.500)	
Age at first win	12.914	12.958	0.045			
	(2.463)	(2.612)				
Number of competitions	3.641	3.699	0.058*	3.119	3.304	0.185***
	(2.342)	(2.417)		(1.950)	(2.100)	
Number of wins (all competitions)	0.481	0.648	0.168***	0.014	0.013	−0.001
	(0.907)	(1.109)		(0.123)	(0.119)	
Number of wins platform	0.039	0.054	0.015***	0.014	0.013	−0.001
	(0.220)	(0.265)		(0.123)	(0.119)	
Pre-treatment periods	0.738	0.764	0.026***			
	(0.440)	(0.425)				
Any platform competitions before first win (yes = 1, no = 0)	0.189	0.165	−0.024*	0.247	0.202	−0.045***
	(0.392)	(0.371)		(0.431)	(0.401)	
Platform comps. before first win (total number)	0.265	0.242	−0.023	0.331	0.311	−0.020
	(0.626)	(0.617)		(0.655)	(0.718)	
N	20,551	11,928		7,098	2,096	

4.2. *Empirical approach*

We estimate a two-way fixed effect model (TWFE) in an event study specification to identify treatment effects from winning a low-risk (springboard) contest relative to the time since that win. Since divers have their first win at different points in time, we opt for a TWFE with staggered treatment, which takes the following form:

$$Y_{i,t} = \alpha_0 + \sum_{k=-5}^{-2} \beta_k^{lead} \cdot \mathbb{1}\left[\text{first win}_{i,t}^{k}\right] + \sum_{k=1}^{7} \beta_k^{lag} \cdot \mathbb{1}\left[\text{first win}_{i,t}^{k}\right] + \phi_i + \gamma_t + \epsilon_{i,t}\ . \quad (1)$$

The dependent variable $Y_{i,t}$ is our outcome of interest. That could be the extensive (diver i participates in platform competitions in quarter t) or intensive margin of risk-taking (the fraction and absolute number of platform competitions in quarter t). ϕ_i and γ_t are diver and time (year-quarter) fixed effects. The model also includes twelve event-time dummies capturing five quarters before and seven quarters after the treatment of the first win from the springboard. The reference period is $k = -1$, whereas the treatment period, when the first win occurs ($t = 0$), is excluded (i.e., $3,863$ diver-quarter observationsn leaving us with an estimation sample of 37,810 observations). This is because the treatment period is a transition point, and it is unclear whether it is pre- or post-treatment. Note also that we do not control for the diver's age as age is perfectly collinear with diver- and quarter-of-year fixed effects.

We define divers as treated (first win = 1) after their first win in a springboard contest provided they have not won a platform contest prior to this win. Platform contest participation is allowed before treatment, however. For the control group, platform wins are not excluded but very rare ($N = 142$). Standard errors $\epsilon_{i,t}$ are clustered on the diver level.

Given the data structure, we must address the issue that divers do not compete every quarter and may occasionally pause. Hence, periods before and after the treatment may not be continuous. In our preferred specification, we, therefore, define period $t + 1$ as the next period in which diver i is active after period t. However, we also show the robustness of our results to continuous time in Section 5.2.

Finally, we use this 'non-dynamic' version of model (1) to estimate the average treatment effect on the treated (ATT) for all periods after treatment:

$$Y_{i,t} = \alpha_0 + \delta \cdot \mathbb{1}\left[\text{first win}_{i,t}^{k}\right] + \phi_i + \gamma_t + \epsilon_{i,t} \ . \tag{2}$$

5. Results

5.1. Basic results

We begin by presenting results from fitting our 'static' model (2), which includes only one treatment indicator variable, to the data. Thus, estimates of the coefficient δ can be interpreted as the average treatment effect on the treated (ATT). Outcome variables are the absolute number of competitions, which can be taken as a proxy for activity, and the extensive and intensive margins of competing in (high-risk) platform competitions.

Table 2 presents our findings for male and female divers separately. While individuals of both genders increase their general activity level after the treatment and are more willing to participate in platform competitions, the change in risk preference differs in magnitude: While also being slightly more active in general (first column), treated male divers are substantially more engaged in platform competitions, both on the extensive (fourth column) and intensive margin (second column). Evaluated at the sample mean, males are, for instance, 37.2% more likely to dive from greater heights in a contest after the treatment (fourth column). For females in our sample, the effect size is 9.88%. On the intensive margin, the difference is similarly sized (50.24 vs. 20.77%, second column). Conditional on participation in platform competitions after treatment, the probabilities of competing in more than one contest from greater heights are 39.24% for female and 50.54% for male divers relative to the sample mean (last column). Figure A.3 in Appendix A shows the robustness of our result for different estimators.

While estimates of the general effect are undoubtedly important, focusing on the treatment dynamics is even more interesting, as it also helps to understand the pre-trends. Panel *(a)* of Figure 2 presents estimates of model (1) and, thus, illustrates our main results. First, it is important to note that the pre-treatment event-time coefficients indicate that the treatment and control groups do not differ in terms of pre-trends. For the periods following the treatment, we observe that our initial result from Table 2 mirrored in the figure: both male and female divers are encouraged to take more risks by their first win, but male divers to a greater extent. We also find the effect to be rather mildly hump-shaped than linear. In addition, panel *(b)* of Figure 2 presents similar results for the intensive margin of risk-taking, that is, when the dependent variable is the absolute number of platform competitions of diver i in quarter t. Our takeaway is that positive feedback in the form of success in a low-risk contest encourages agents in our setting to take more risks, but males seem to react more strongly to it.

To formally test for gender differences in reaction to the first win, we estimate a variant of model (1) including an interaction term between $\mathbb{1}\left[\text{first win}_{i,k}\right]$ and a binary gender indicator. The results are presented in panels *(a)* and *(b)* of Figure 3. We find that the gender gap in risk-taking response to the quasi-treatment is relatively stable for most post-treatment quarters and significant at the 5 per cent level.

Figure 4 below illustrates the average scores for platform competitions in the treatment and control groups for both women's and men's samples. The final score for athletes in the control group is higher for both genders compared to the average score of treated divers before the treatment of their first win from the springboard. This suggests that it is not higher (pre-treatment) ability per se that drives the decision to take risks and compete from the platform more often, but rather the treatment itself – winning a springboard competition for the first time in a young career – and the associated boost in confidence.

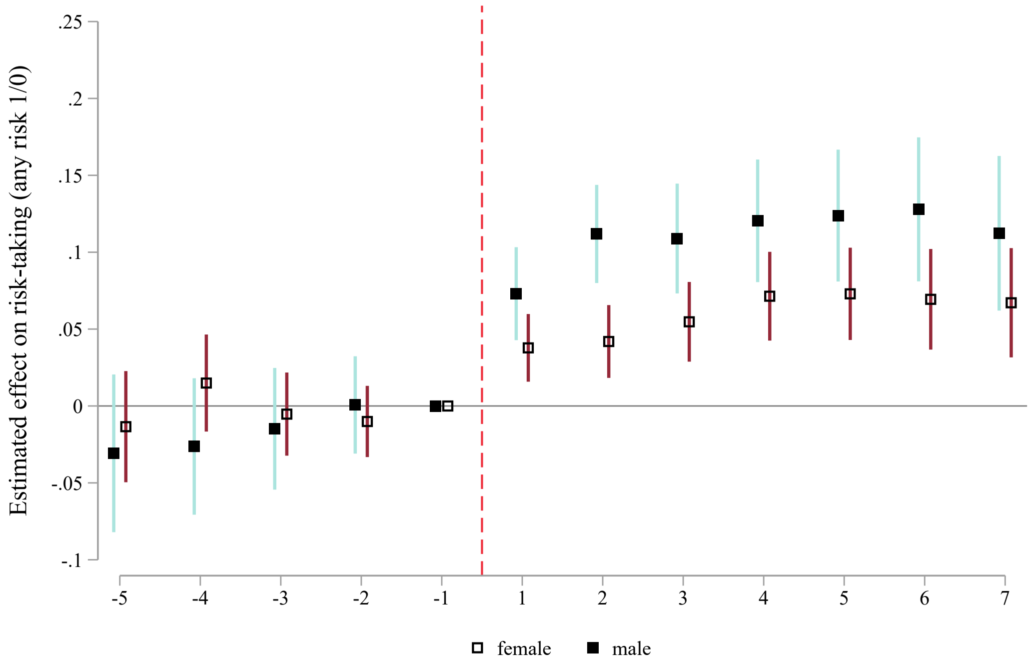
Table 2 — Main results: The effect of positive feedback on risk-taking

	(1) *Number of all comps.*	(2) *Number of platform comps.*	(3) *Share of platform comps.*	(4) *Any platform comp. (0/1)*	(5) *Multiple platform comp. (0/1)*
FEMALE DIVERS					
δ	0.571***	0.099***	0.010***	0.049***	0.031***
	(0.052)	(0.017)	(0.004)	(0.011)	(0.006)
Individual FEs	*yes*	*yes*	*yes*	*yes*	*yes*
Time (quarter) FEs	*yes*	*yes*	*yes*	*yes*	*yes*
Mean dep. var.	3.468	0.344	0.076	0.236	0.079
R^2	0.351	0.447	0.443	0.463	0.311
MALE DIVERS					
δ	0.696***	0.166***	0.022***	0.096***	0.047***
	(0.075)	(0.024)	(0.005)	(0.014)	(0.009)
Individual FEs	*yes*	*yes*	*yes*	*yes*	*yes*
Time (quarter) FEs	*yes*	*yes*	*yes*	*yes*	*yes*
Mean dep. var.	3.619	0.357	0.069	0.224	0.093
R^2	0.378	0.485	0.469	0.485	0.370

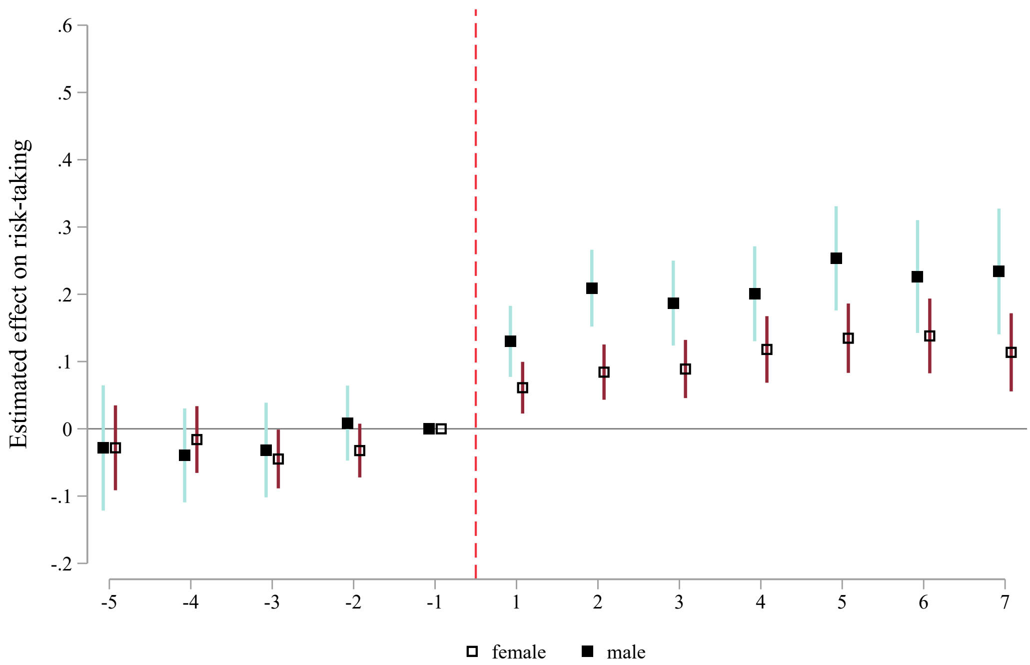
Notes: *, ** and *** indicate statistical significance at the 10%, 5%, and 1% level. Standard errors in parentheses are clustered on the diver level. N = 25,236 for female divers, N = 12,574 for male divers. δ: average post-treatment effect. All model specifications included quarter-of-treatment and diver fixed-effects.

FIGURE 2 — Main results: Extensive and intensive margin

(a) Extensive margin



(b) Intensive margin

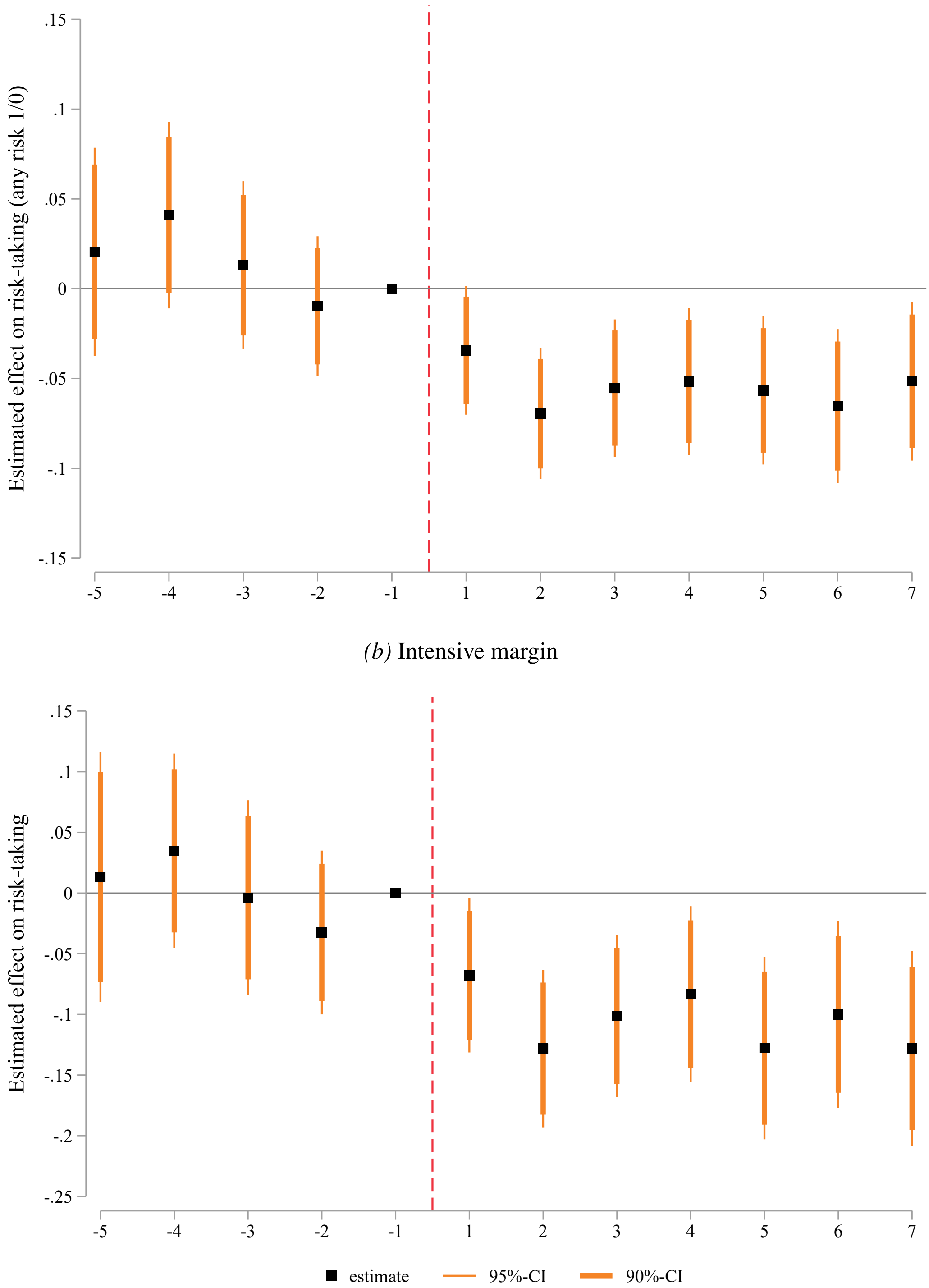


Notes: This figure presents estimates of the two-way fixed-effects model and 95% confidence intervals. The dependent variable for panel *(a)* is equal to 1 if diver *i* participates in a platform competition in quarter *t* (0 otherwise). The dependent variable for panel *(b)* is the absolute number of platform competitions in quarter *t* in which diver *i* has participated. Standard errors are clustered on the diver level.

Figure 3 — Main results: Extensive margin margin - gender differences

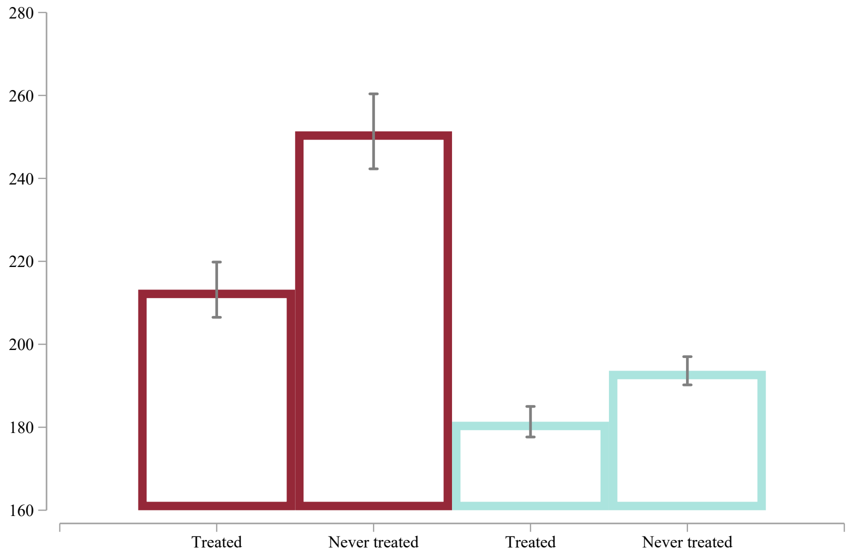
(a) Extensive margin

(b) Intensive margin



Notes: Estimates represent an interaction of all time indicators (β_k) of the TWFE model with the gender indicator and 95% confidence intervals. The dependent variable for panel *(a)* is equal to 1 if diver i participates in a platform competition in quarter t (0 otherwise). The dependent variable for panel *(b)* is the absolute number of platform competitions in quarter t in which diver i has participated. Standard errors are clustered on the diver level.

FIGURE 4 — Average score for platform competitions by gender and treatment status



Notes: Treated means include all pre-treatment periods, the quarter of the first win, and the first post-treatment quarter. For the control group (which never records a win), all quarters are considered. Only competition finals are included. Sample means and 95% confidence intervals are shown.

5.2. Robustness

We conducted additional analyses to verify the robustness of our results. First, we acknowledge the concern expressed by Sun & Abraham (2021) that in standard TWFE models, estimates of the treatment effect might be biased due to heterogeneous and dynamic treatment effects. We, therefore, re-estimate model (1) using the interaction-weighted estimator proposed in their paper. Figures A.4 and A.5 in the Appendix confirm our prior results: The gender gap in the difference in effect size is even more apparent here.

Second, Figures A.6 and A.7 show the robustness of our main result for continuous time, with exactly one quarter between periods k. Since, naturally, athletes cannot compete at any time, the estimated treatment effects slightly differ from our preferred specifications. This also captures the fact that there are time gaps between the intention to participate in a contest, the registration process, and the actual event. However, our main results are confirmed.

Third, we analyse the whole dataset, using all available information without restrictions on age, timing, and control group definitions, to ensure that sample selection does not bias our results. Specifically, we re-estimate model (1) with a sample of 6,683 individuals and 90,058 observations on the diver-quarter level. The results for the extensive margin are presented in Figure A.8 in the Appendix. Panel *(a)* illustrates all periods before and after the treatments. Since outliers at the extremes of the interval can obscure the main effect, panel (b) zooms in on the baseline sample – covering ten quarters before and thirty quarters after treatment. Here, the estimates are quantitatively very close to the results from Figure 2: Male divers are significantly more likely to participate in high-risk platform competitions after their first win in a low-risk springboard contest than female divers. The effect is also positive and statistically significant for male divers up to 10 quarters after the victory. For women, the estimated effect is quantitatively smaller, and it flattens out earlier. Figure A.9 present the analogous estimates for the intensive margin. Again, our main results are confirmed. We conclude that sample selection does not explain our main finding. Furthermore, this exercise addresses another concern: platform diving could mean career progression, for instance, due to the longer sequence of routines. The fact that the positive feedback effect flattens out at some point suggests that it is not purely mechanical in the sense of sorting the most talented athletes into platform diving.

Another potential concern is attrition within the control group of divers who are never treated – that is, those who never win a competition. For example, divers who do not achieve a win between ages 10 and 18 may be more likely to drop out of competition entirely. To address this, we restrict the control group to divers whom we observe at both ages 10 and 18. This ensures a complete observation window during the critical developmental period, mitigating concerns about selective attrition bias. The corresponding results are shown in Figure A.10, and all main findings remain robust.

Finally, we address the issue that some competitors are treated by winning in events where only a single ranked diver is observed in the data. This may result from other participants failing to make valid attempts, not competing at all, or due to errors in data recording. To eliminate potential bias arising from such cases, we re-estimate our TWFE model, excluding these observations. The results are presented in Figure A.11 in the Appendix and confirm our main results presented in Figure 2.

6. Mechanisms

In this section, we investigate the mechanisms that explain the effect of positive feedback on the gender gap in the willingness to take risks and its evolution. In Sections 6.1 and 6.2, we conduct a heterogeneity analysis examining two key factors: prior risk experience and age. If the increase in risk tolerance is caused by higher levels of self-efficacy gained from competition success, then the athlete's pre-treatment risk type should matter. Furthermore, since prior literature documents that risk attitudes are not constant over the life cycle, suggesting that there are times when attitudes are more flexible and open to change, age at treatment time might also plays a role.

In Sections 6.3 to 6.5, we assess the role of potential channels that can moderate the treatment effect. These are the intensity of the treatment (Section 6.3), the coaches' gender (Section 6.4), and the risk preferences of peers (Section 6.5). We will focus on the extensive margin. Results for the intensive margin can be found in Appendix A.

6.1. Prior risk experience

As described in Section 3, a change in (perceived) self-efficacy can explain why positive feedback increases the willingness to take risks. In our context, the mastery experience gained from winning a springboard contest, combined with social persuasion from coaches, peers, and others, may increase confidence in one's abilities and encourage divers to take the next step in their careers, expand their portfolios, and compete in high-risk platform contests. If this is true, the positive feedback should have a greater impact on those divers with high risk aversion than on more risk-tolerant individuals. In other words, we do not expect to see an effect for the group of divers who already have some platform contest experience but for those who have not.

Therefore, in the analysis, we split the sample into two groups: divers with and without prior platform experience. Figure 5 presents estimates of model (1) for both groups. In line with our expectations, it shows that the effect is completely driven by the group of risk-averse divers without prior engagement in (high-risk) platform contests. Hence, we take this finding as evidence in favour of the idea that it is indeed a change in preferences (and not talent, for instance) that is key to our main result, which is the greater willingness to take risks after success.

6.2. Age at treatment

As noted above, prior research suggests that the gender gap in risk preferences evolves in adolescence when girls but not boys become more risk-averse. Besides a hormonal change, this is when attitudes are more flexible and open to change. In our setting, female divers could be more open to a change in risk preferences when they are younger. They might also be less responsive afterwards, as their preferences may lead them to avoid taking the higher risks associated with platform diving. Furthermore, positive feedback may have a greater impact on self-efficacy in the early stages of a career, when the success of future performance is still uncertain (Feltz 1988). Therefore, we choose 14 years as a threshold for the following analysis.

Figure 6 illustrates estimates of the βs defined in model (1) for divers who were treated before and after the age of 14 separately. Both panels show, if any, only mild differences in the treatment effect in favour of *early* ($<$ 14 years) and *late* ($\geq$ 14 years) male and female winners, suggesting that the specific time of treatment in adolescence does not play a dominant role in our setting.

6.3. Treatment intensity

Next, we turn to the intensity of the treatment. For some divers, winning a competition may come as a surprise; for others – those who consistently rank among the top and narrowly miss victory – it may be anticipated. As a result, the boost in confidence and the subsequent effect on risk preferences are likely to differ between these two groups of athletes. For the analysis, we define a position between second and fourth place as a *top performance*. Before their first win, the median number of *top performances* is three in our sample. We hence define the treatment effect as strong (weak) for athletes with less than three (more than two) *top performances* before the treatment.

Figure 7 illustrates the results. It shows a substantial and significant increase in the willingness to participate in a high-risk platform competition for athletes who experienced a strong treatment. This result applies to female and male divers, whereas we estimate a zero effect for the group of female divers who experienced a weak treatment. This suggests that the gender difference documented in our main result is moderated by the treatment intensity, i.e. prior success. The finding may also be seen in reference to prior research on gender gaps in self-confidence (e.g., Casale 2020, Alan et al. 2020, Exley & Kessler 2022) and belief updating in response to feedback (e.g., Coffman et al. 2024).

Moreover, since winning a contest for the first time is likely to be perceived as a positive shock by divers who are unaccustomed to high achievement, we also contribute to the literature on shocks on risk preferences. This literature, however, focuses on adverse events such as violence (Callen et al. 2014, Bucciol & Zarri 2015), losing a child (Bucciol & Zarri 2015, Meier 2022), and natural disasters (Cameron & Shah 2015, Hanaoka et al. 2018). With a focus on treatment during childhood, evidence is mixed. While Bellucci et al. (2020) show that children exposed to World War II are less likely to invest in stocks but more likely to hold life insurance, Yi et al. (2022) find that children who endured hardships caused by famine are more likely to become entrepreneurs, suggesting increased risk tolerance. Similarly, the results presented by (Uğur & Doğanay 2024) suggest that exposure to the Syrian war makes children more risk-tolerant. Referring to gender differences in the reaction to adverse shocks, Rice & Robone (2022) document that unanticipated health shock experienced by men decreases the household's financial risk tolerance, while they do not find this effect for the female part of the couple.

6.4. Coaches

As noted in Section 3, the increase in self-efficacy gained from experiencing a win can be moderated by the social environment. In sports, coaches can act as role models and encourage their protégés to move on to the next step on their career ladder. Moreover, the effects of social persuasion may vary with the coaches' and athletes' gender due to differences in speech and identification, for instance. Previous studies have demonstrated that a coach's gender can influence the risk behaviour of individuals (Böheim et al. 2025, Rinne & Sonnabend 2022).

While our data does not allow for a clear identification of the person who coached diver i in a given quarter t, we have information about the divers' coaches at each stage of their careers, such as high school, Amateur Athletic Union (AAU), and USA Diving. To classify a coach's gender, first names were fed into the application programming interface (API) of the deep-learning-driven gender detection tool available at *genderize.io*. We then analyse the treatment effect for two groups: divers who are the same gender as their coach(es) and those who are not.

The results of this approach are shown in Figure 8. We find evidence that sharing the coach's gender is an important moderator of the treatment effect for males but far less important for females.

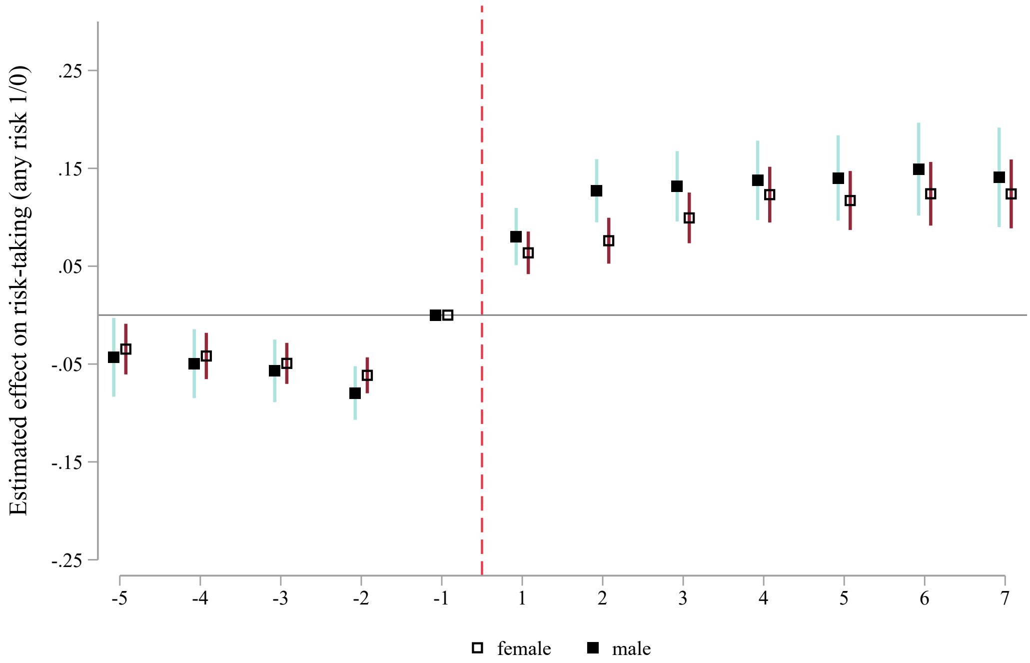
6.5. *Peers*

In the final step, we focus on potential peer effects. The literature suggests that individuals in general (Bougheas et al. 2013, Lopera & Marchand 2018, Ager et al. 2022) and adolescents (Lucks et al. 2020) do change their risk-taking decisions in response to the risk-taking behaviour of their peers. Regarding social learning, an environment with more risk-tolerant peers may catalyse the increase in self-efficacy gained through the mastery experience of winning a springboard contest.

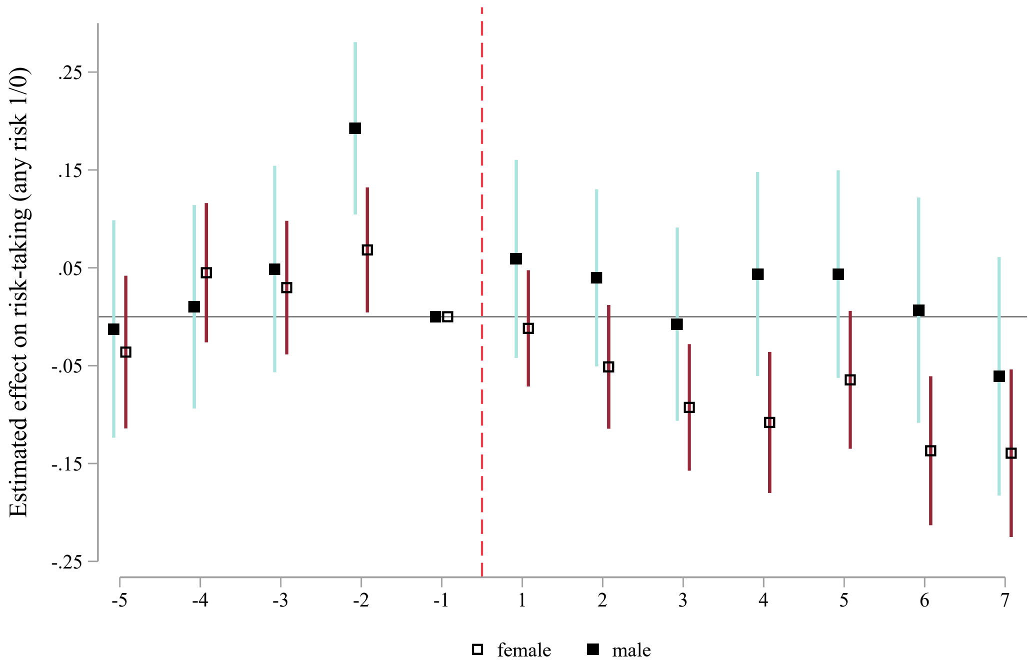
In the underlying competitive setting, we define peers as all divers who have the same gender and age during a particular quarter in our data. We calculate the extensive and intensive margin of competing in risky platform competitions for all peers and split the sample according to the gender-specific median. Results for the extensive margin are presented in Figure 9. We do not find that the self-efficacy effect for male and female divers is moderated by peer behaviour.

Figure 5 — Effect heterogeneity: risk type

(a) No prior platform experience



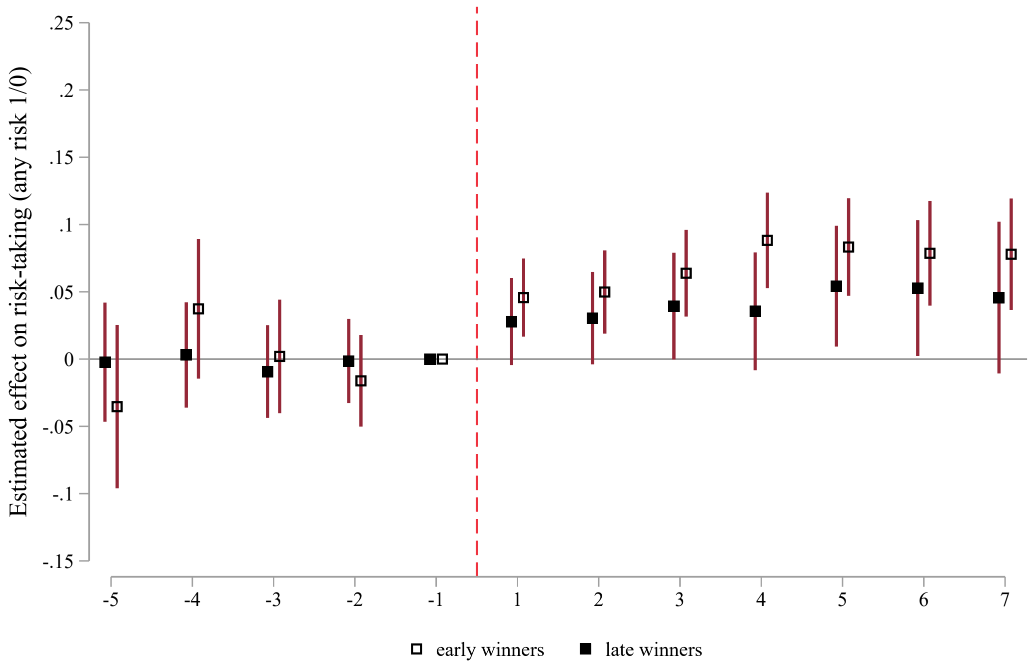
(b) Prior platform experience



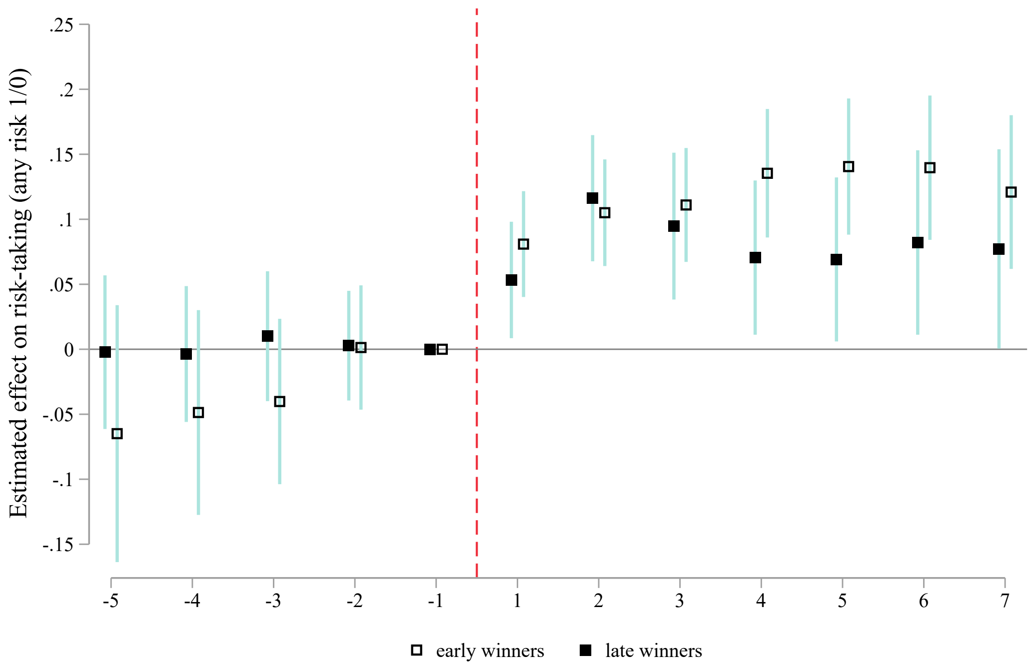
Notes: This figure presents estimates of the two-way fixed-effects model and 95% confidence intervals. The dependent variable is equal to 1 if diver i participates in platform competitions in quarter t (0 otherwise). The sample is split into two groups: divers with prior experience in platform competitions (panel *(a)*) and those without (panel *(b)*). Standard errors are clustered on the diver level.

FIGURE 6 — Effect heterogeneity: age at treatment

(a) Women



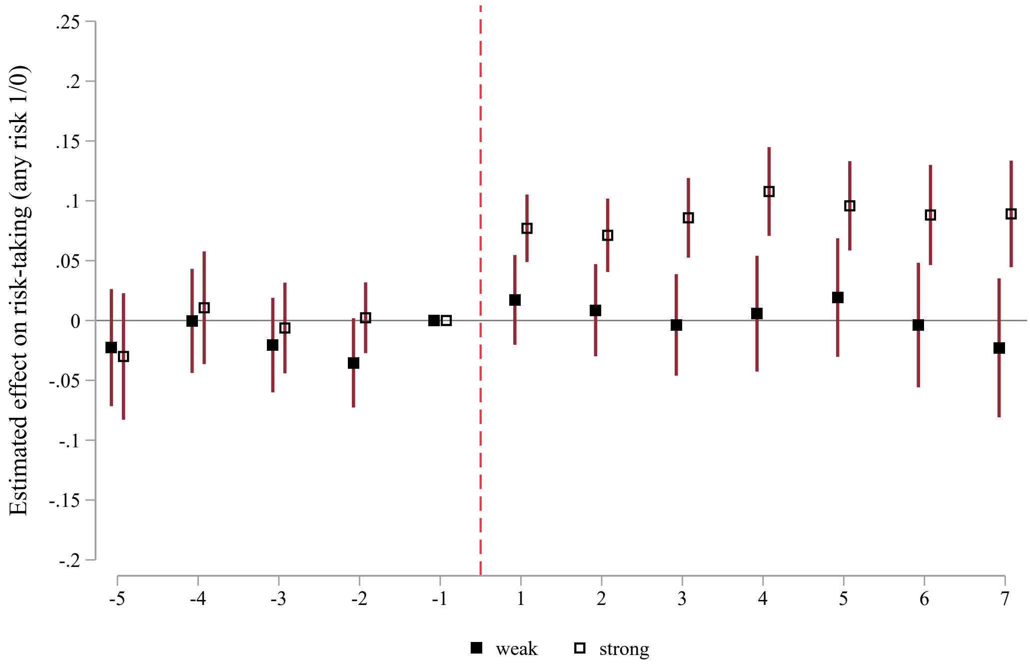
(b) Men



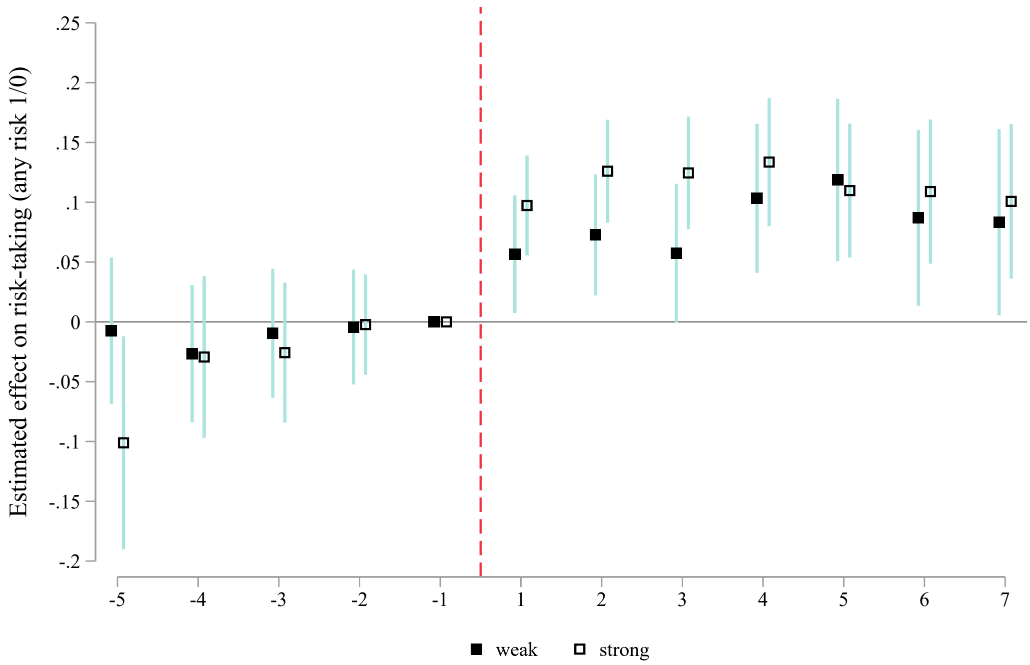
Notes: This figure presents estimates of the two-way fixed-effects model and 95% confidence intervals. The dependent variable is equal to 1 if diver i participates in platform competitions in quarter t (0 otherwise). *Early winners*: aged 10 to 13; *late winners*: aged 14 to 18. Standard errors are clustered on the diver level.

Figure 7 — Effect heterogeneity: treatment intensity

(a) Women



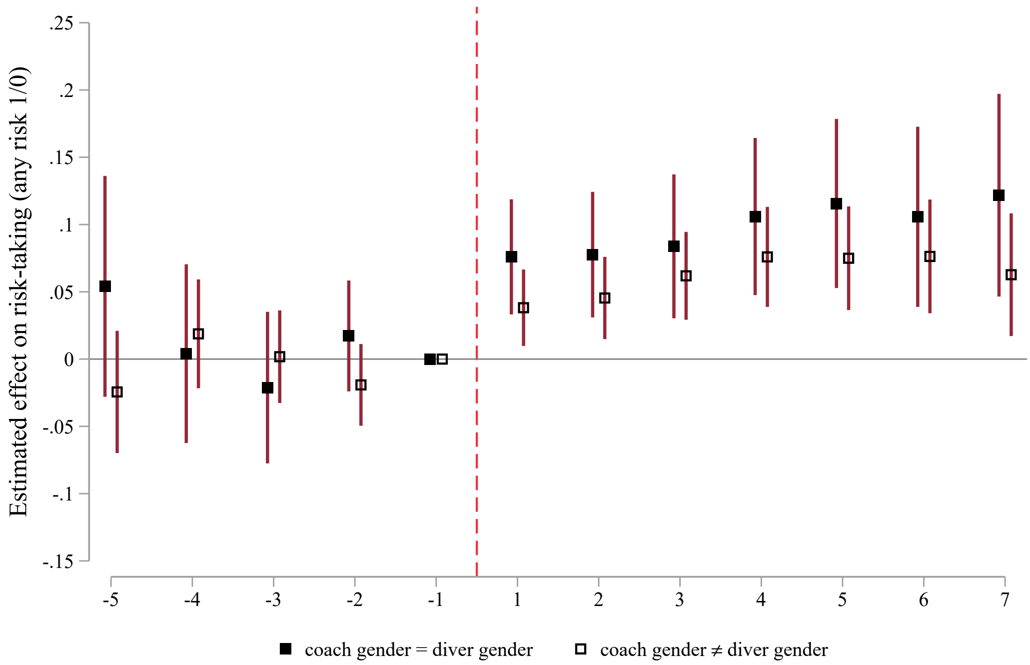
(b) Men



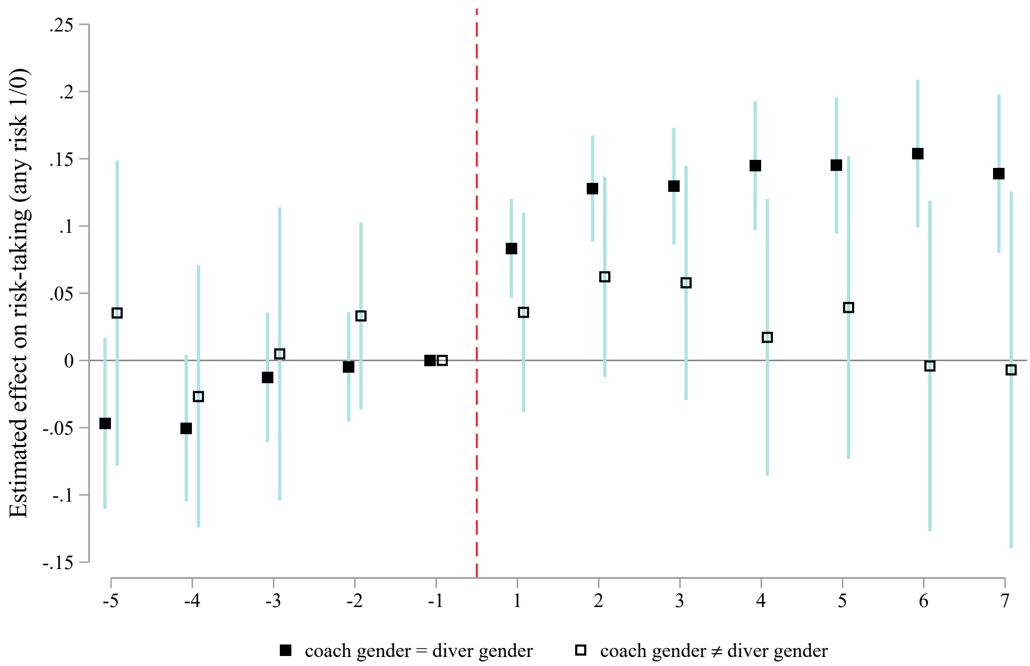
Notes: This figure presents estimates of the two-way fixed-effects model and 95% confidence intervals. The dependent variable is equal to 1 if diver i participates in platform competitions in quarter t, and 0 otherwise. *Strong treatment*: Athletes with less than three placements in ranks 2–4 before the treatment. *Weak treatment*: Athletes with three or more such placements. The sample median is three. Standard errors are clustered at the diver level.

Figure 8 — Effect heterogeneity: coach's gender

(a) Women



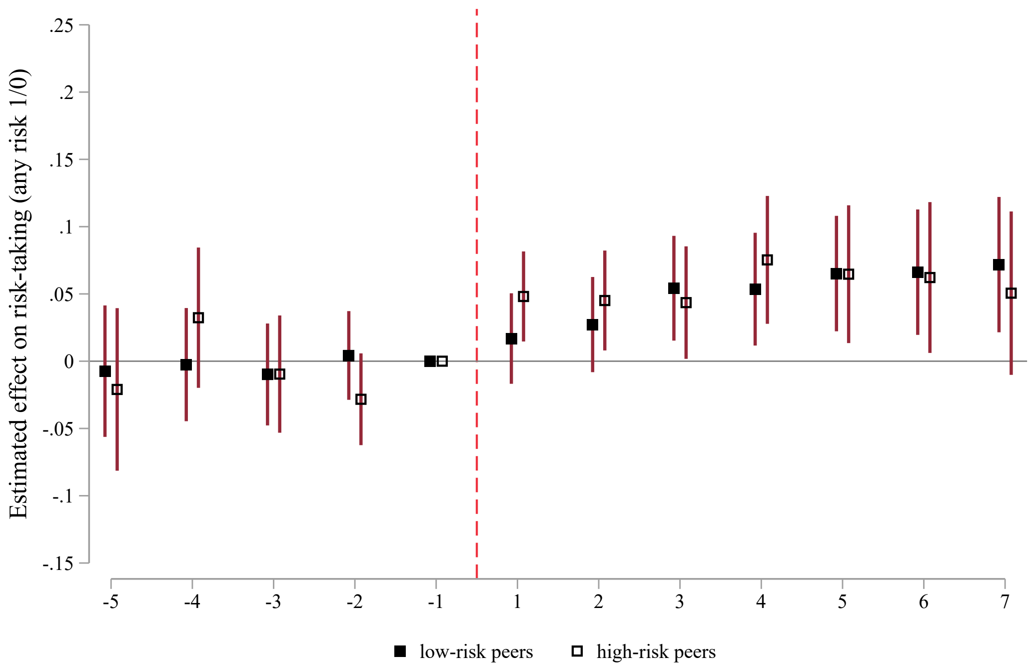
(b) Men



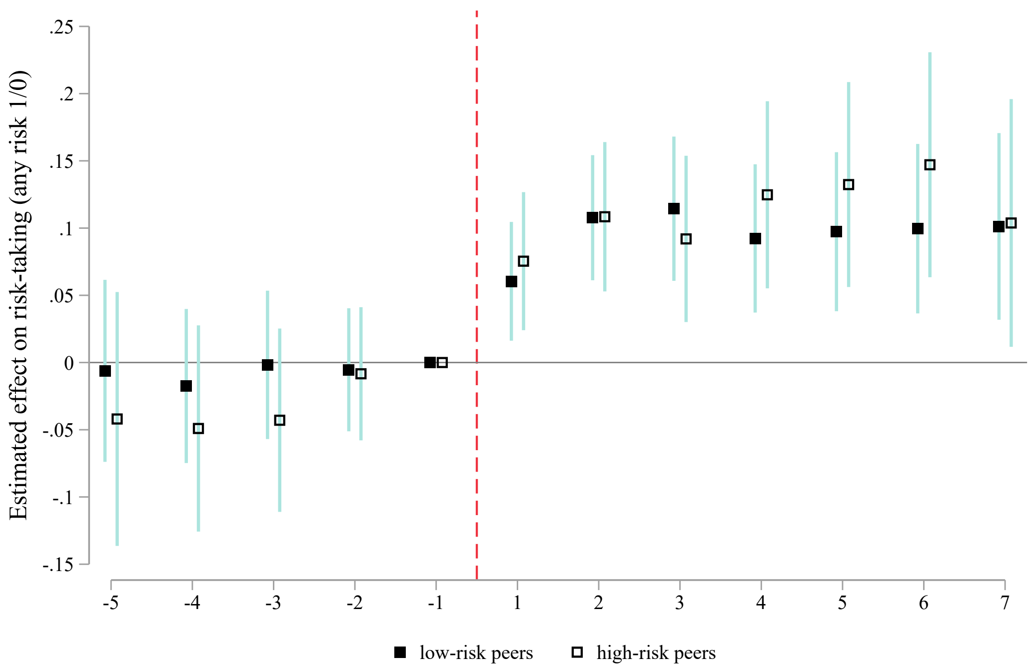
Notes: This figure presents estimates of the two-way fixed-effects model and 95% confidence intervals. The dependent variable is equal to 1 if diver i participates in platform competitions in quarter t (0 otherwise). Standard errors are clustered on the diver level.

FIGURE 9 — Effect heterogeneity: risk-taking by peers

(a) Women



(b) Men



Notes: This figure presents estimates of the two-way fixed-effects model and 95% confidence intervals. The dependent variable is equal to 1 if diver *i* participates in platform competitions in quarter *t* (0 otherwise). *High-risk peers*: above-median risk-taking by all peers. *Low-risk peers*: below-median risk-taking peers. Peers are defined as all divers with the same age in a given quarter. Risk-taking by peers is defined as the share of peers who participate in any risky platform competitions. Standard errors are clustered on the diver level.

6.6. Outcome effects

Finally, we investigate if increasing the risk is beneficial for careers in the profession, not in the sense of a promotion but as a return to versatility. Switching to more challenging and hence less favourite heights should reduce the intensity of competition within the group of elite divers.

Specifically, we estimate a model of participation in prestigious national or international competitions within a diver's career such as the US trials, national or world championships, and the Olympics. In other words, this means pursuing a professional career and earning a living from the sport. The focus independent variable, *Risk*, is defined as the share of quarters with participation in at least one platform competition after the first win in a springboard contest, and is interacted with the diver's gender. Furthermore, we control for the number of contests before the first win as a proxy for experience. Finally, youth coach (see Section 6.4) and year-of-the-first-win fixed effects were added to the model. In total, we can use a sample of 3,085 treated divers for whom complete information is available (approximately 84% of all treated divers).

Table 3 presents the results. We find that divers who competed in platform events post-treatment are more likely to become elite divers: a one-percentage-point increase in the share of quarters after treatment with at least one competition from the platform increases the probability of participation in national (international) competitions by 0.4 (0.05) percentage points, see columns (1) and (4). Evaluated at the sample mean of the dependent variable, this corresponds to 1.3% (3.0%) increase.

Moreover, while we find only very weak evidence of gender difference in the treatment effect, columns (2), (3), (5), and (6) show that the age at treatment matters: Divers benefit more from increasing the risk if the treatment happens at a very early age, i.e. before the age of 12 (note that 13 is the median age of the first springboard contest victory.) Given the minor role of age as a mediator of the treatment effect (Section 6.2), the early demonstration of excellence combined with more open career paths may explain this finding. Table B.1 in the Appendix presents estimates for a variant of our model where *Risk* is defined as the share of platform contests in absolute numbers compared to the total number of competitions after the first springboard win.

In addition to examining long-term career outcomes, we also assess the treatment effect on (short-term) success within a dynamic framework. Specifically, we estimate our TWFE model (1) using two new dependent variables: (i) the total number of wins and (ii) the number of wins in platform competitions. The results are presented in Figure A.17 in the Appendix. The estimates indicate that both treated female and male divers experience an increase in overall wins (Panel b) and in platform-specific wins (Panel a) following treatment. However, a notable gender difference emerges: male divers exhibit a significantly larger increase in the number of victories compared to their female counterparts.

TABLE 3 — Association of risk and later career paths: extensive margin

PANEL A: NATIONAL COMPETITION	(1)	(2)	(3)
Age at first win:	**all**	**>12**	**≤12**
Risk (extensive margin)	0.0043***	0.0031***	0.0055***
	(0.0004)	(0.0006)	(0.0007)
Female	–0.0527**	–0.0342	–0.0769**
	(0.0209)	(0.0334)	(0.0331)
Female × Risk	–0.0009*	–0.0005	–0.0014*
	(0.0005)	(0.0008)	(0.0008)
No. of comps.	–0.0027*	–0.0030	–0.0030
before first win	(0.0016)	(0.0025)	(0.0021)
Year of first win FE	*yes*	*yes*	*yes*
Youth coach FE	*yes*	*yes*	*yes*
N	3,085	1,473	1,612
Mean dep. var.	0.320	0.286	0.350
R^2	0.390	0.445	0.445

PANEL B: INTERNATIONAL COMPETITION	(4)	(5)	(6)
Age at first win:	**all**	**>12**	**≤12**
Risk (extensive margin)	0.0005***	0.0002	0.0004**
	(0.0002)	(0.0003)	(0.0002)
Female	0.0043	–0.0088	0.0048
	(0.0049)	(0.0092)	(0.0038)
Female × Risk	–0.0004*	0.0002	–0.0004*
	(0.0002)	(0.0004)	(0.0002)
No. of comps.	–0.0003	0.0000	–0.0004
before first win	(0.0005)	(0.0008)	(0.0006)
Year of first win FE	*yes*	*yes*	*yes*
Youth coach FE	*yes*	*yes*	*yes*
N	3,085	1,473	1,612
Mean dep. var.	0.016	0.013	0.018
R^2	0.237	0.241	0.417

Notes: *, ** and *** indicate statistical significance at the 10%, 5%, and 1% level. Standard errors in parentheses are clustered on the year-of-first-win level. The dependent variable for columns (1) to (3) is equal to 1 if diver i's career includes at least one participation in a national competition (0 otherwise). The dependent variable for columns (4) to (6) is equal to 1 if diver i's career includes at least one participation in a World Championship or at the Olympic Games. $Risk$: share of quarters with participation in at least one platform competition after the first win in a springboard contest; mean 0.252 and std. dev. 0.330.

7. Discussion and Conclusion

Men and women tend to differ in their willingness to take risks. This difference does not exist in early childhood but develops over time. We present a mechanism that affects the evolution of risk preferences but has received little attention so far: positive feedback. Furthermore, we extend the existing literature on gender differences in risk-taking in children and adolescents to an environment with real health risks that – for obvious reasons – cannot be studied in experimental settings. In doing so, we complement previous research that relies on low risks in experiments (e.g., Sutter et al. 2019) or more substantial financial risks in a game show (Säve-Söderbergh & Sjögren Lindquist 2017, Jetter & Walker 2020).

In the 'real-world, real risk' setting of competitive diving, we find that individuals aged 10 to 18 of both genders respond to success in a low-risk contest with a greater willingness to participate in contests associated with a higher risk. However, the effect is two to three times larger – or about 5 percentage points in the extensive margin – for male divers and lasts longer.

In a heterogeneity analysis, we provide evidence that positive feedback works by encouraging individuals who previously shy away from high-risk contests. Moreover, for females, the intensity of the 'quasi-treatment' matters as the effect is entirely driven by the group of divers with below-median prior success – those for whom success is less expected – highlighting the role of early success in low-risk contests for building self-efficacy and confidence. Regarding the social environment, we find supportive evidence in favour of a moderating role of coaches but not for peers. Importantly, we find no evidence that age at treatment plays a significant role in moderating these effects within the 10–18 age range. This suggests that the observed increase in risk-taking is driven by the positive success shock itself rather than by age-related differences in the development of risk preferences across genders (Khachatryan et al. 2015).

Finally, although (high-risk) platform diving cannot be seen as a promotion, our results suggest that increasing the risk pays off: Athletes who add platform diving to their portfolios after their first win are more likely to be among the national or international top divers. This implies that evolving gender differences in risk-taking cannot be attributed to divergent career trajectories, as increased risk is associated with greater long-term success for both genders. However, male divers appear to benefit more from this shift in the short run: they achieve higher competitive success in the periods following their first win and the corresponding increase in risk-taking.

References

Ager, P., Bursztyn, L., Leucht, L. & Voth, H.-J. (2022), 'Killer Incentives: Rivalry, Performance and Risk-Taking among German Fighter Pilots, 1939–45', *The Review of Economic Studies* **89**(5), 2257–2292.

Alan, S., Baydar, N., Boneva, T., Crossley, T. F. & Ertac, S. (2017), 'Transmission of risk preferences from mothers to daughters', *Journal of Economic Behavior & Organization* **134**, 60–77. https://doi.org/10.1016/j.jebo.2016.12.014.

Alan, S., Ertac, S., Kubilay, E. & Loranth, G. (2020), 'Understanding gender differences in leadership', *The Economic Journal* **130**(626), 263–289.

Andersen, S., Ertac, S., Gneezy, U., List, J. A. & Maximiano, S. (2013), 'Gender, competitiveness, and socialization at a young age: Evidence from a matrilineal and a patriarchal society', *Review of Economics and Statistics* **95**(4), 1438–1443.

Andreoni, J., Di Girolamo, A., List, J. A., Mackevicius, C. & Samek, A. (2020), 'Risk preferences of children and adolescents in relation to gender, cognitive skills, soft skills, and executive functions', *Journal of Economic Behavior & Oganization* **179**, 729–742.

Bandura, A. (1977), 'Self-efficacy: toward a unifying theory of behavioral change.', *Psychological Review* **84**(2), 191.

Bandura, A. (1997), *Self-Efficacy: The Exercise of Control*, W. H. Freeman and Company (USA).

Baretta, D., Greco, A. & Steca, P. (2017), 'Understanding performance in risky sport: The role of self-efficacy beliefs and sensation seeking in competitive freediving', *Personality and Individual Differences* **117**, 161–165.

Bellucci, D., Fuochi, G. & Conzo, P. (2020), 'Childhood exposure to the second world war and financial risk taking in adult life', *Journal of Economic Psychology* **79**, 102196.

Bertrand, M. (2018), 'Coase lecture–the glass ceiling', *Economica* **85**(338), 205–231.

Blanksby, B. A., Wearne, F. K., Elliot, B. C. & Blitvich, J. D. (1997), 'Aetiology and occurrence of diving injuries: a review of diving safety', *Sports Medicine* **23**, 228–246.

Blau, F. D. & Kahn, L. M. (2017), 'The gender wage gap: Extent, trends, and explanations', *Journal of Economic Literature* **55**(3), 789–865.

Böheim, R., Freudenthaler, C. & Lackner, M. (2025), 'Male coaches increase the risk-taking of female teams — Evidence from the NCAA', *Labour Economics* **94**, 102692.

Booth, A. L. & Nolen, P. (2012), 'Gender differences in risk behaviour: does nurture matter?', *The Economic Journal* **122**(558), F56–F78.

Bougheas, S., Nieboer, J. & Sefton, M. (2013), 'Risk-taking in social settings: Group and peer effects', *Journal of Economic Behavior & Organization* **92**, 273–283.

Bucciol, A. & Zarri, L. (2015), 'The shadow of the past: Financial risk taking and negative life events', *Journal of Economic Psychology* **48**, 1–16.

Buser, T. (2016), ‘The impact of losing in a competition on the willingness to seek further challenges’, *Management Science* **62**(12), 3439–3449.

Buser, T., Niederle, M. & Oosterbeek, H. (2014), ‘Gender, competitiveness, and career choices’, *The Quarterly Journal of Economics* **129**(3), 1409–1447.

Callen, M., Isaqzadeh, M., Long, J. D. & Sprenger, C. (2014), ‘Violence and risk preference: Experimental evidence from afghanistan’, *American Economic Review* **104**(1), 123–148.

Cameron, L. & Shah, M. (2015), ‘Risk-taking behavior in the wake of natural disasters’, *Journal of Human Resources* **50**(2), 484–515.

Casale, S. (2020), ‘Gender differences in self-esteem and self-confidence’, *The Wiley Encyclopedia of Personality and Individual Differences: Personality Processes and Individual Differences* pp. 185–189.

Coffman, K., Collis, M. R. & Kulkarni, L. (2024), ‘Stereotypes and belief updating’, *Journal of the European Economic Association* **22**(3), 1011–1054.

Coffman, K. & Klinowski, D. (2025), ‘Gender and preferences for performance feedback’, *Management Science* **71**(4), 3497–3516.

Croson, R. & Gneezy, U. (2009), ‘Gender differences in preferences’, *Journal of Economic Literature* **47**(2), 448–474.

Day, C., Stolz, U., Mehan, T. J., Smith, G. A. & McKenzie, L. B. (2008), ‘Diving-related injuries in children < 20 years old treated in emergency departments in the United States: 1990–2006’, *Pediatrics* **122**(2), e388–e394.

Delhomme, P. & Meyer, T. (2004), ‘Risk taking and self-efficacy among young male drivers: Self-efficacy and changing task demands’, *Traffic & Transport Psychology* pp. 135–146.

Dohmen, T. & Falk, A. (2011), ‘Performance pay and multidimensional sorting: Productivity, preferences, and gender’, *American Economic Review* **101**(2), 556–590.

Dohmen, T., Falk, A., Golsteyn, B. H., Huffman, D. & Sunde, U. (2017), ‘Risk attitudes across the life course.’, *Economic Journal* **127**(605).

Dohmen, T., Falk, A., Huffman, D. & Sunde, U. (2012), ‘The intergenerational transmission of risk and trust attitudes’, *Review of Economic Studies* **79**(2), 645–677.

Dohmen, T., Quercia, S. & Willrodt, J. (2023), ‘On the psychology of the relation between optimism and risk taking’, *Journal of Risk and Uncertainty* pp. 1–22.

Exley, C. L. & Kessler, J. B. (2022), ‘The gender gap in self-promotion’, *The Quarterly Journal of Economics* **137**(3), 1345–1381.

Feltz, D. L. (1988), ‘Self-confidence and sports performance’, *Exercise and Sport Sciences Reviews* **16**, 423–457.

Filippin, A. & Crosetto, P. (2016), ‘A reconsideration of gender differences in risk attitudes’, *Management Science* **62**(11), 3138–3160.

Flory, J. A., Leibbrandt, A. & List, J. A. (2015), ‘Do competitive workplaces deter female workers? A large-scale natural field experiment on job entry decisions’, *The Review of Economic Studies* **82**(1), 122–155.

Gauriot, R. & Page, L. (2019), ‘Does success breed success? A quasi-experiment on strategic momentum in dynamic contests’, *The Economic Journal* **129**(624), 3107–3136.

Genakos, C., Pagliero, M. & Garbi, E. (2015), ‘When pressure sinks performance: Evidence from diving competitions’, *Economics Letters* **132**, 5–8.

Goller, D. & Spath, M. (2023), ‘Gender differences in investment reactions to irrelevant information’, *CEPA Discussion Paper No. 67* .

Hanaoka, C., Shigeoka, H. & Watanabe, Y. (2018), ‘Do Risk Preferences Change? Evidence from the Great East Japan Earthquake’, *American Economic Journal: Applied Economics* **10**(2), 298–330.

Heslin, P. A. & Klehe, U.-C. (2006), Self-efficacy, *in* S. G. Rogelberg, ed., ‘Encyclopedia Of Industrial/Organizational Psychology’, Vol. 2, SAGE Publications, USA, pp. 705–708.

Jetter, M. & Walker, J. K. (2020), ‘Gender differences in performance and risk-taking among children, teenagers, and college students: Evidence from Jeopardy!’, *The BE Journal of Economic Analysis & Policy* **20**(2), 20190179.

Jones, N. S. (2017), ‘Competitive diving principles and injuries’, *Current Sports Medicine Reports* **16**(5), 351–356.

Khachatryan, K., Dreber, A., Von Essen, E. & Ranehill, E. (2015), ‘Gender and preferences at a young age: Evidence from armenia’, *Journal of Economic Behavior & Organization* **118**, 318–332.

Klein, W. M. & Kunda, Z. (1994), ‘Exaggerated self-assessments and the preference for controllable risks’, *Organizational Behavior and Human Decision Processes* **59**(3), 410–427.

Krueger Jr, N. & Dickson, P. R. (1994), ‘How believing in ourselves increases risk taking: Perceived self-efficacy and opportunity recognition’, *Decision Sciences* **25**(3), 385–400.

Lackner, M. & Weichselbaumer, M. (2023), ‘Can barely winning lead to losing? gender and past performance’, *Journal of Economic Behavior & Organization* **208**, 258–274.

le Viet, D. T., Lantieri, L. A. & Loy, S. M. (1993), ‘Wrist and hand injuries in platform diving’, *The Journal of Hand Surgery* **18**(5), 876–880.

Llewellyn, D. J., Sanchez, X., Asghar, A. & Jones, G. (2008), ‘Self-efficacy, risk taking and performance in rock climbing’, *Personality and Individual differences* **45**(1), 75–81.

Lopera, M. A. & Marchand, S. (2018), ‘Peer effects and risk-taking among entrepreneurs: Lab-in-the-field evidence’, *Journal of Economic Behavior & Organization* **150**, 182–201.

Los Angeles Times (2021), ‘Broken wrists, twisted necks and concussions: The brutal nature of Olympic diving ’, https://www.latimes.com/sports/olympics/story/2021-07-29/broken-wrists-concussions-brutal-nature-olympics-diving.

Lucks, K. E., Lührmann, M. & Winter, J. (2020), 'Assortative matching and social interaction: A field experiment on adolescents' risky choices', *Journal of Economic Behavior & Organization* **170**, 313–340.

Macko, A. & Tyszka, T. (2009), 'Entrepreneurship and risk taking', *Applied Psychology* **58**(3), 469–487.

Meier, A. N. (2022), 'Emotions and risk attitudes', *American Economic Journal: Applied Economics* **14**(3), 527–558.

Merritt, C. J. & Tharp, I. J. (2013), 'Personality, self-efficacy and risk-taking in parkour (free-running)', *Psychology of Sport and Exercise* **14**(5), 608–611.

Montford, W. & Goldsmith, R. E. (2016), 'How gender and financial self-efficacy influence investment risk taking', *International Journal of Consumer Studies* **40**(1), 101–106.

Niederle, M. & Vesterlund, L. (2007), 'Do women shy away from competition? Do men compete too much?', *Quarterly Journal of Economics* **122**(3), 1067–1101. https://doi.org/10.1162/qjec.122.3.1067.

Pattinson, E. M., Cotterill, S. T. & Leyland, S. (2017), 'Sources of self-efficacy in springboard and highboard diving: A qualitative investigation', *Sport & Exercise Psychology Review* **13**(1).

Post, P. G., Simpson, D., Young, G. & Parker, J. F. (2014), 'A phenomenological investigation of divers' lived experience of imagery', *Journal of Imagery Research in Sport and Physical Activity* **9**(1), 67–82.

Reuben, E., Wiswall, M. & Zafar, B. (2017), 'Preferences and biases in educational choices and labour market expectations: Shrinking the black box of gender', *The Economic Journal* **127**(604), 2153–2186.

Rice, N. & Robone, S. (2022), 'The effects of health shocks on risk preferences: Do personality traits matter?', *Journal of Economic Behavior & Organization* **204**, 356–371.

Rinne, U. & Sonnabend, H. (2022), 'Female workers, male managers: Gender, leadership, and risk-taking', *Southern Economic Journal* **88**(3), 906–930.

Rogers, M. & Paskevich, D. (2021), 'Experience and management of fear in men's world cup alpine ski racing', *Frontiers in Psychology* **12**, 682059.

Rubin, B. D. (1999), 'The basics of competitive diving and its injuries', *Clinics in Sports Medicine* **18**(2), 293–303.

Säve-Söderbergh, J. & Sjögren Lindquist, G. (2017), 'Children do not behave like adults: Gender gaps in performance and risk taking in a random social context in the high-stakes game shows jeopardy and junior jeopardy', *The Economic Journal* **127**(603), 1665–1692.

Schildberg-Hörisch, H. (2018), 'Are risk preferences stable?', *Journal of Economic Perspectives* **32**(2), 135–54.

Suhonen, N. & Saastamoinen, J. (2018), 'How do prior gains and losses affect subsequent risk taking? new evidence from individual-level horse race bets', *Management Science* **64**(6), 2797–2808.

Sun, L. & Abraham, S. (2021), ‘Estimating dynamic treatment effects in event studies with heterogeneous treatment effects’, *Journal of Econometrics* **225**(2), 175–199.

Sutter, M., Kocher, M. G., Glätzle-Rützler, D. & Trautmann, S. T. (2013), ‘Impatience and uncertainty: Experimental decisions predict adolescents’ field behavior’, *American Economic Review* **103**(1), 510–531.

Sutter, M., Zoller, C. & Glätzle-Rützler, D. (2019), ‘Economic behavior of children and adolescents–a first survey of experimental economics results’, *European Economic Review* **111**, 98–121.

Uğur, Z. B. & Doğanay, S. (2024), ‘Risk and time preferences following war evidence from syrian children’, *Journal of Behavioral and Experimental Economics* **112**, 102242.

Wong, J. C. S. & Yang, J. Z. (2021), ‘Seeing is believing: Examining self-efficacy and trait hope as moderators of youths’ positive risk-taking intention’, *Journal of Risk Research* **24**(7), 819–832.

Wozniak, D. (2012), ‘Gender differences in a market with relative performance feedback: Professional tennis players’, *Journal of Economic Behavior & Organization* **83**(1), 158–171.

Yi, J., Chu, J. & Png, I. P. (2022), ‘Early-life exposure to hardship increased risk tolerance and entrepreneurship in adulthood with gender differences’, *Proceedings of the National Academy of Sciences* **119**(15), e2104033119.

A. Additional figures

Figure A.1 — Contest intensity by gender

(a) Number of competitors

(b) Final scores

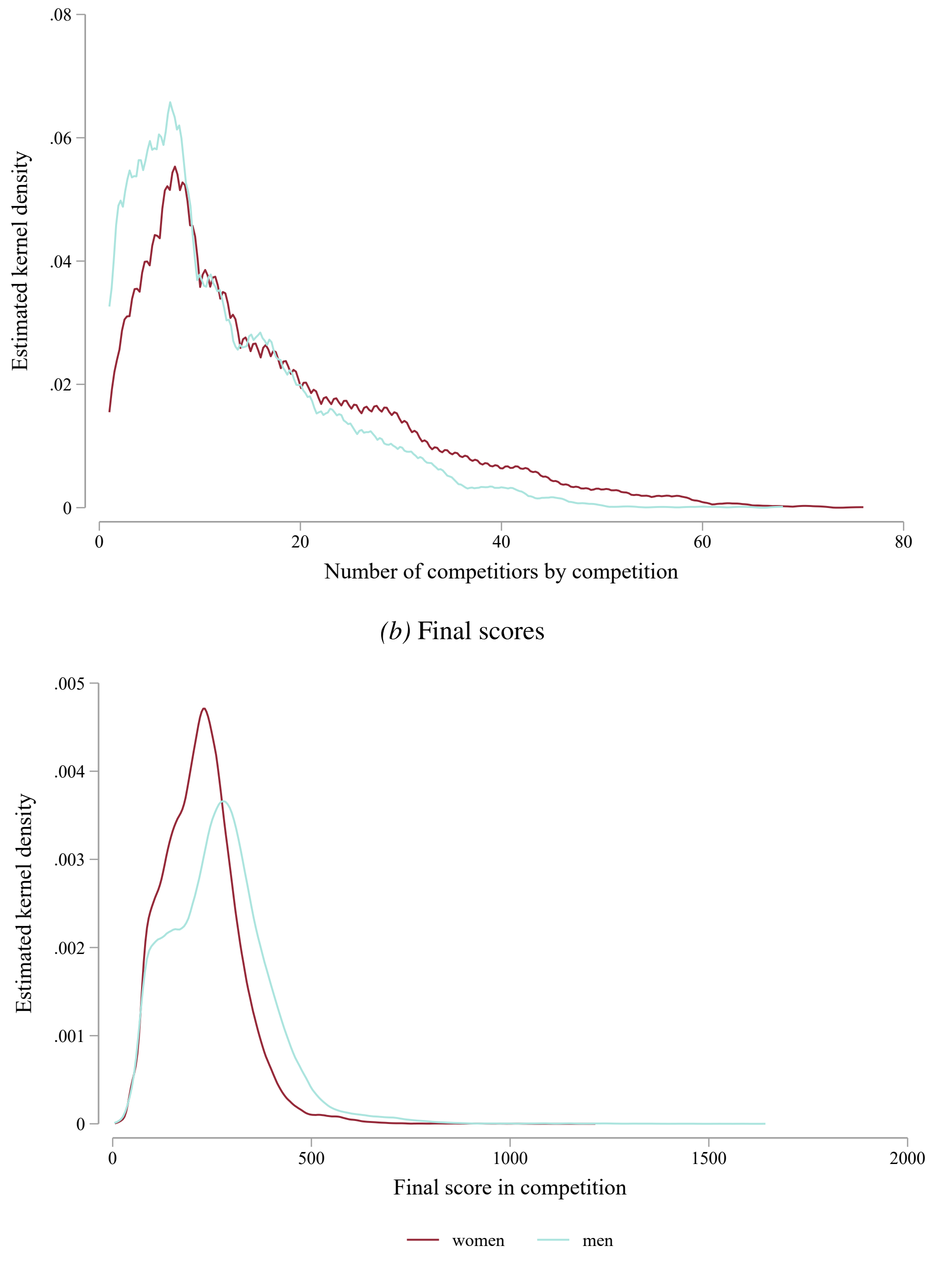


FIGURE A.2 — Number of competitions over time

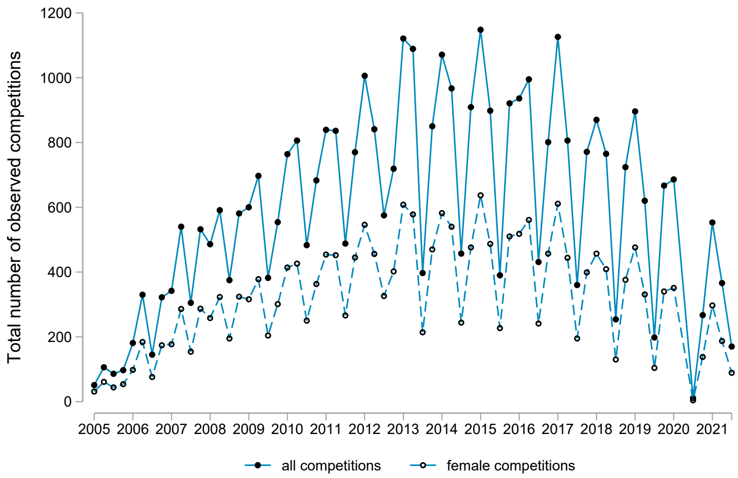
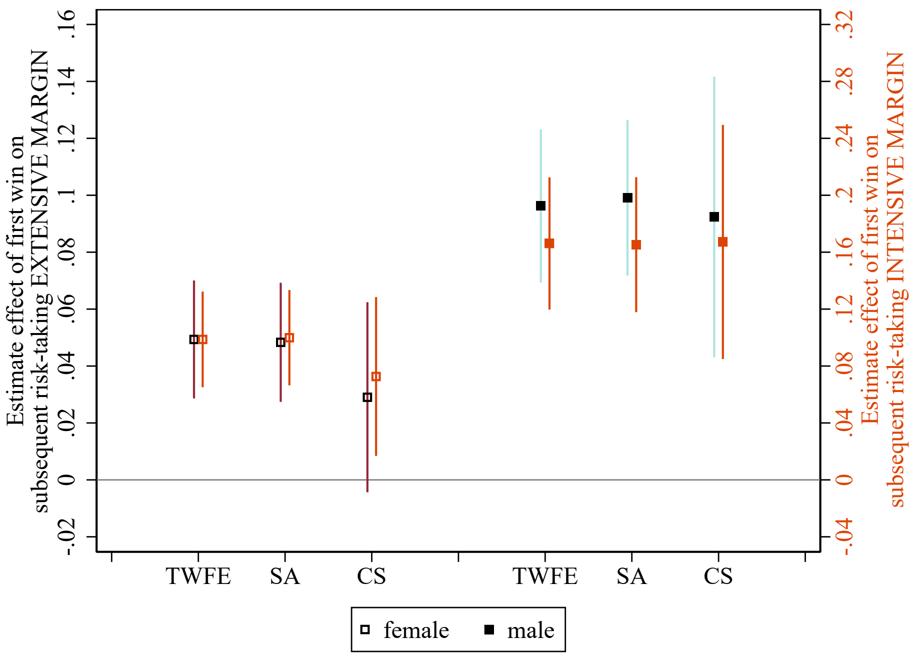
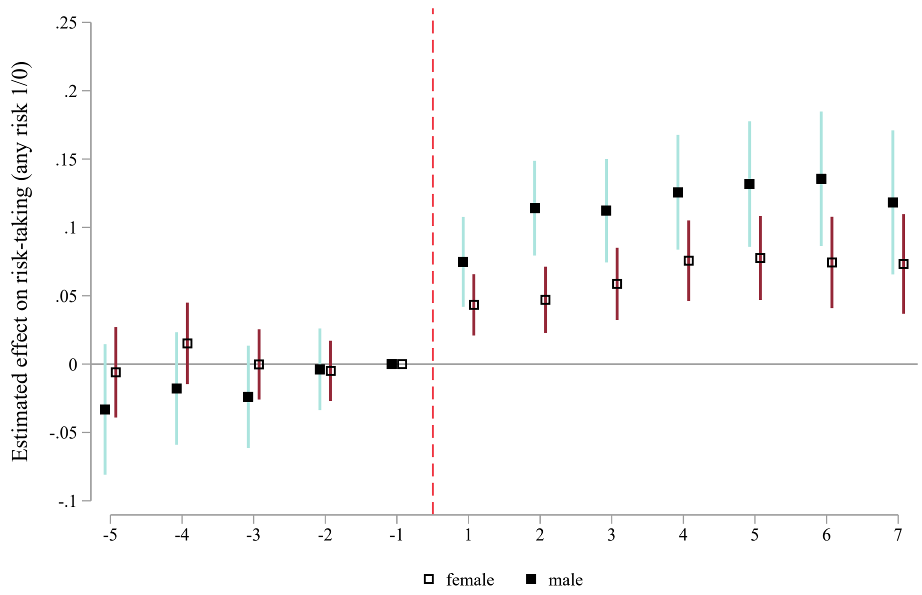


FIGURE A.3 — Static model – robustness



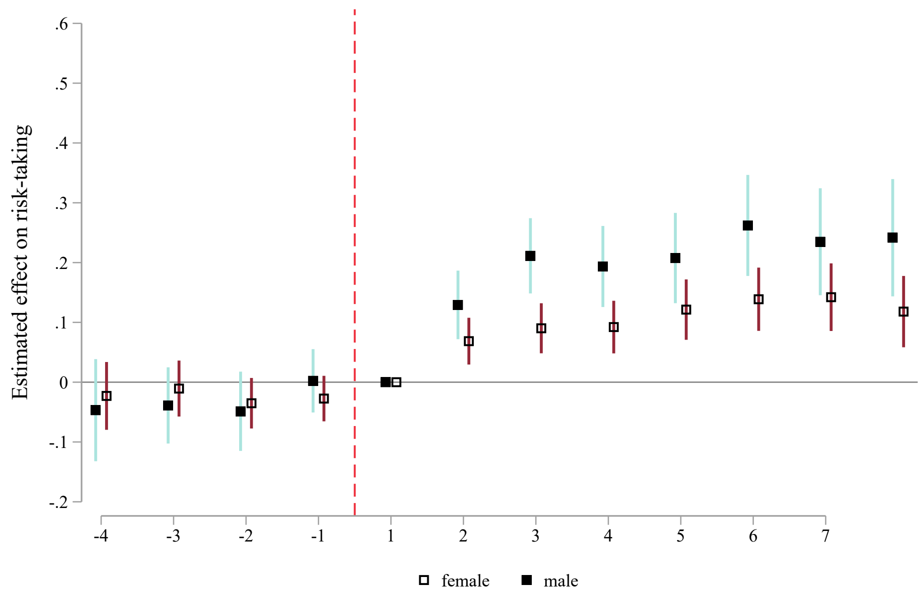
Notes: **TWFE:** two-way fixed-effects model, **SA:** Sun & Abraham (2021), **CS:** Callaway & Sant'Anna (2021).

FIGURE A.4 — Robustness check 1: Heterogeneous treatment effect, extensive margin



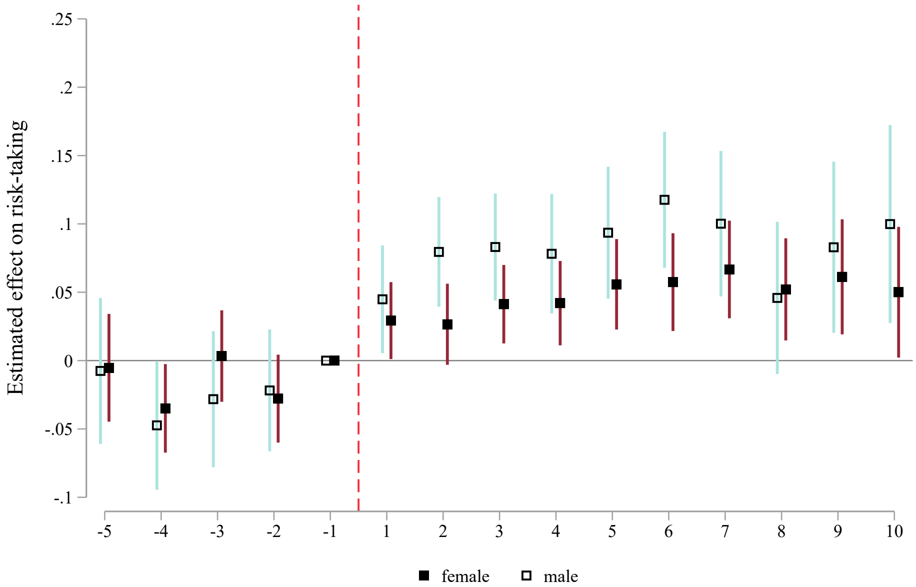
Notes: Estimates of the two-way fixed-effects model using the 'contamination-free' estimator proposed by Sun & Abraham (2021) and 95% confidence intervals. The dependent variable is equal to 1 (0 otherwise) if diver i participated in platform competitions in quarter t. Standard errors are clustered on the diver level.

FIGURE A.5 — Robustness check 1: Heterogeneous treatment effect, intensive margin



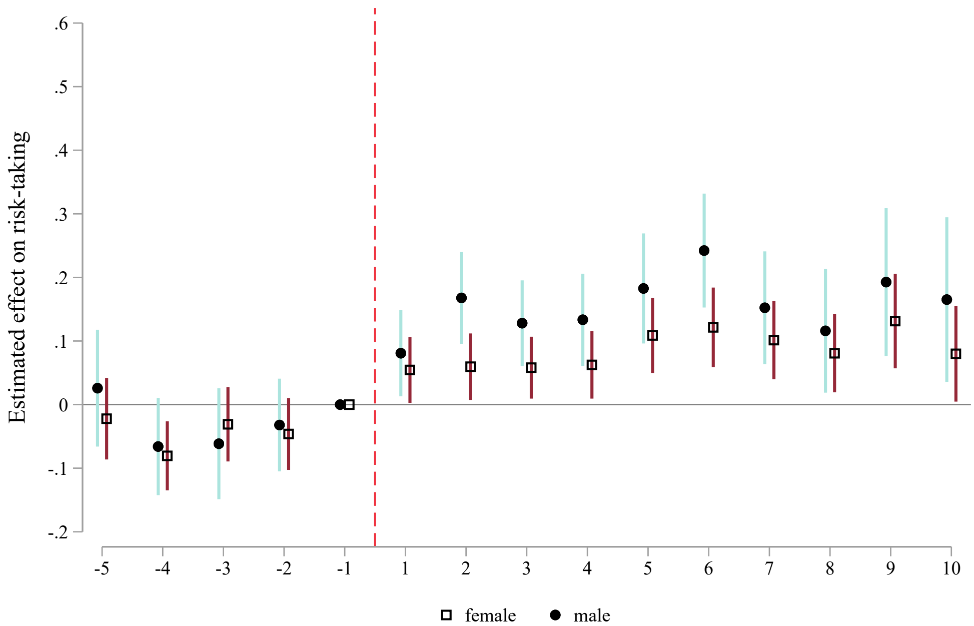
Notes: Estimates of the two-way fixed-effects model using the 'contamination-free' estimator proposed by Sun & Abraham (2021) and 95% confidence intervals. The dependent variable is the absolute number of platform competitions of diver i in quarter t. Standard errors are clustered on the diver level.

Figure A.6 — Robustness check 2: Continuous timing, extensive margin



Notes: This figure presents estimates of the two-way fixed-effects model and 95% confidence intervals. The dependent variable is equal to 1 (0 otherwise) if diver i participated in platform competitions in quarter t. Standard errors are clustered on the diver level. Periods are defined in continuous time, meaning one observation per quarter year.

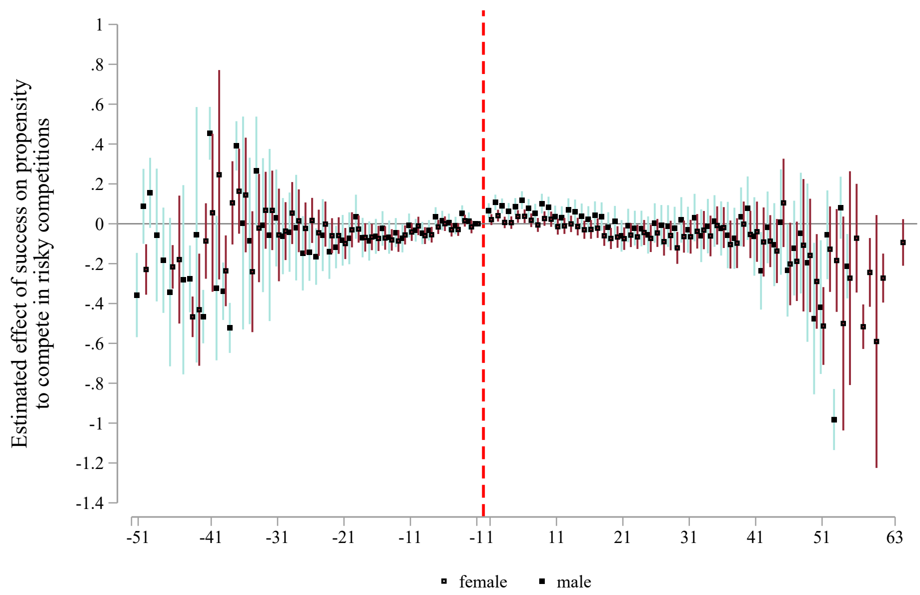
Figure A.7 — Robustness check 2: Continuous timing, intensive margin



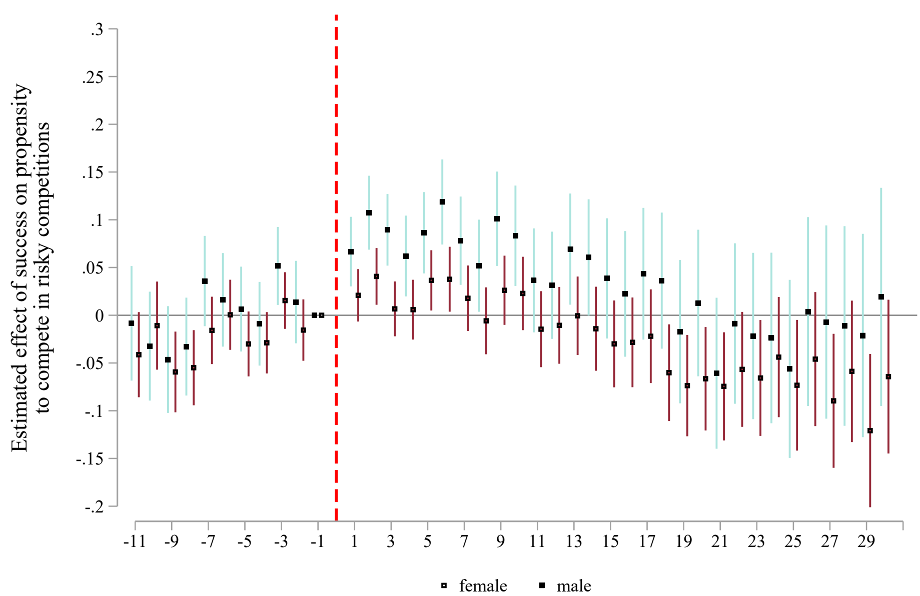
Notes: This figure presents estimates of the two-way fixed-effects model and 95% confidence intervals. The dependent variable is the absolute number of platform competitions of diver i in quarter t. Standard errors are clustered on the diver level. Periods are defined in continuous time, meaning one observation per quarter year.

FIGURE A.8 — Robustness check 3: Unrestricted sample - Extensive margin - Platform competition yes/no

(a) All periods



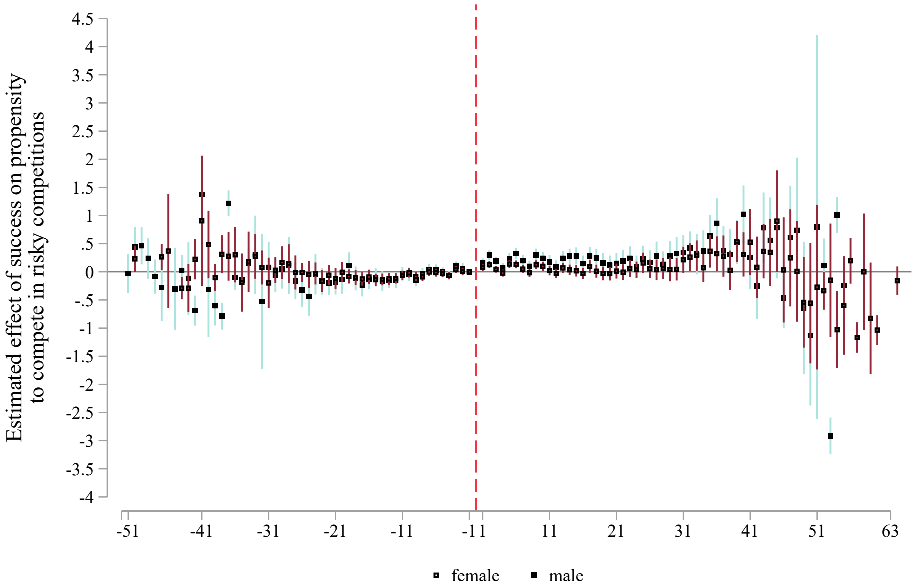
(b) Only periods close to treatments



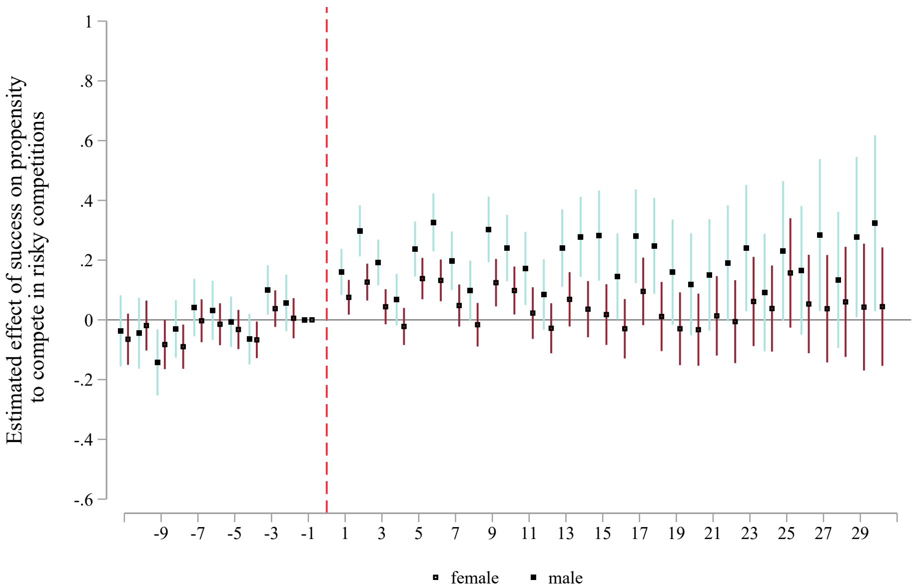
Notes: This figure presents estimates of the two-way fixed-effects model and 95% confidence intervals; the dependent variable is equal to 1 if diver i participates in a platform competition in quarter t (0 otherwise). Full set of data, including 90,058 observations on the diver-quarter level for 4,227 female and 2,456 male divers. Standard errors are clustered on the diver level.

FIGURE A.9 — Robustness check 3: Unrestricted sample - Intensive margin - Absolute number of platform competitions

(a) All periods



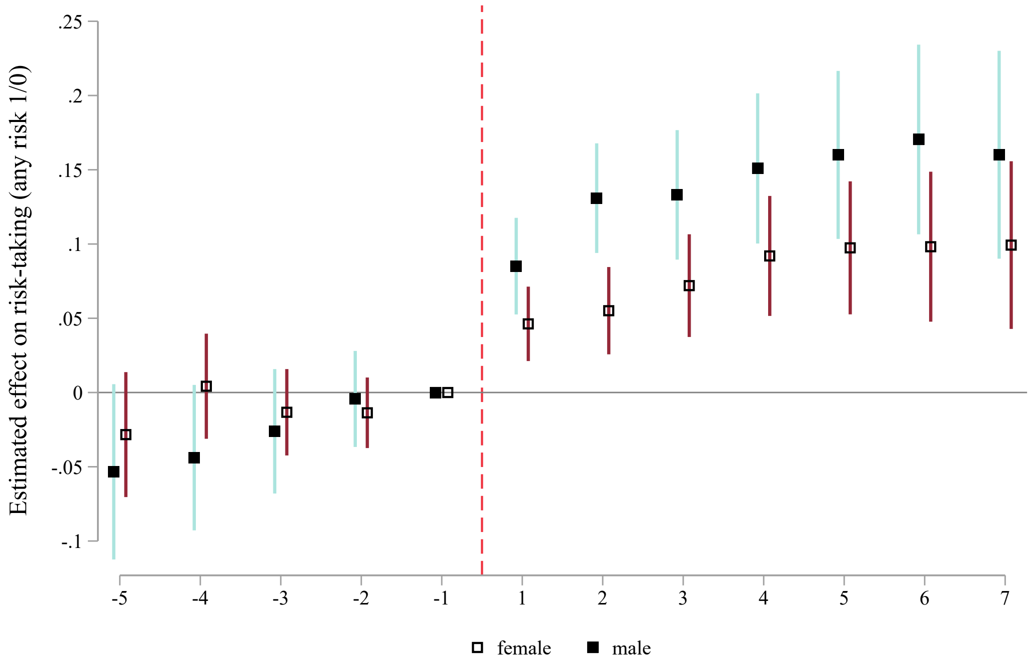
(b) Only periods close to treatments



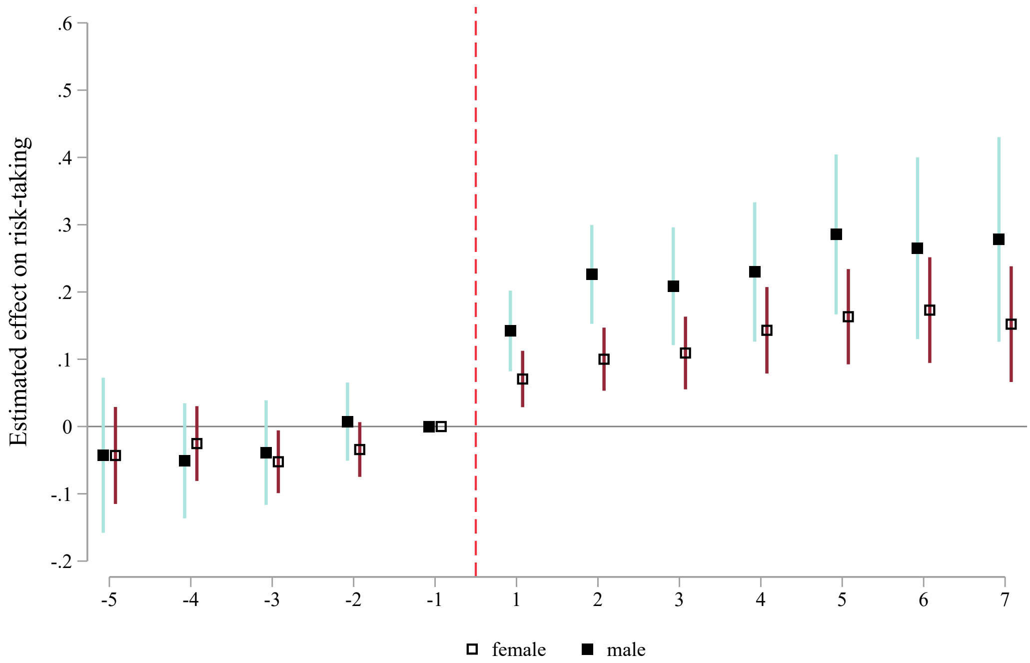
Notes: This figure presents estimates of the two-way fixed-effects model and 95% confidence intervals. The dependent variable is the absolute number of platform competitions of diver i in quarter t. Full set of data, including 90,058 observations on the diver-quarter level for 4,227 female and 2,456 male divers. Standard errors are clustered on the diver level.

FIGURE A.10 — Sensitivity: Avoiding attrition in the control group

(a) Extensive margin



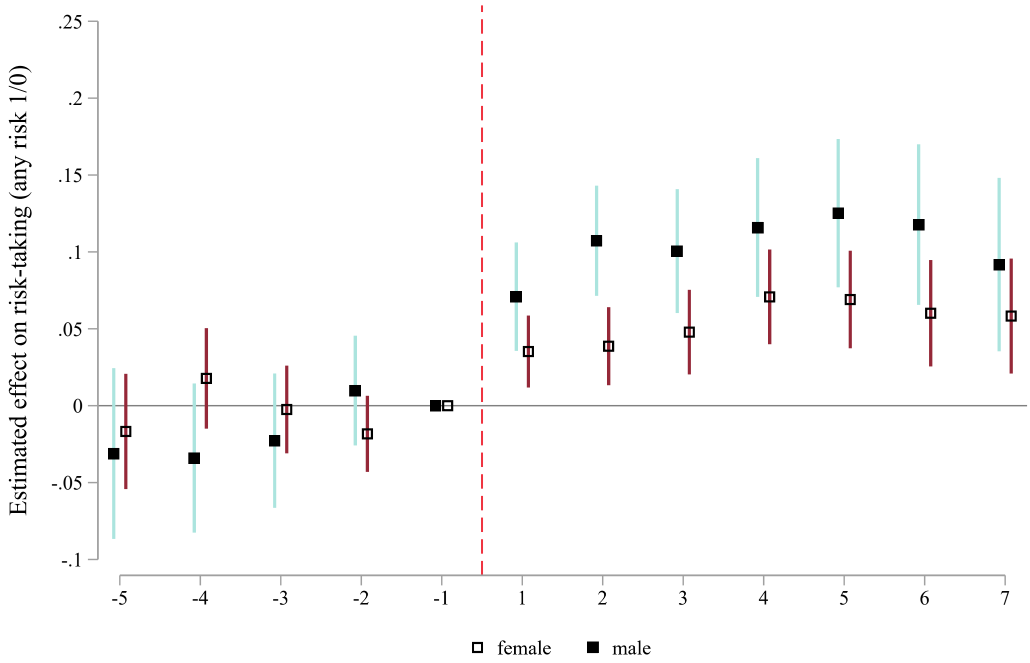
(b) Intensive margin



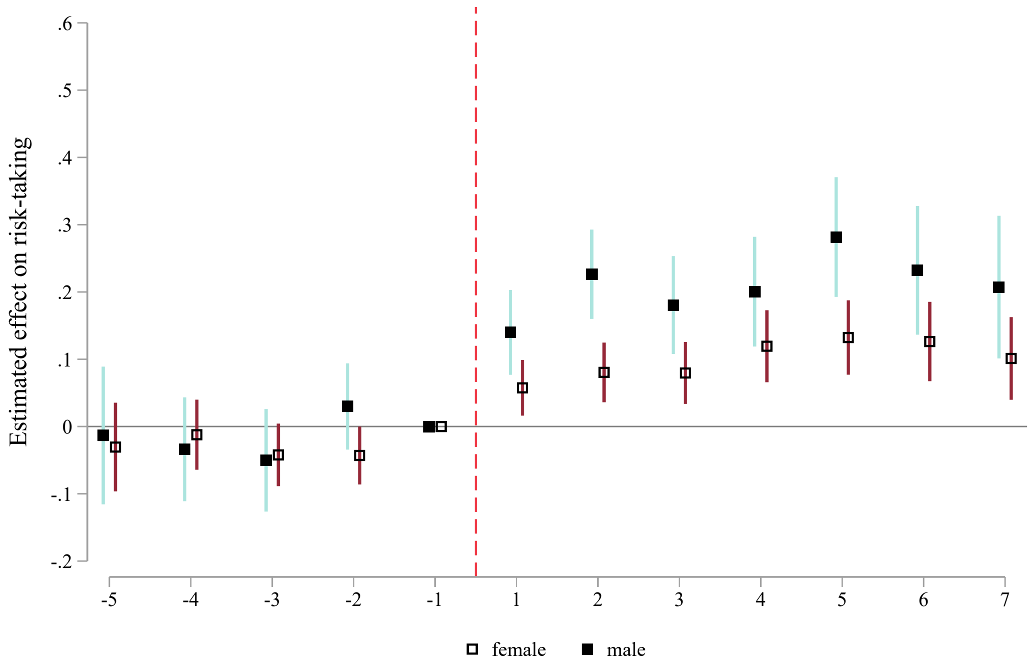
Notes: This figure presents estimates of the two-way fixed-effects model and 95% confidence intervals. We consider only divers in the (never-treated) control group whom we observe at ages 10 and 18. The dependent variable for panel *(a)* is equal to 1 if diver i participates in platform competitions in quarter t (0 otherwise). The dependent variable for panel *(b)* is the absolute number of platform competitions diver i participated in quarter t.

FIGURE A.11 — Sensitivity: No first wins with a single competitor

(a) Extensive margin



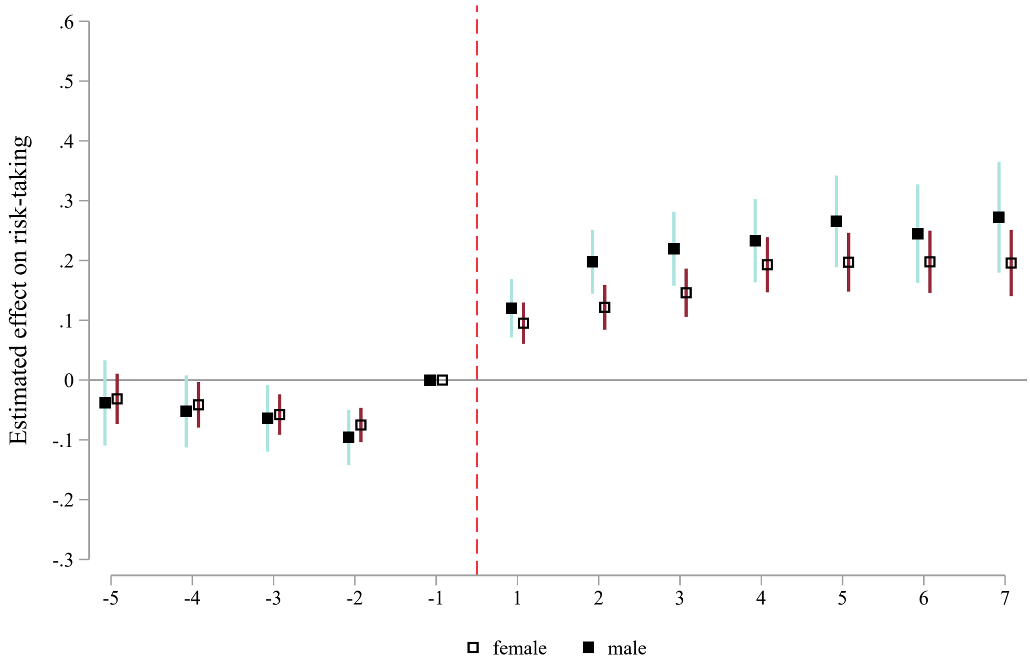
(b) Intensive margin



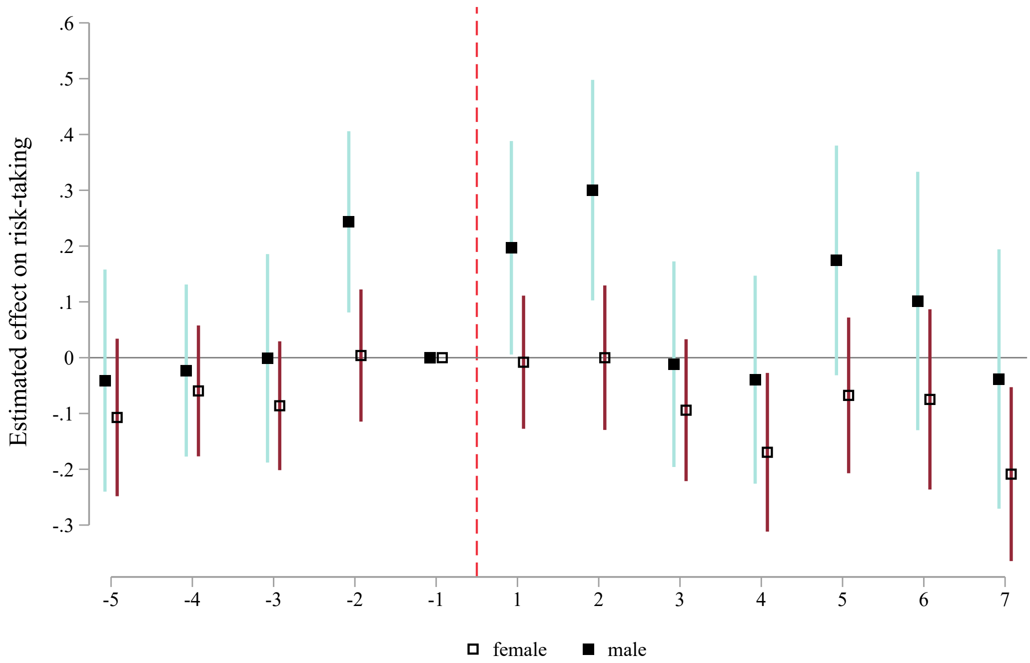
Notes: This figure presents estimates of the two-way fixed-effects model and 95% confidence intervals. The dependent variable for panel *(a)* is equal to 1 if diver i participates in platform competitions in quarter t (0 otherwise). The dependent variable for panel *(b)* is the absolute number of platform competitions diver i participated in quarter t.

FIGURE A.12 — Effect heterogeneity: risk type, intensive margin

(a) No prior platform experience



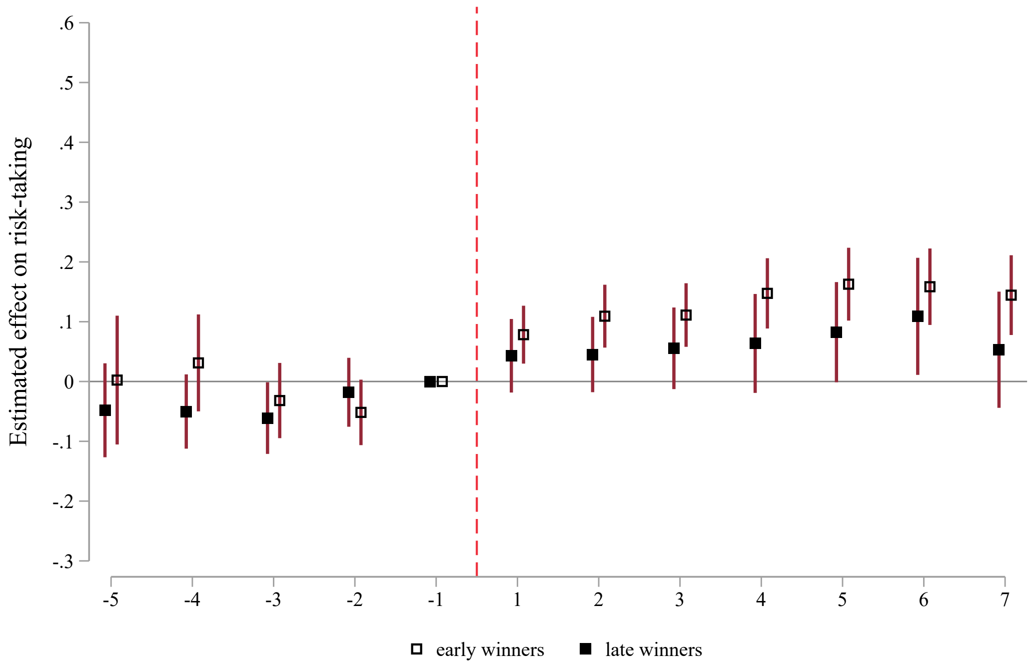
(b) Prior platform experience



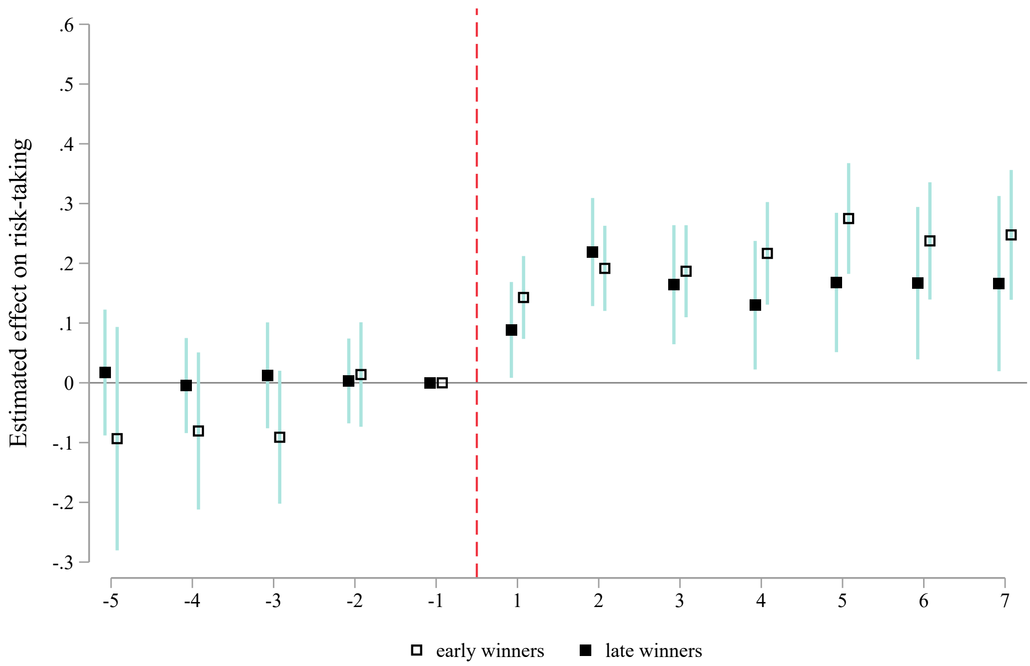
Notes: This figure presents estimates of the two-way fixed-effects model and 95% confidence intervals. The dependent variable is the absolute number of platform competitions of diver i in quarter t. The sample is split into two groups: divers with prior experience in platform competitions (panel *(a)*) and those without (panel *(b)*). Standard errors are clustered on the diver level.

FIGURE A.13 — Effect heterogeneity: age at treatment, intensive margin

(a) Female



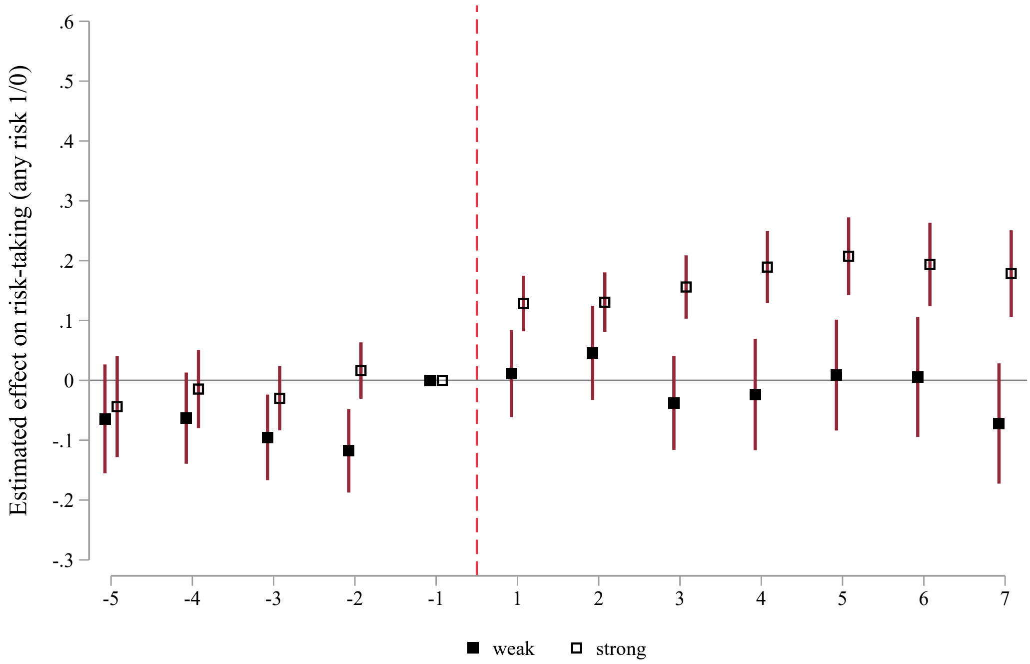
(b) Male



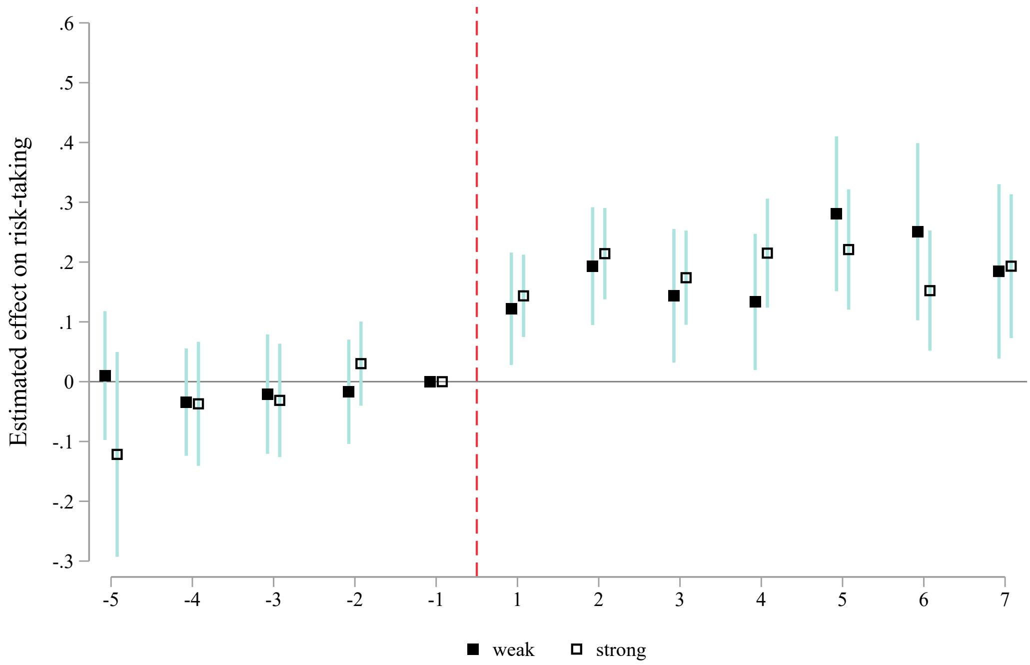
Notes: This figure presents estimates of the two-way fixed-effects model and 95% confidence intervals. The dependent variable is the absolute number of platform competitions of diver i. *Early winners*: aged 10 to 13; *late winners*: aged 14 to 18. Standard errors are clustered on the diver level.

FIGURE A.14 — Effect heterogeneity: treatment intensity, intensive margin

(a) Female



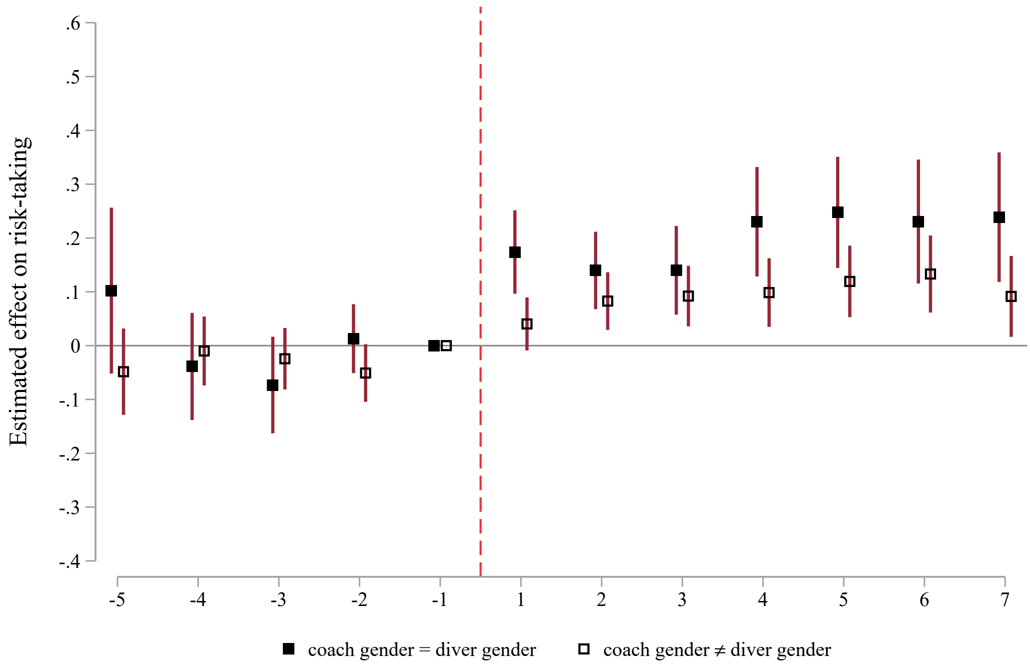
(b) Male



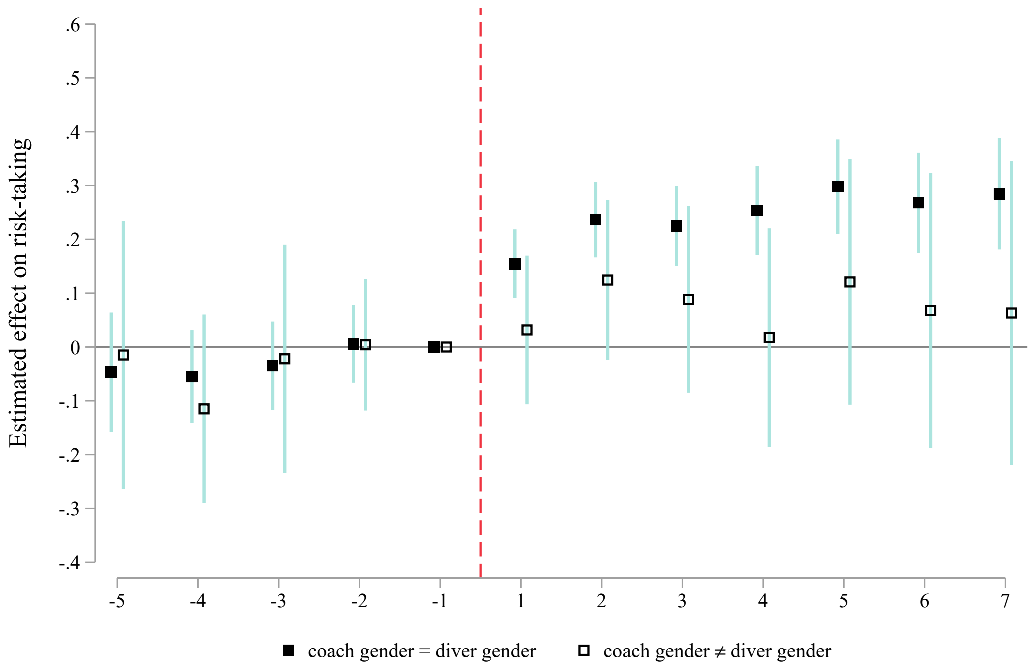
Notes: This figure presents estimates of the two-way fixed-effects model and 95% confidence intervals. The dependent variable is the absolute number of platform competitions diver i participated in quarter t. *Strong treatment*: Athletes with less than three placings in ranks two to four. *Weak treatment*: Athletes with more than or equal to three placings in ranks two to four. Sample median: three. Standard errors are clustered on the diver level.

FIGURE A.15 — Effect heterogeneity: gender of coaches, intensive margin

(a) Female



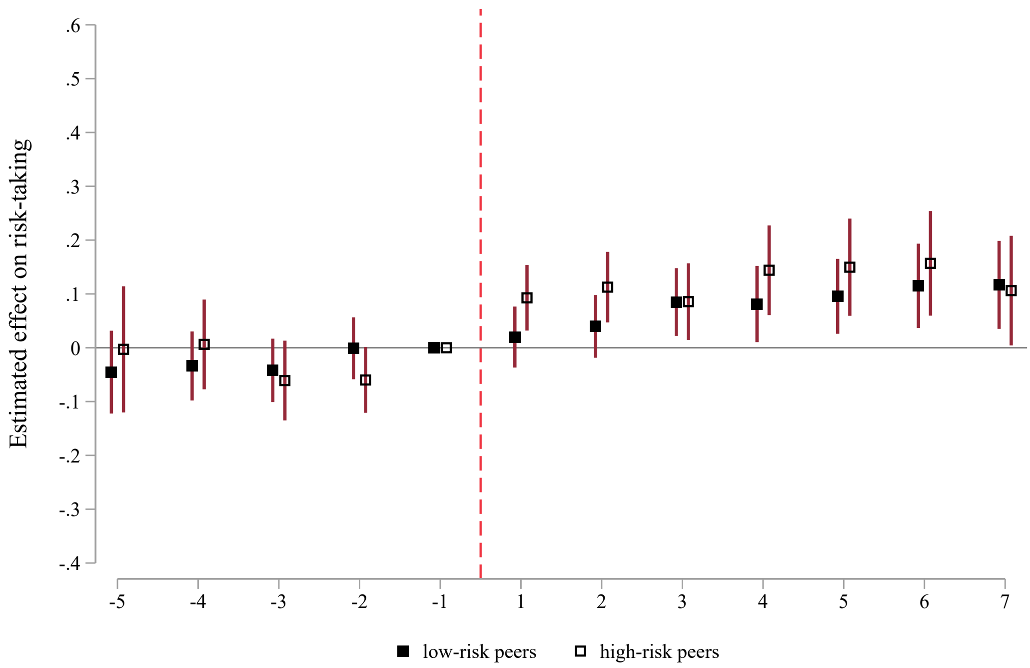
(b) Male



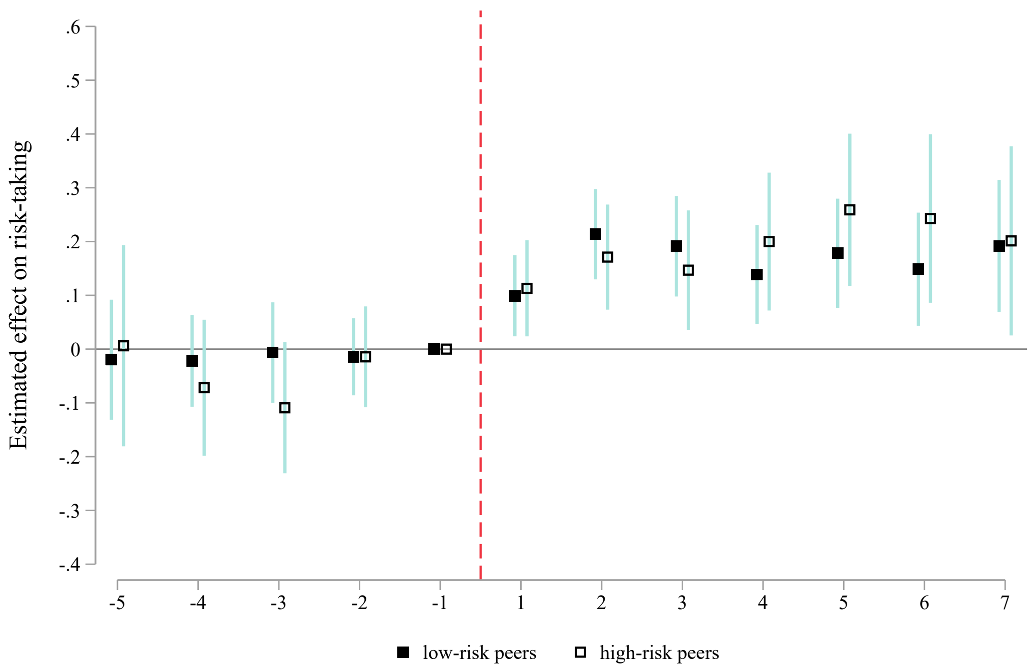
Notes: This figure presents estimates of the two-way fixed-effects model and 95% confidence intervals. The dependent variable is the absolute number of platform competitions of diver i. Standard errors are clustered on the diver level.

Figure A.16 — Effect heterogeneity: risk-taking by peers - intensive margin

(a) Female



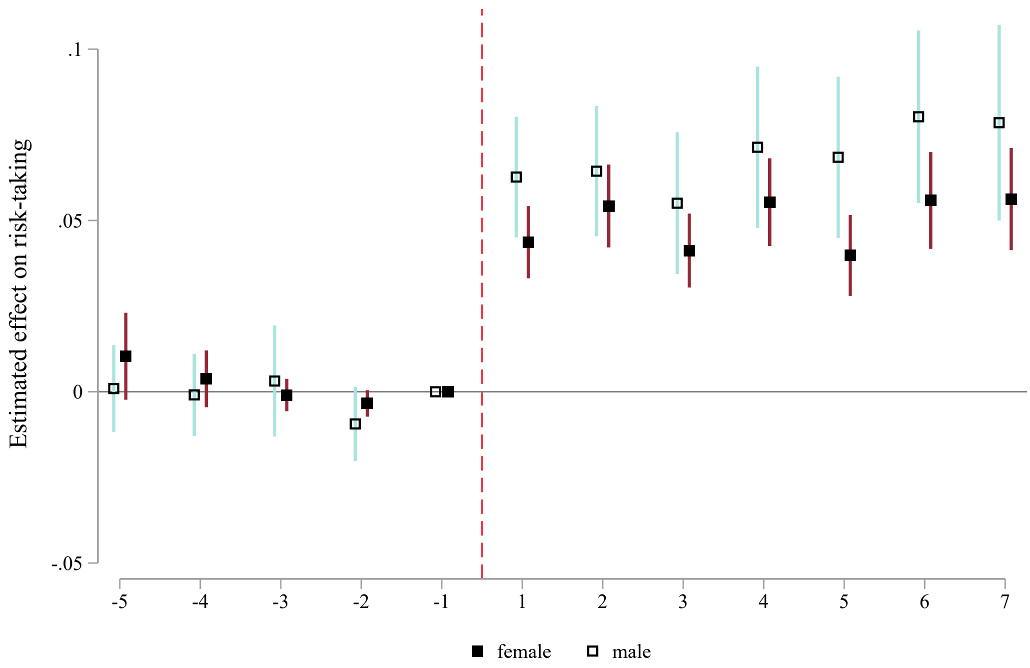
(b) Male



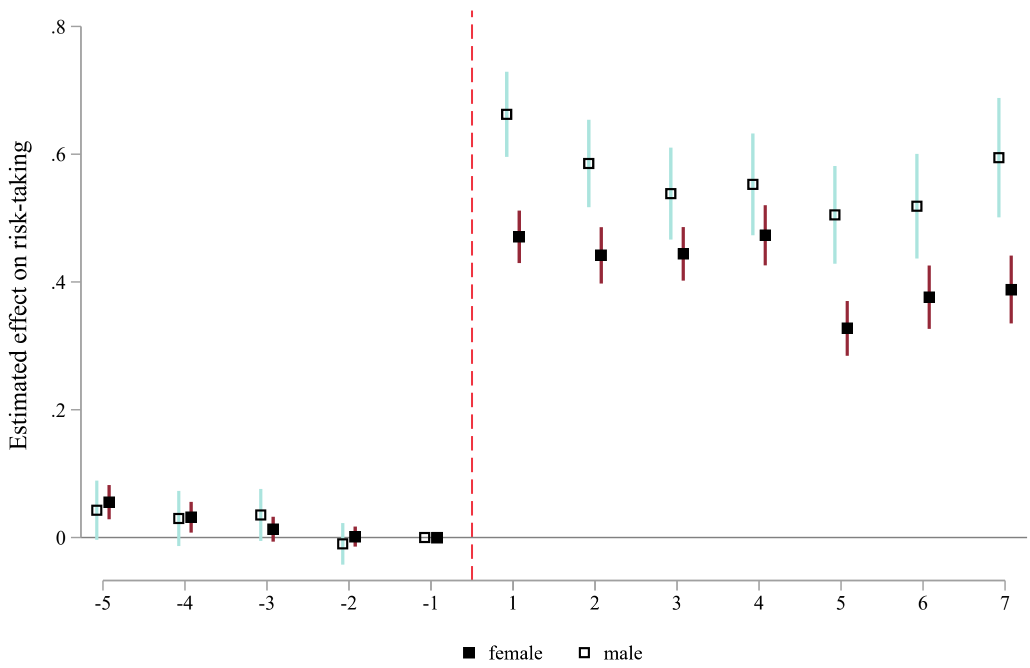
Notes: This figure presents estimates of the two-way fixed-effects model and 95% confidence intervals. The dependent variable is the absolute number of platform competitions of diver i. *High-risk peers*: above-median risk-taking by all peers. *Low-risk peers*: below-median risk-taking by all peers. Peers are defined as all divers with the same age in a given quarter. Risk-taking by peers is defined as the share of peers who participate in any risky platform competitions. Standard errors are clustered on the diver level.

FIGURE A.17 — Effect of treatment on later success

(a) Wins from the platform



(b) Total number of wins (platform and springboard)



Notes: This figure presents estimates of the two-way fixed-effects model and 95% confidence intervals. The dependent variable for panel *(a)* is the absolute number of wins in platform competitions by quarter. For female divers, the mean is 0.034; for male divers, it is 0.051. The dependent variable for panel *(b)* is the total number of wins by quarter. For female divers, the mean is 0.259; for male divers, it is 0.433. Standard errors are clustered on the diver level.

B. Additional tables

TABLE B.1 — Association of risk and later career paths: intensive margin

PANEL A: NATIONAL COMPETITION			
	(1)	(2)	(3)
Age at first win:	**all**	**>12**	**≤12**
Risk (extensive margin)	0.2389***	0.1525***	0.3335***
	(0.0216)	(0.0309)	(0.0290)
Female	–0.0598***	–0.0423	–0.0889***
	(0.0202)	(0.0315)	(0.0320)
Female × Risk	–0.0265	–0.0013	–0.0410
	(0.0329)	(0.0539)	(0.0423)
No. of comps.	–0.0026*	–0.0027	–0.0031
before first win	(0.0015)	(0.0024)	(0.0021)
Year of first win FE	*yes*	*yes*	*yes*
Youth coach FE	*yes*	*yes*	*yes*
N	3,085	1,473	1,612
Mean dep. var.	0.325	0.301	0.350
R^2	0.397	0.445	0.465
PANEL B: INTERNATIONAL COMPETITION			
	(4)	(5)	(6)
Age at first win:	**all**	**>12**	**≤12**
Risk (extensive margin)	0.0487***	0.0382	0.0394***
	(0.0160)	(0.0292)	(0.0112)
Female	0.0053	–0.0054	0.0048
	(0.0050)	(0.0092)	(0.0039)
Female × Risk	–0.0216	0.0092	–0.0248
	(0.0164)	(0.0306)	(0.0179)
No. of comps.	–0.0003	0.0000	–0.0004
before first win	(0.0005)	(0.0008)	(0.0006)
Year of first win FE	*yes*	*yes*	*yes*
Youth coach FE	*yes*	*yes*	*yes*
N	3,085	1,473	1,612
Mean dep. var.	0.017	0.015	0.019
R^2	0.252	0.266	0.423

Notes: *, ** and *** indicate statistical significance at the 10%, 5%, and 1% level. Standard errors in parentheses are clustered on the year-of-first-win level. The dependent variable for columns (1) to (3) is equal to 1 if diver i's career includes at least one participation in a national competition (0 otherwise). The dependent variable for columns (4) to (6) is equal to 1 if diver i's career includes at least one participation in a World Championship or at the Olympic Games. $Risk$: average number of platform competitions after the first win in a springboard contest; mean 0.402, std. dev. 0.590.