

Sabotage on Ice

A Natural Experiment in Short Track Speed Skating

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Abstract:

Organizations often adopt systems based on tournament structures that, given their emphasis on relative performance, create incentives for sabotage. This study exploits a change in the regulation in short track speed skating as a natural experiment. The new regulation forbids the execution of specific movements in the race, affecting differentially the skaters according to their skills, and thus providing differential incentives for sabotage. Using data from the men's 500 m race involving 14 different tournaments from the international skating union (ISU), it was found that the change of rules encouraged the least experienced skaters (a proxy for skaters' skills) to do more sabotage, but only in the most advanced rounds of the competition. By contrast, experienced skaters perform more sabotage in the first rounds of the competition. In addition, inexperienced skaters starting in a further back position (i.e., with fewer chances to win) in the race are less likely to sabotage others.

Key Words: asymmetry, competitive behavior, performance, sports, tournament.

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1. Introduction:

In most organizations, incentives to strive are controlled by structures similar to tournaments. In many cases these systems manage to incentivize the effort of those involved and obtain better results. The salaries paid based on the relative work of the workers are a clear example of this, since they determine a payment based on the performance of the workers, which encourages them to work harder (Lazear, 1989). In fact, even if the individual has previously participated and has not obtained the best results or considers the results unfair, when he returns again to participate, he usually exercises a greater productive effort (Kräkel, 2000).

Tournaments are a great way to increase the effort a person makes when she performs an activity. However, tournament structures demand a continuous overexertion that can trigger the response of some destructive behaviors among the participants. In the example of wages based on relative work, workers will find it useful to make the other workers look bad to get a higher payment. It happens in the same way with those individuals who believe the result of the tournament is unfair, they will have no qualms about cheating and harming their contenders because when they think that the system is corrupt, they renounce their moral criteria.

Given this, the institutions through their regulatory work have been playing a fundamental role in society through the sabotage mitigation and violence reduction (North et al., 2009), especially in structures of this type that give incentive to this behavior with the extra effort demanded from some participants. Additionally, there are other factors that ideally would have to be considered in the context of formulating tournament rules, one of those is the competitive balance.

The competitive balance is a measure which says how possible it is that all the participants have the chance to win in the tournament (Szymanski, 2013). The above guarantees the interest of those

who observe the competition and the participation of the individuals in the tournament. Another consequence is that, when it allows everyone to have opportunities to win the prize (even if the opportunities are minimal), it makes the tournament fairer in comparison to the situation in which some contestants have no chance of winning. From the point of view of a rule-making institution, a rule intervention in a tournament that enhances the competitive balance will be a good intervention to ensure that the consumer pays to see the tournament (Rottenberg, 1956), and therefore it should plead for rules guaranteeing competitive balance, or balanced rules.

In other words, to avoid very high levels of sabotage, balanced rules for the game are designed to discourage it. However, even though these rules have a large impact on the productivity of individuals, they can have a side effect on contestant performance. Think of the Spanish Civil War as a competition for power between the national and republican sides. The national part decided to send bombs and projectiles to the republicans. However, they forced several Republican engineers to develop that weaponry. The Republicans were in disadvantage and were losing, so the Republican engineers did not hesitate to use the opportunity to sabotage the bombs and keep them from exploding (García, 2019). Why a contestant would consider doing that? Over the years, some investigators have concluded that the “cheating behavior” under competition is entirely due to the fact that the individuals are performing worse at a task (Weichselbaumer et al., 2010).

A change in regulations not only affects performance but may also encourage sabotage through the comparative disadvantage it generates. Based on this reasoning, this paper seeks to study the relationship between the rules and the destructive behavior of individuals. It is difficult to measure sabotage in classic work environments. However, sports competitions offer a valid alternative to address this issue given the frequent changes in regulations by sports associations in order to pursue competitive balance-enhancing effects (Budzinski et al., 2014).

2. The study case:

A change in the regulation of short track speed skating, a winter Olympic sport, will be used as a natural experiment. Unlike speed skating, here several athletes compete at the same time on an oval track with no lane divisions, which makes for easier sabotage between skaters. That is why it's common to see a lot of penalties and disqualifications because of accidents in these competitions. Because of that, the international skating union (ISU), the authority over short track regulation, has constantly changed the competition rules. In the 55th ISU congress, the sport suffered several changes. Some of them were significant for the penalty and qualification system, and they took effect in the 2014/2015 season. These changes cover a modification in the starting procedure that says “c) If a Skater places his skate partially or completely on or over the starting line, it is a false start” (ISU, 2014), “d) If a Skater does not have both skates on the ice, i.e. full contact over the length of the blades, it is a false start” (ISU, 2014) and “After a race has been called back for a false start, then any subsequent false start by any of the Skaters will result in a penalty for the Skater(s) concerned.” (ISU, 2014)².

The above-mentioned changes will be of primary interest in this study. This rule change recreates a scenario similar to the Civil War example. In the first instance, there is a group of skaters who prepare themselves hard to compete, they develop a technique that in many occasions allows them to obtain the best results. However, one day the ISU decides to modify the regulation to make these skaters start with both skates having full contact over the length of the blades on the ice. Then, the skaters who had the technical habit of starting with some part of the blade of his skate lifted will

² For more information consult the proposals 184 and 185 from “AGENDA OF THE 55th ORDINARY CONGRESS DUBLIN — 2014” (ISU, 2014).

be restricted and affected by the rules. Since starting is crucial in a race and can determine the final results, skaters whose technique involves lifting some part of the skate blade will be affected and their performance may decrease. The group of skaters resulting in disadvantage could be encouraged to worsen the performance of their contenders to improve their own results. In this way, the regulation could become an incentive to sabotage and hinder other skaters.

In summary, for this paper, the rules that modify or restrict the way in which some actions must be executed during a tournament can encourage the destructive behavior of individuals. If we wish to demonstrate that the rule constitutes a perverse incentive to increase destructive behavior, it should be possible to show a significant increase in sabotage once it is implemented. That is why the purpose with this work is to quantify the evidence of how sabotage increased once the new ISU rules were implemented. In order to accomplish this goal, the next research question was formulated: Did the change of rules for short track competitions of 55th ISU congress constitute a perverse incentive that increased sabotage in sporting events?

Sabotage has been an object of interest in economics (Chowdhury et al., 2015). Since it has been suggested that sabotage has re-optimizing effects and on well-being, understanding its causes may be fundamental for the design of economic incentives. This exercise also allows us to understand the behavior of individuals who makes selfish decisions based on incentives under competition.

Finally, this analysis incorporates the presence of different skill levels, which can cause heterogeneous responses to regulations among skaters. For that motive, in order to answer to the research question, it is fundamental to perform an analysis according to the type of skater and his skill level. When speaking of asymmetric skill levels, differences of ability between individuals are being contemplated. However, it is important to highlight that the asymmetries can be present in other characteristics.

To understand this, a couple of examples presents in soccer will be described. Deutscher et al. (2013) evaluated whether the level of favoritism of the spectators affected the cheating behavior of the players. Indeed, the least favorite players cheated the most in the soccer games. Similarly, Garicano and Palacios-Huerta (2005) used a modification on the point rewards system as natural experiment to show an increase in sabotage on soccer. In Hockey, a change in the rules over the extra time were used as a natural experiment to analyze how a larger extra time could affect the violent behavior of the teams (Abrevaya, 2004). Similar to the soccer case, teams became more violent and greater saboteurs with the rule's modification.

According to the existing literature, sporting the rules could create perverse incentives that increase sabotage in tournaments. However, they differ from this work in several aspects that must be taken into account. First, although they contemplate a change in regulations that increases the sabotage in tournaments, the regulatory change does not affect performance by limiting the technique of executing an action, so the analysis is different from that obtained in the present investigation.

The second difference is that football and hockey are group sports, while short track speed skating is an individual sport. So, it would be a good to review some text about the rule changes and sabotage in individual sports. For instance, Balafoutas et al (2012) examine the effects of sabotage in the cost structure of judo. The regulations were modified, so that the participants were given the opportunity to commit a first offense without penalty. Once that rule was implemented, sabotage increased. On that occasion, however, it was also possible to identify that the less talented athletes performed the most sabotage, and more talented athletes tend to be targets of that sabotage.

A factor to highlight from that study is that, as in the skating modality studied, judo is an individual sport, which means that, unlike football or other team sports, there is no dimension of public goods

that can distort the incentives to execute the sabotage³. This means that the consequences or behaviors that result from the judo exercise have a high probability of resembling those made by this research and therefore are an excellent starting point. Another factor in common with the present study is that it contemplates the appearance of heterogeneous effects based on the ability of the participants. Chowdhury and Gürtler (2015) conceived sabotage as an asymmetric factor and show that some contenders are more likely to be sabotaged than others. Asymmetry is an important factor in this study because it allows us to explore whether there are skaters more likely of being sabotaged, and some others that are associated to a greater number of sabotage incidents. However, there is an important difference when considering the short track speed skating example. In judo, the direct conflict between opponents is evident, since there is only one opponent that must be defeated; while in a short track speed skating race, one would expect lower levels of direct conflict because the person is not focused on beating only one person. When facing several contenders at the same time, the skater cares less about who is being faced. Although this last argument is not a central point of the investigation, it could be a factor that provides additional differences in the results obtained.

Summing up, there are different types of asymmetries that can be explored according to the example. Thus, in the same way that there are asymmetrical skill levels, in this research there may be other asymmetries that determine the results. In particular, the different stages of the tournament. If you think about the fact that there are early stages are farther to the finals in a competition, you will notice that it creates a greater asymmetry among competitors. This

³ There is no voluntary contributions' problem for sabotage, because the exercise is reduced to an individual problem in which each one chooses the amount of sabotage that makes him happier.

asymmetry has been so fundamental in the context of tournaments that some people have explored human behavior based on this difference. Altmann and Wibrál (2012) suggested that, in general, in the early tournaments stages, individuals tend to overexert because of the competition between people. So, as we saw at the beginning of this document with the work of Kräkel (2000), the overexertion caused by these structures based on tournaments can be of two types: productive and destructive. Thus, from the contribution of Altmann, Wibrál and Kräkel it can be inferred that individuals may exert a greater destructive effort in tournament qualifying stages.

However, the evidence is mixed. Yudkin (2015) studied how the number of rounds or opportunities can influence cheating. He conducted several experiments which separated two groups of people and gave one of them a greater number of attempts. In this way Yudkin managed to lengthen the time of the activity for some people (he added rounds) and discovered that regardless of the group, people tended to cheat as they approached the end of the activity. Contrarily, Yaniv and Siniver demonstrate from an extension of Becker's crime model⁴ that a higher gain from cheating may rationally decrease cheating (Yaniv et al., 2016). Then, in the context of sabotage, a person might find it less valuable to sabotage their contenders as their chances of winning increase (increases the sabotaging profit). The above suggests that in a tournament-based system, as the participants approach the finals, they find it less valuable to cheat and sabotage others. Therefore, the levels of sabotage in the final stages of competition would tend to be reduced.

⁴ The simple model of rational crime of Becker says that people commit crimes based on a rational analysis. Thus, individuals commit criminal acts if the net benefits of doing so are positives.

Summing up, some elements that differentiate this investigation from previous related research are: 1) The context of this speed skating eliminates the direct conflict with a specific opponent and downplays the importance of whom the opponent will be. 2) Two types of asymmetries are included in the analysis: in skills and in stages of the competition. 3) The change of regulations studied here are different to those analyzed in other sports because they restrict the technique with which an action must be executed, while the rest of the examples contemplate changes in the payment system, modifications in extra time or changes in cost structures.

This study is structured as follows. First, issues related to the necessary data for the exercise are addressed. The second section focuses on econometric issues. The last section covers the results, a discussion of them and the conclusion.

3. Data:

The unit of observation will be the skater in a given competition. The dependent variable “sabotage” understood as destructive behavior, will be approximated through the skater penalties and yellow cards. So, this will be a dichotomous variable that will take value one when one of those two qualifications (PEN or YC) are recorded. To contextualize why the use of these two qualifications some main reasons for obtaining them will be described. As for the rating PEN (Penalty), it is obtained when an infringement of racing rules like “Impeding” or “Kicking Out” other skaters. However, when the actions take a higher level of danger that the referee considers unsafe, it is assigned the skater to YC (yellow card). As, you can see these two qualifications or measurements register destructive behaviors that for purposes of this work are defined as sabotage.

The set of independent variables includes the starting position of the skater, since according to the position he could be more interested in being or not being destructive. It will also include the round of the tournament and the season of the competition. It is essential to have these variables for some skaters who competed in ISU short track tournaments before, during and after the changes introduced in the 2014/2015 season. The last information is available at the International Skating Union (ISU) website. For this study, a database that combined information for all the international short track games was used (European Championships, World Championships, Olympic Games and World Cup) from the year 2012 to 2017 for the men's 500 m.

4. Dataset description:

The data set has 5,125 observations with information corresponding for each race such as: the sportsman name, the personal time, position in the ranking of each group, stage of the season, the event time, season⁵, time spent per round, starting position, nationality, competition in which those results were obtained, including the location and the date, traveled distance, round, group number to which the skater belongs, number of the athlete and qualified or penalized information of the player for each race. A detailed description is provided for the most relevant variables, which are:

- Qualification: Describes the qualification of an athlete in a given round. It takes the values: PEN if it is a penalty, DNS if the skater did not start, DNF if the skater did not finish, ADV if the skater advance to the next round, YC if he got a yellow card, Q if he qualified, QA if

⁵ Seasons usually go from October or November to march of the following year.

he qualified for final A, QB if he qualified for final B, q if he qualified as the fastest third place skater and ADA if he advanced to final A (exempts him from running in the final B).

- Start position: A numeric variable that the higher it is; it implies a starting position further back than that of other skaters.
- Round: Indicates the round in which the skater competed. It could be: Final A, Final B, Semifinals, Quarterfinals, Heats, Rep Semifinals, Rep Quarterfinals, Rep Heats, Preliminaries, Pre preliminaries and Ranking Races.

All the data and scripts employed in the analysis are available in the following link:

https://osf.io/ks5wh/?view_only=21fa44eee3594011b643a8561b5d7493

5. Methodology:

A fundamental aspect to highlight in this analysis is that the regulation was imposed by the ISU, an institution with worldwide character and jurisdiction over the sport, and therefore it was implemented in all the existing tournaments, even those that were not made by this institution. The study will focus on understanding what happened with the skaters competing in the men's 500 m of the World Cup, World Championship, European Championship and Winter Olympic Games. It includes skaters from all nations competing in high stakes tournaments in the discipline, with heterogeneous skill levels reflected in the difference of time, score, ranking and start position that they obtain when they perform the same action. Finally, the experience is also endowed with great differentiability if it is measured by the number of times that the skater competes in these tournaments and rounds. These characteristics make the skaters a relevant population of study.

6. Definition of heterogeneous skill levels:

Two subsamples were defined based on the importance of explore the heterogeneous effects that could have the rules on skaters with differential skills levels. Thus, it is important to define the concept of skill. Based on the reasoning that the competitions in the analysis are high-level Worldwide competitions, and that not all skaters can access these tournaments, it is possible to say that to qualify even for the lowest rounds requires great skill as an athlete. Therefore, multiple participations reflect a degree of superiority in skill for this sport. So, the skill can be approximated by the experience of the skater, understood as the number of times in which the skater has participated in the tournaments. Now the problem is to delimit a threshold from which one skater is more experienced than another. That is, why, arbitrarily, those 3041 skaters that are observed thirty or more times in the database, will be the experienced skaters; the remaining 2053 skaters will be classified as inexperienced skaters. The above, allows to observe the skater behavior based on the skills he has, what allows to obtain some interesting research conclusions.

7. The regression model:

The research question is solved using an econometric analysis that exploits the repeated nature of the competitions in which each skater is observed, before and after the change of regulation, using a panel data. For this particular case the skaters are different each in their own way and given the regulations it is proposed that their performance in the competition may vary in time once they are affected by the rule. However, there are variables that, unlike performance, do not change in the time as the characteristics of the season, tournament or even the skater. Therefore, it is necessary

to include fixed effects for the construction of an appropriate model that permits the evaluation of the net predictor effects by eliminating the invariants.

The fixed effects have some advantages to construct this model. The first is that it supposes uncorrelation between estimator and errors which allows identification of the marginal effect even if the regressor is endogenous with respecting the composed error. Another is that although a little of efficiency is sacrificed, obtaining estimated coefficients without bias is guaranteed. On the other hand, it has been affirmed that it does not allow the identification of the effects of variables that do not vary over time. However, the relationship of causality to explore is a relationship that varies over time, so this does not mean any problem for the work to be done.

Once the econometric part of this study situation has been clarified, the regression model proposed for the solution of the research question will be described. For the correct formulation it is essential to consider the causal chain since it allows to understand the relationships between the events to be studied. As the study hypothesis suggests, the rules can be an incentive to cause an increase the destructive behavior (i.e., sabotage). However, this relationship can be affected by other things that are unobserved (unobserved heterogeneity) and vary by skater, tournament and season. That is why it is interesting to explore the causal chain separately for experienced and inexperienced skaters. The above, keeping in mind for that there are other factors that could explain the bad behavior of the contestants, that is why the regression model will consider the round in which the skaters compete, and their starting position.

The round in which the skater competes is taken into account due to the differences in importance between a qualifying round and a final. According to the round, there are differences in the probability of obtaining the highest payment (winning the competition). That is to say, in a final

round, the probability of obtaining the victory increases, as the number of rivals in the race is reduced. The opposite effect is present with the qualifying rounds in which there are more skaters. Hence, it is important to contemplate the effect of competing in earlier or final rounds of the competition, since it may alter the actions of individuals based on the probability of obtaining the prize. Based on that, a differentiation of groups is contemplated based on the rounds of competition. The data has information from the “Ranking Races” until the “Final A”, for a total of information of eleven rounds by tournament.

The rounds were divided in two groups, the advanced rounds of the tournament “Tournament Stages” that has information from the “Heats” rounds until the “Final A”. And the other, the earliest rounds of the tournament “Qualifying Stages” with information from the “Ranking Races” until the “Rep Semifinals” rounds. On the other hand, the skater start position was included in the model too because starting the race further back than other participants may encourage the skater in question to commit sabotage because of the feeling of lagging behind. Once those points are clarified, the next regression model is proposed for the “i” skater, “j” tournament and “s” season.

$$\begin{aligned} Sabotage_{ijs} = & \beta_0 + \beta_1 (Treated)_{ijs} + \beta_2 (Round)_{ijs} + \beta_3 (Treated \times Round)_{ijs} \\ & + \beta_4 (Start\ Position)_{ijs} + \beta_5 (Treated \times Start\ Position)_{ijs} + \delta_i + \gamma_j + \rho_s + \mu_{ijs} \end{aligned}$$

Where “*Sabotage*” is the dependent variable describing the amount of destructive behavior of the skater, “*Treated*” is a dummy variable that takes value one when the time period corresponds to a time period with the ISU new rules. “*Round*” is a variable for the stage of the tournament, that takes lower value takes the more the stage approaches to the Final A. “*Treated* × *Round*” is a variable of interaction between the tournament stage and the implementation time of the ISU new rules. “*Start Position*” is a numeric variable that indicates the position where the skater starts the

racing (as the number is higher the skater is further back). And “*Treated* \times *Start Position*” is a variable of interaction between the start position and the implementation time of the ISU new rules.

It is important to highlight that the regression model incorporates fixed effects for the variables of tournament (γ_j), season (ρ_s) and skater (δ_i). Moreover, since the effect on the destructive behavior (sabotage) of the individuals can be given by their degree of experience in the tournaments, the regression was run for each one of the defined groups of skaters (experienced and inexperienced). It was also performed for qualifying stages and tournament stages. So as a summary the regression was performed for the different groups of rounds and types of skaters.

8. Results:

In order to analyze the general effect of the regulation on rounds by skater experience, the regression was performed for both group of stages (qualifying stages and tournament stages) by experienced and inexperienced skaters, and all skaters. As you can see in Table 1 if one does not make a distinction between skaters by experience and considers all rounds, as the skaters advance one round forward in the tournament, the ISU new rules do not have a general effect on skater's sabotage. But we can see that for “experienced skaters” and “all skaters” groups, the start position, and the tournament stage variables are significant factors to explain the sabotage that the skaters carry out in a competence.

Nevertheless, for the experienced skaters it was found that if they advance one round forward in the tournament, the probability of sabotage decreases by 0.412 percentage points, and that effect is significant (p-value = 0.009). Also, if the skater is experienced, and he is in a “start position”

TABLE 1⁶
Regressions Results

Variables	<i>Including Qualifying and Tournament Stages</i>			<i>Tournament Stages Only (Qualifying Stages are Excluded)</i>			<i>Qualifying Stages Only. (Tournament Stages are Excluded)</i>		
	All Skaters	Experienced Skaters	Inexperienced Skaters	All Skaters	Experienced Skaters	Inexperienced Skaters	All Skaters	Experienced Skaters	Inexperienced Skaters
Treated (Post July 2015)	0.0157 (0.0209)	-0.00204 (0.0252)	-0.0132 (0.0451)	0.0491 (0.0382)	0.0103 (0.0437)	0.171* (0.0979)	0.0425 (0.111)	0.220* (0.129)	-0.151 (0.182)
Round	-0.00330** (0.00139)	-0.00412*** (0.00157)	-0.000903 (0.00304)	-0.00229 (0.00449)	-0.00367 (0.00496)	0.00864 (0.0115)	-0.00326 (0.0106)	0.0117 (0.0119)	-0.0205 (0.0177)
Treated × Round	-0.00156 (0.00231)	-0.00525* (0.00283)	0.00656 (0.00461)	-0.0109 (0.00707)	-0.00746 (0.00798)	-0.0300* (0.0167)	-0.00459 (0.0126)	-0.0320** (0.0149)	0.0195 (0.0203)
Start Position	0.00667** (0.00289)	0.00643* (0.00352)	0.00728 (0.00507)	0.0134*** (0.00469)	0.0121** (0.00530)	0.0202* (0.0104)	0.00244 (0.00367)	0.000191 (0.00407)	0.00425 (0.00620)
Treated × Start Position	-0.00343 (0.00436)	0.00452 (0.00578)	-0.00924 (0.00695)	-0.00635 (0.00679)	0.00115 (0.00829)	-0.0239* (0.0127)	0.00494 (0.00585)	0.0120* (0.00713)	0.000512 (0.00916)
Constant	0.0284* (0.0163)	0.0269 (0.0186)	0.0297 (0.0353)	0.00454 (0.0279)	0.0103 (0.0306)	-0.0121 (0.0781)	0.0538 (0.0967)	-0.0808 (0.108)	0.212 (0.162)
Skater Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Tournament Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Season Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	5094	3041	2053	2640	1937	703	2454	1104	1350
R-squared	0.061	0.028	0.120	0.100	0.029	0.355	0.137	0.089	0.160
Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1									

⁶ Source: Own calculations using data from ISU web page.

further back, the probability of sabotage increases in 0.643 percentage points (p-value = 0.068). On the other hand, the effect of advancing a round with the new rules for this group is a decrease of the probability of committing sabotage in 0.525 percentage points (p-value = 0.064). The latter result suggests that the sabotage performed by experienced skaters was reduced with the new rules, but only in late stages of the competition. As a next step, the sabotage regression was performed only for the “tournament stages”⁷ for every group of skaters (“all skaters”, “experienced skater and “inexperienced skaters”). In this case, it was found that once again the “start position” explains the probability of destructive behavior (sabotage) on tournaments. However, the interesting results are in the “Inexperienced skaters” group. The effect of the new rules implemented after July 2015 by the ISU is an increase in the probability of sabotage of 17.1 percentage points (p-value = 0.081). In addition, for inexperienced skaters the effect of advancing a round with the new rules is a decrease in 3 percentage points of the probability of committing sabotage (p-value = 0.072). The effect of a start position further back with the new rules is a decrease of the probability of sabotage in 2.39 percentage points (p-value = 0.061). In other words, these results show that the rules changes increased the inexperienced skater’s committed fouls in tournaments, and that once the ISU rules were implemented, the further back the inexperienced skater starts the race, he is less likely to incur in sabotage, apparently because he is discouraged from the lower chances to win the race, and therefore behaves less destructively.

The regression was performed again for the groups made up of experienced skaters, inexperienced skaters and all skaters groups; but this time only the qualifying stages were

⁷ You will find these results in columns four, five and six of Table 1.

taken into account. By this process, significant results were obtained on the experienced skater's group. Firstly, it is possible to see that the new rules of the ISU increased the experienced skater probability of sabotage in 22 percentage points ($p\text{-value} = 0.088$). In addition, if experienced skaters advance one round in the qualifying stages and the new rules of the ISU are valid, their probability of sabotage decreases in 3.2 percentage points ($p\text{-value} = 0.032$). Finally, the effect of a "start position" further back, under the new rules of the ISU on experienced skaters is an increase in the probability of sabotage in 1.2 percentage points ($p\text{-value} = 0.092$).

9. Discussion:

To recapitulate, the regulation does not seem to have an effect when the asymmetry of the stages in the competition is not taken into account. In spite of this, the round and the starting position of the skater are significant elements to explain the sabotage of the tournament. Once the asymmetry of the rounds is incorporated into the analysis through the definition of early and advanced stages in the competition (qualifying and tournament stages), there is a significant effect of the regulation. In the advanced stages of the competition (tournament stages) the change in the rules increased the sabotage acts made by the inexperienced skaters. Additionally, the further back the start position is, these inexperienced skaters are less likely to sabotage. This finding coincides with the results found by Yudkin (2015), Balafoutas, Lindner and Sutter (2012). Individuals cheat at the end of the competition, and those who do this are the least skilled or inexperienced.

Contrary to the literature findings, in which sabotage was performed by the least skilled contestants, this work found that experienced or more skilled skaters are also encouraged by the rule, and increase their sabotage activity during the earliest rounds of the tournament, especially

in the final qualifying phase. This result agrees with the work of Altmann and Wibrál (2012), in that people make more destructive effort in early tournament stages. In addition, it highlights the importance of taking into account the group of expert participants when analyzing cheating and destructive behaviors, as they are not exempt from incurring in it.

10. Conclusions:

This article examined how a change in the rules associated with the technique with which an action must be executed can affect the performance of sportsmen. In fact, it creates a perverse incentive that increases the amount of sabotage carried out in a tournament. To address this analysis, we used a natural experiment present in short track speed skating, focusing on the heterogeneity in skills and tournament stages. We conclude that the change of rules of the 55th ISU congress created incentives for the skaters to commit more sabotage in different moments and stages of the competition. Then, the rules associated with the technique in which certain activities must be executed affect the performance and destructive behavior of the individuals. On the other hand, it is important to highlight the findings in the increase of sabotage for experienced skaters. Since they suggest that all individuals can be encouraged to cheat or sabotage if the appropriate conditions and incentives for it are presented, these results ratify the importance of institutions in the formulation of a correct regulation of human behavior in competitive contexts.

Finally, regarding the possible application of this study in terms of gender, this research only evaluated the destructive behavior of men in short track speed skating tournaments. However, the possibility of exploring similar behaviors in women's tournaments it is open, and could be incorporated in future analysis to draw conclusions around the gender differences in sabotage.

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