The Swiss Gambit

Extended Abstract

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ABSTRACT

In each round of a Swiss-system tournament, players of similar score are paired against each other. An intentional early loss therefore might lead to weaker opponents in later rounds and thus to a better final tournament result—a phenomenon known as the Swiss Gambit. To the best of our knowledge it is an open question whether this strategy can actually work.

This paper provides answers based on an empirical agent-based analysis for the most prominent application area of the Swiss-system format, namely chess tournaments. We simulate realistic tournaments by employing the official FIDE pairing system for computing the player pairings in each round. We show that even though gambits are widely possible in Swiss-system chess tournaments, profiting from them requires a high degree of predictability of match results. Moreover, even if a Swiss Gambit succeeds, the obtained improvement in the final ranking is limited. Our experiments prove that counting on a Swiss Gambit is indeed a lot more of a risky gambit than a reliable strategy to improve the final rank.

KEYWORDS

Swiss system; chess tournament; strategyproofness; simulation

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1 INTRODUCTION

At sports tournaments, players and teams are usually expected to give their best in each game they play. However, they might withhold effort for strategic reasons: for example, a team might let weaker team members play a match they would probably lose anyway, so their strong team members are well rested when playing a more important match. A considerably more obscure scenario happened at the Olympic Games 2012: two badminton teams were both trying to lose a group-stage match, because the loser would meet a weaker team at the upcoming elimination match [15].

1.1 Gaming the Swiss System

The *Swiss-system* tournament format is widely used in competitive games like most e-sports, badminton, and chess, the last of which this paper focuses on. In such tournaments, the number of rounds is predefined, while the pairing of players in each of these rounds depends on the results of previous rounds. In each round, players of similar score are paired against each other. Therefore, a weaker performance generally leads to weaker opponents.

These rules provide an incentive to intentionally draw or even lose a match early in a tournament to subsequently play against weaker opponents and finish the tournament at a better rank than if that early match would have been won. This strategic move is colloquially called a *Swiss Gambit*, referring to a gambit in chess, which means sacrificing a piece in order to gain an advantage [30]. However, even though some observations based on intuition or minimalistic simulations, such as “this strategy [. . .] is just as likely to backfire as succeed” [10] has been made, to the best of our knowledge, no research study has been conducted on the Swiss Gambit, despite the fact that it is well-known among competitive chess players [1, 10, 16], and the lack of “serious research” is pointed out in their online discussions [24–26].

Intentionally losing a match to gain an advantage in a tournament is a highly controversial strategy, which is generally considered unethical or even cheating. In 2019, the five-time ex-world champion Vishy Anand has been tagged by punters, pundits, and commentators alike as having “played the gambit”, when staging a remarkable recovery following his shock opening-round upset result at the Grand Swiss tournament on the Isle of Man [18].

1.2 Related Literature

The Swiss system regularly evokes interest in the AI and Economics communities [2, 17, 21, 27, 28]. The works of Csató [6, 7, 8] study the ranking quality of real-world Swiss-system tournaments, in particular, whether a fairer ranking could have been obtained by different scoring rules. The importance of winning or losing compared to drawing a lot of games was highlighted by Billings [4]. Computing player pairings at Swiss-system chess tournaments is also a popular topic. Automated matching approaches are proposed by Glickman and Jensen [14], while Kujansuu et al. [20] use the stable roommates problem, see [19], to model a Swiss-system tournament pairing decision. Ólafsson [23] and Biró et al. [5] attempt to implement the official FIDE criteria as accurately as possible. Führlich et al. [13] propose a new approach to derive fair pairings at tournaments and they analyze the obtained ranking quality.

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Sports tournaments are by far not the only application area of the Swiss system. Self-organizing systems [11], person identification using AI methods [29], and choosing the best-fitting head-related transfer functions for a natural auditory perception in virtual reality [22] all rely on the Swiss system as a solution concept.

1.3 Our Contribution

In the full version of our paper [9], we show the following key insights on the impact of gambits.

(1) Gambits are possible even in very small tournaments.
(2) There is an effective gambit heuristic even if match results can only be approximated.
(3) The gambit player must be able to estimate match results very accurately in order to identify a gambit possibility.
(4) Even with a successful gambit, the expected rank improvement is small.
(5) Gambits are more likely to succeed if the players' strengths span a large range or if the tournament is long.
(6) The impact of gambits on the ranking quality of all players is low in general.

All in all: even though a Swiss Gambit might lead to a higher rank in tournaments, under realistic conditions it cannot be used to reliably improve a player's rank or to derive a a largely false final ranking.

2 AN EXAMPLE OF A SWISS GAMBIT

A *pairing engine* calculates the pairing of players for each round, based on the results of previous rounds. The pairing must adhere to the voluminous FIDE pairing criteria [12, C.04.3 and C.04.4.2]. The open-source and state-of-the-art pairing engine *Dutch BBP*, developed by Bierema [3], is endorsed by the FIDE [12, C.04.A.10. Annex-3], as it implements the FIDE criteria for the so-called Dutch pairing system. In all our experiments we use Dutch BBP for pairing the players in each round.

Figure 1 illustrates an example Swiss system chess tournament with its respective pairings for each round. This example is completed by the example of a successful Swiss Gambit in Figure 2.

3 IDENTIFYING A GAMBIT POSSIBILITY

We work on two models, a deterministic and a probabilistic one. In the latter, more sophisticated model, the results of the individual matches are computed via a probabilistic calculation that is designed to be as realistic as possible. Due to the probabilistic setting, starting with the same set of players, the final ranking might be different in different runs. This is not possible in the deterministic model, where match results can be reliably calculated from the players' Elo rating and their color assignment.

In the deterministic model, there are 12 gambit possibilities on average for 5 rounds and 32 players, as Figure 3 shows. This number increases to 54 if there are 11 rounds. The length of the tournament is therefore a decisive factor in the number of possible gambits, probably because the gambit player has more matches to capitalize on her gambit in longer tournaments. However, in the more realistic deterministic model, hardly any gambit possibilities were identified. This shows that the gambit player must be able to estimate match results very accurately in order to identify a gambit possibility.

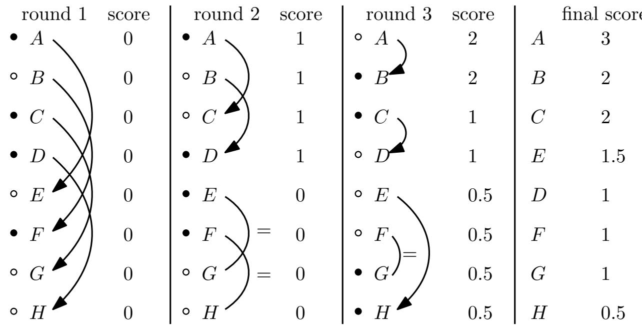

Figure 1: Example of a 3-round tournament paired with the Dutch pairing system. The players A, B, C, D, E, F, G, H are labeled according to their strength, with player A being the strongest. Arcs indicate the matches of the respective rounds. Arrows point from winner to loser while undirected arcs indicate a draw. The initial score and the color distribution (• for black and ∘ for white) in a round are shown in each column. The final ranking and final scores are shown in the fourth table on the right. All players play truthfully.

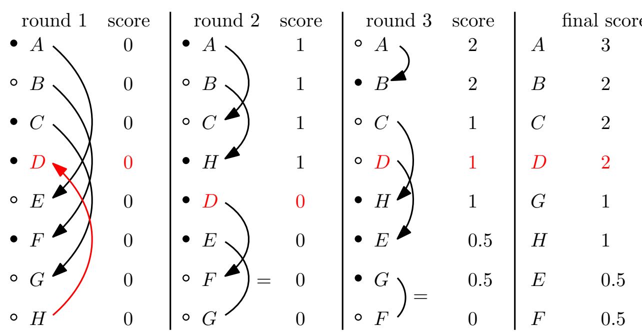

Figure 2: The tournament from Figure 1 with player D intentionally losing her first match. This is a successful Swiss Gambit since player D gains one rank and one point compared to playing truthfully as in Figure 1.

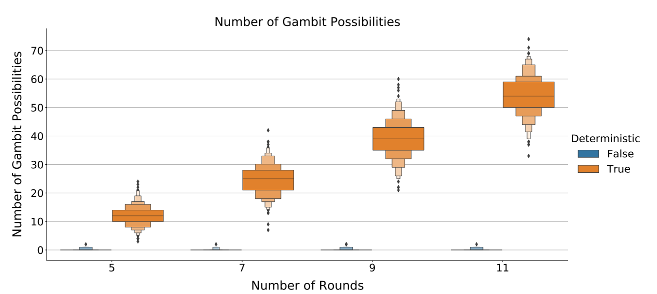

Figure 3: Number of gambit possibilities as a function of the number of rounds. Results for the deterministic model are shown in orange, while results for the probabilistic model are shown in blue.

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