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Did the Soviets collude? A statistical analysis of championship chess 1940–1978

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ABSTRACT

We expand the set of outcomes considered by the tournament literature to include draws and use games from post-war chess tournaments to see whether strategic behavior can be important in such scenarios. In particular, we examine whether players from the former Soviet Union acted as a cartel in international all-play-all tournaments – intentionally drawing against one another in order to focus effort on non-Soviet opponents – to maximize the chance of some Soviet winning. Using data from international qualifying tournaments as well as USSR national tournaments, we consider several tests for collusion. Our results are inconsistent with Soviet competition but consistent with Soviet draw-collusion that yielded substantial benefits to the cartel. Simulations of the period's five premier international competitions (the FIDE Candidates tournaments) suggest that the observed Soviet sweep was a 60%-probability event under collusion but only a 25%-probability event had the Soviet players not colluded.

Research into how tournament structure affects effort in athletic competition has generated many insights into the problems of optimal compensation in labor and management. In much of this literature, outcomes are monotonic functions of effort plus an error term (cf. Ehrenberg and Bognanno, 1990), match-ups end in either wins or losses, and strategic behavior by players is accordingly considered unimportant. Many important economic scenarios, though, are better characterized by the presence of a third outcome that is analogous to a draw, and the existence of such a draw outcome can introduce the potential for strategic behavior. In this paper, we test whether Soviet chess players exploited the existence of the draw and round robin (i.e., all-play-all) formats, effectively acting as a cartel in international tournaments following World War II. Our findings suggest that the existing tournament literature may have fewer real world applications than has been appreciated and that important caveats may apply.

"Draws" in life are commonplace, and the presence of a draw strategy complicates the problem of encouraging effort. For instance, a player may have the choice of more and less conservative strategies with different chances for a draw. Risk-averse players may pursue less aggressive strategies, trading expected payout for reduced variance.[1] Furthermore, it is not

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[1] Consider the following hypothetical. Assume that a large automotive company wishes to motivate one of its divisions to innovate by offering a very high reward in the event of a new design success, but consistent with much of the tournament literature, the company also proposes no reward or even punishment if the proposed design fails. Under certain assumptions, the division would do its best to produce a terrific design but only if outcome is monotonic in effort. On the other hand, suppose the division had two options: a low-risk design (the draw option) with little chance of being a "home run" but also little chance of being a failure or a high-risk design (the play for the win strategy) with a higher probability of leading to a big success but also a

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unreasonable to think that many real-world tournament settings are more akin to the repeated play against many opponents that one finds in the round robin format than to the elimination rules of a knockout format. The combination of the draw option with something similar to an all-play-all set of rules creates the possibility that collusion among a subset of players may upend at least some of the predictions from tournament theory.

In our setting we begin by noting that tournament chess is not simply stressful but notoriously tiring. We hypothesize that very strong players who wish to collude in round robin formats can improve their performance against other players by agreeing to early or prearranged draws. Assuming for simplicity that the expected outcome of a game between players of equal strength is half a point each, a peaceful pair of agreed draws produces the same outcome with less effort and risk than taking a win and loss apiece.

The literature on the economics of tournaments within sporting events is now well established. For our purposes the most relevant work has focused on the importance of tournament structure in motivating effort and in providing incentives for good play (see the overview by Szymanski, 2003). In most cases the applications have been to athletic competitions, whether individual (golf or tennis) or team sports (basketball or soccer). There is also a related literature on the problem of collusion and of cheating in sports that overlaps with this work.[2]

Chess has numerous strengths for the purposes of econometric analysis. First, the outcomes are clear and objective: a win, a draw, or a loss. Moreover, a perfect record of all games is available for virtually all important championship and high-level tournament games of the modern era. Most important of all is that there exists a rating system that is a precise and accurate reflection of the performances of players and an excellent indicator of the relative strengths of players. These ratings are the best unbiased estimates of relative strengths, and the differences in ratings correspond to the likelihood that the stronger player will defeat the weaker (cf. Elo, 1978). These Elo-style ratings have since been applied not only to other sports but also to studies of revealed preference rankings in college selection (cf. Avery et al., 2005).

The question of Soviet collusion during the period when the USSR dominated the struggle for the world championship has been one of the long-standing debates in the chess world. The best-known (but not unique) criticism was aired by Bobby Fischer some weeks after the 1962 Candidates Tournament in Curacao in the magazine *Sports Illustrated* in the article "The Russians Have Fixed World Chess" (cf. Timman, 2005).[3] In it, he claimed that three of the Soviet players (Paul Keres, Tigran Petrosian, Efim Geller) had agreed to pre-arranged draws among themselves in order to conserve energy and to permit themselves to play to the fullest against the non-Soviet competitors. A fourth player (Viktor Korchnoi) was supposedly forced to throw games to the others to minimize the chance of a non-Soviet (probably Fischer) winning the tournament.[4] These allegations were immediately denied by the Soviets, and many observers have noted that Fischer performed so poorly in that tournament that any collusion was unlikely to have been the cause of his defeat (Timman).[5] Nonetheless, the World Chess Federation (Fédération Internationale des Échecs or FIDE), the governing body of the world chess organization, was sufficiently concerned to modify the system for selecting the challenger for the world championship from 1964 onwards, changing the penultimate Candidates tournament from round robin to a knockout format.[6] We exploit this change in tournament format to quantify the extent of Soviet outperformance of rating that was due to draw-collusion as opposed to other potential Soviet advantages.

Prior analyses of the question of Soviet collusion have turned on the evaluation of individual games and the judgment as to whether some were deliberately "lost" or "drawn" in favorable positions.[7] For the most part there has been no systematic analysis of the pattern of wins and draws in the tournaments themselves, though all have noted that there was indeed a large number of draws between the three leading Soviet players in Curacao 1962 (Timman, 2005).[8]

The problem of detecting collusion has naturally received much attention in industrial organization, and our identification strategy has a strong parallel there. Our approach when applied to games in round robin events is most in line with the literature that makes comparisons to a broadly acceptable conduct benchmark. For example, Bresnahan (1987) uses the approach to great effect, coupling the benchmark that a firm will set prices "collusively" for all products in its portfolio

greater chance of serious failure. Depending on the precise conditions, it might actually pay the company to use a less skewed payoff structure if it wants to encourage true innovation. (For work that treats draws in the context of refinements of the prize structure, see Nalebuff and Stiglitz, 1983.)

[2] The most commonly cited work in this genre is Duggan and Levitt's work on sumo wrestling (2002), but there is also a related literature involving biased judging in sporting events (Zitzewitz, 2006; Garicano et al., 2005).

[3] See also Plisetsky and Voronkov (2005).

[4] After his defection, Korchnoi claimed that the trio of Geller, Keres, and Petrosian had agreed upon a private arrangement to draw amongst themselves.

[5] After the tournament, Soviet writers took pains to dismiss Fischer's allegations (for example, see discussion by Flohr and Boleslavsky in Plisetsky and Voronkov, 2005, p. 105). Forty years later, though, Averbakh and Korchnoi clashed when Averbakh continued to deny the allegations while Korchnoi claimed that, indeed, a private pact had been agreed to (Plisetsky and Voronkov, pp. 105–109).

[6] In the knockout format, two players will play, alternating colors between games, until one player has exceeded some point threshold. The winner advanced, and the loser was eliminated.

[7] Timman's book on Curacao (2005) goes into the most detail regarding the games themselves. The testimony of participants since the fall of the Soviet Union makes it more likely than ever that some kind of draw-agreement was in place. Furthermore, Timman's analysis of the critical game between Keres and Petrosian probably provides the strongest "smoking gun" as far as prearranged draws are concerned. The two players decided to a draw in a position that was extremely favorable towards Black. Timman (a world class grandmaster and at one time the top player in the Western world) provided a detailed chess analysis of the position and said, "My conclusion is that Fischer was correct in declaring that Petrosian agreed to a draw in a winning position," (Timman, p. 186). This is especially striking considering that both were tied for first with only three rounds to follow.

[8] To the extent that one finds the existing testimony and documentary evidence of Soviet collusion conclusive, there remains the additional question that we address, namely the magnitudes of impact on outcomes of such collusion.