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An Analysis of Prize Money Distributions in Snooker

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Abstract: There have been many public discussions about prize money distributions in professional snooker, but few of these discussions include a real quantitative analysis. Here, four decades of snooker rankings are analyzed in terms of prize money distributions. In particular, it is investigated how much these rankings are dominated by the top players, and also by players from the UK. Among others, an analysis based on the Pareto principle (or 80-20 rule) is performed. The main conclusions are that: (1) with an increasing amount of available prize money, the rankings are *less* dominated by the top players, and (2) players from the UK have historically earned a significantly larger share of the available prize money than could be reasonably expected based on the actual percentage of UK players. The presented analyses and results aim at providing an objective and quantitative basis for any further discussions on the prize money distribution issue.

Keywords: snooker; ranking; prize money; pareto principle

1. INTRODUCTION

There have been many public discussions about issues related to prize money distributions in professional snooker (Hendon, 2022), or whether the snooker tour is perhaps too UK-centric. However, few of these discussions include any real quantitative analysis other than an occasional simple statistic. To address these issues more quantitatively, a detailed analysis of snooker prize money rankings is presented here. In particular, this analysis focuses on (1) how dominated the rankings are by the top players, and (2) the share of prize money earned by UK players.

Seasonal prize money ranking data over a time range of more than four decades (1980-2023) is considered. The main results that follow from the analyses are that: (1) with a larger total amount of prize money, the rankings are *less* dominated by the top players, and (2) UK players have earned a statistically significantly larger share of this total amount of prize money than the actual percentage of UK players. These analyses and results aim at providing a more objective and quantitative basis for any further discussions on the mentioned issues.

2. METHODS

2.1. Data

All data analyzed here was obtained online from CueTracker (Florax). In particular, the prize money ranking at the end of each season starting from the 1980-1981 season up to and including the 2022-2023 season were used. For each of these seasons, the full list of players who earned any prize money in a professional snooker tournament (including tournaments that do not count towards the official world ranking, such as invitational tournaments like the Masters) during that season, ranked from largest to smallest amount, was retrieved. To illustrate, Figure 1 shows the top 10 of the professional tournament prize money ranking at the conclusion of the 2022-2023 season.

In addition, a list of the total number of professional snooker tournaments held in each season was retrieved. Besides presenting various basic statistics such as averages and min-max ranges, the two main results are based on calculating an 80% rank and performing a t-test for statistical significance, respectively. These analyses are explained in detail next.

	Player	Prize Money
1	Mark Allen	683,250
2	Luca Brecel	658,750
3	Mark Selby	538,950
4	Judd Trump	501,400
5	Shaun Murphy	440,500
6	Ronnie O'Sullivan	397,100
7	Kyren Wilson	310,050
8	Ding Junhui	301,550
9	Mark Williams	245,600
10	Ali Carter	244,600

Figure 1: The top 10 of the 2022-23 prize money ranking. Source: CueTracker

2.2. 80% rank

As a measure of how much the rankings are dominated by the top players, an *80% prize money rank*, or simply referred to as an *80% rank* here, is calculated for each season. This 80% rank is directly related to the Pareto

principle, more commonly known as the 80-20 rule (Dunford et al., 2014). This principle is based on the observation that, for example, roughly 80% of the wealth of a country is owned by (the richest) 20% of people, or 80% of the revenue of a company is generated by (the largest) 20% of customers. To find out whether this principle also holds for snooker prize money rankings, one can ask what percentage of the (top) players it takes to earn 80% of the available prize money.

To calculate the 80% rank for a given prize money ranking, first express each player's earnings as a percentage of the total amount of prize money. Next, add up these percentages, starting at rank one and going down the ranking (i.e., up in rank number), until this subtotal becomes equal to or larger than 80%. Table 1 shows a simple (hypothetical) example with just ten players, where the 80% rank is equal to four (i.e., where the subtotal becomes larger than 80%).

Table 1: A hypothetical example illustrating the calculation of the 80% rank.

Rank	1	2	3	4	5	6	7	8	9	10
Prize money (%)	40	25	10	7	5	4	3	3	2	1
Subtotal (%)	40	65	75	82	87	91	94	97	99	100

Finally, calculate a *relative* 80% rank by expressing the (absolute) 80% rank as a percentage of the length of the full ranking. In the example above, the relative 80% rank would be 40% (rank four in a ranking list of ten players). In other words, it would take the top 40% of players to earn 80% of the available prize money.

2.3. t-test

To determine if (and how much) the prize money rankings are dominated by players from the UK, the percentage of players from the UK (i.e., from England, Scotland, Wales, or Northern Ireland) is compared to the percentage of available prize money that is earned by those UK players in each season. In particular, a t-test (Kalpi et al., 2011) is performed to determine whether the averages (calculated over all 43 seasons) of these two percentages can be considered statistically significantly different or not.

The result of a t-test is generally presented in the form of a p-value, which is calculated from the actual sample data. This p-value indicates the probability that the difference between two sample averages is at least as large as observed in the actual data, under the hypothesis that the two samples were drawn from the same underlying probability distribution. If the calculated p-value is very small, e.g. less than 1% ($p<0.01$), then this hypothesis can be rejected with high confidence, and the sample averages can be considered to be statistically significantly different.

All ranking data analyses and results presented below were performed and generated with the R language for statistical computing (R Core Team), for which a custom script was written.

3. RESULTS AND DISCUSSION

3.1. Number of Tournaments

Figure 2 shows the number of professional snooker tournaments held in each season for the four decades considered. This number fluctuates between 15 and 35, but without any particular trend. On average, there are between 24 and 25 professional tournaments per season.

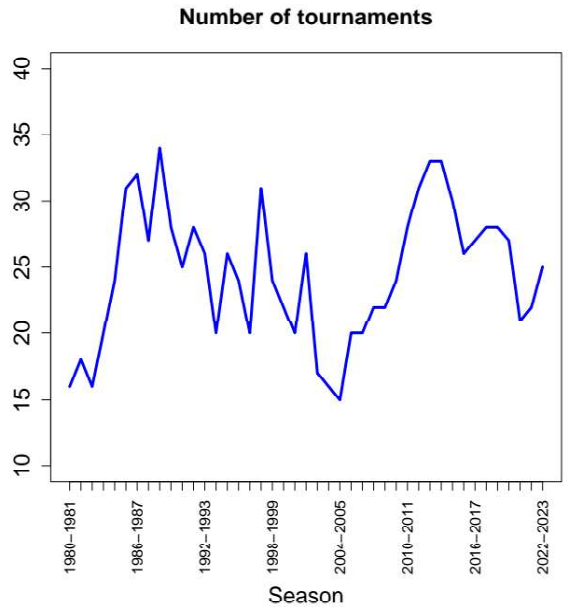

Figure 2: The number of professional tournaments held in each season

3.2. Total prize money

Figure 3 shows the total amount of prize money earned in each season (i.e., added up over all players) in million Great British Pounds (GBP). Clearly there is an overall upward trend, but with two notable exceptions: shortly after the turn of the millennium, and then in more recent years. The most recent downturn was obviously a result of lockdowns and other restrictions.

3.3. Number of Players

Figure 4 shows the number of players that have earned any prize money (no matter how much or how little) in a professional tournament in a given

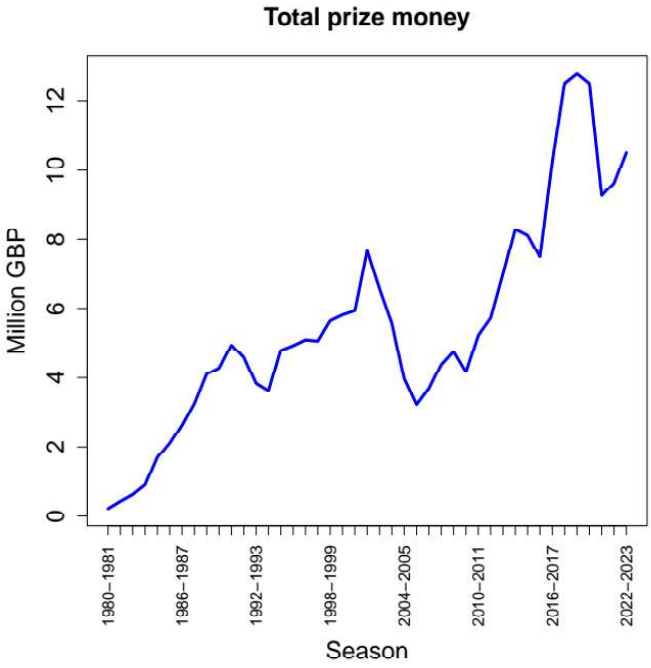

Figure 3: The total amount of prize money in each season

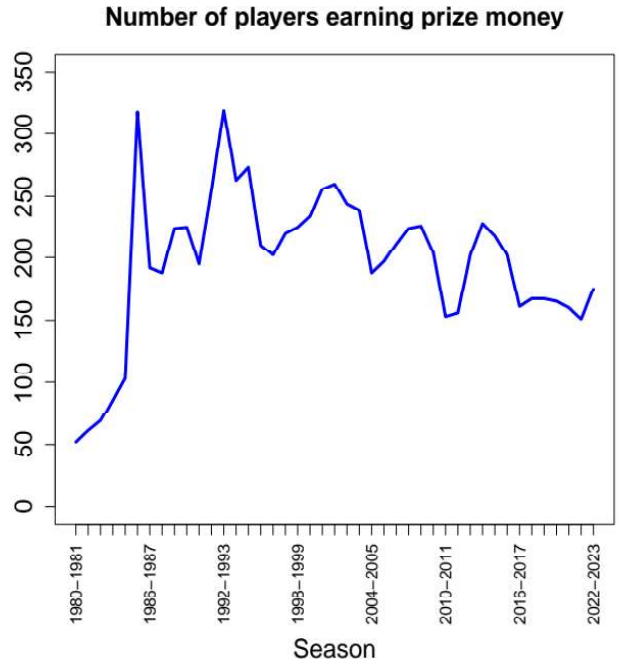

Figure 4: The number of players in each season

season. After a drastic increase in the early 1980s, the number has steadily declined again, but with some fluctuations. During the last (2022-2023) season, 175 players earned at least some prize money, although for some players this was as low as 250 GBP.

3.4. Player Earnings Range

Figure 5 shows the average (dots) and range (bars) of prize money earned by individual players in each season. These amounts range from a minimum (lower end of the bars) of 50 GBP to a maximum (upper end of the bars) of just over one million GBP. The average amount of prize money earned per player (dots) has increased by about one order of magnitude, from around 5,000 GBP to around 50,000 GBP over the four decades considered.

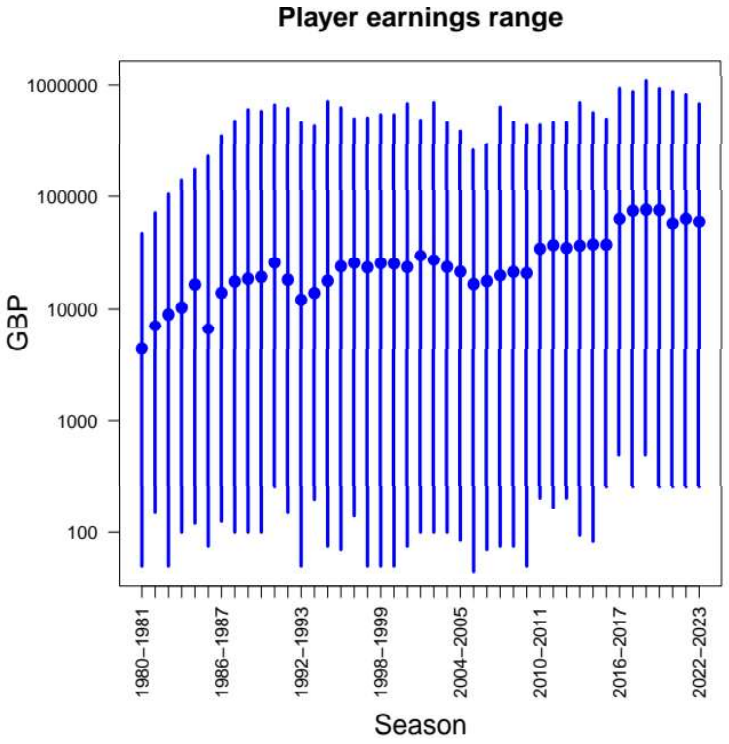

Figure 5: The range of player earnings in each season

Note that the vertical axis in this chart is on a logarithmic scale: every next value going up along the vertical axis is ten times larger than the previous one. Therefore, although the fluctuations at the low end and high end of the range appear visually similar, in absolute value they are several orders of magnitude larger at the high end (on the order of 100,000 GBP) compared to the low end (on the order of 100 GBP).

3.5. Prize Money Distribution

Given the highly skewed distribution of prize money among the players, though, with many players earning very little and a few players earning a large amount, a simple average is unfortunately rather meaningless. Figure 6 shows these skewed distributions in a histogram for the first season (1980-1981; dark blue boxes) and the last season (2022-2023; light blue boxes) considered. The bin width is 10,000 GBP, with the rightmost bar representing the eight players earning more than 250,000 GBP during the 2022-2023 season (see the top 10 in Figure 1).

Note that all presented data is for *actual* prize money earned, not reflecting the 20,000 GBP minimum income guarantee introduced recently. In fact, purely in terms of prize money earned, almost half (47%) of the players earned less than GBP 20,000 and almost one-third (32%) even less than GBP 10,000 during the 2022-2023 season.

3.6. 80% rank

With such skewed distributions, a more informative statistic (instead of a simple average) is a measure of how much a prize money ranking is

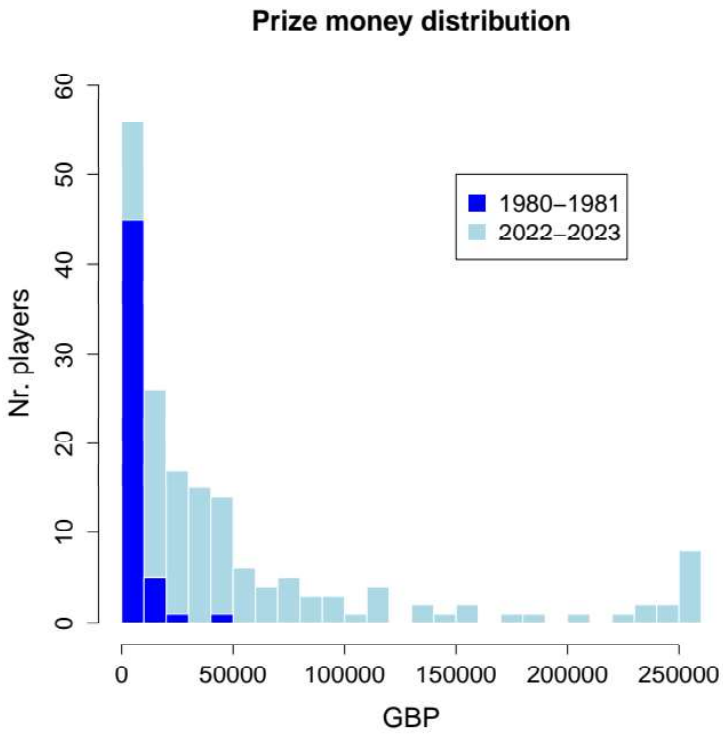

Figure 6: The prize money distribution for the first and last seasons considered

dominated by the top players. One such measure is the 80% rank introduced in Section 2.2.

Figure 7 shows these 80% ranks (vertical axis) against the total amount of prize money (horizontal axis), with each dot representing the data for one season. Clearly there is an upward trend: if the amount of available prize money increases, the 80% rank also becomes larger. This, in turn, means that the ranking becomes *less* dominated by the top players. For example, if the total prize money is less than one million GBP, it takes fewer than the top 20 players to earn 80% of it. However, with a total amount of six million GBP in prize money, it may take more than the top 50 players to earn 80% of it. This trend seems to level out, though, once the total amount of prize money becomes more than about nine or ten million GBP.

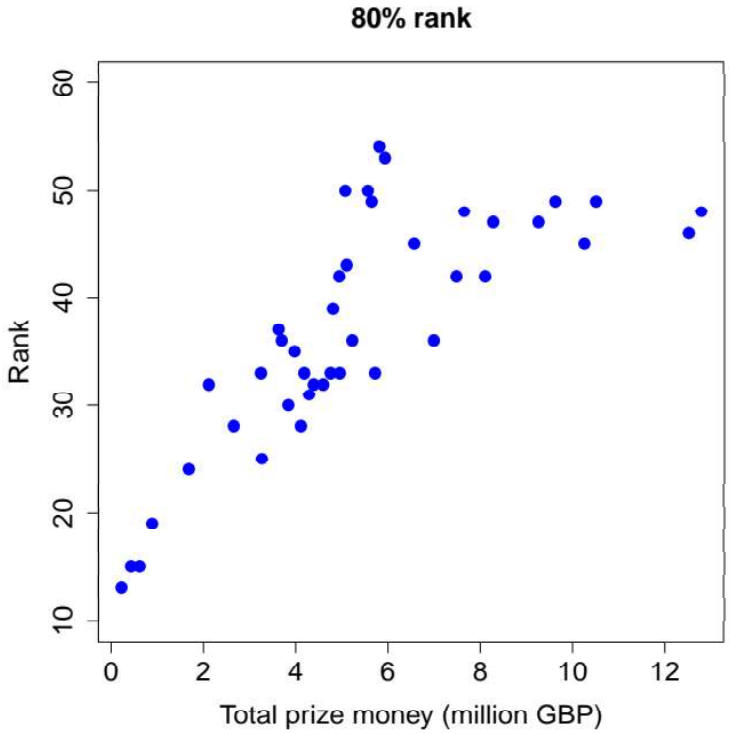

Figure 7: The 80% rank against the total amount of prize money

Figure 8 shows the relative 80% prize money ranks (vertical axis) against the total amount of prize money (horizontal axis). The result is very similar as for the absolute 80% ranks, except for the small cluster of points on the left (with less than 2 million GBP total prize money). These data points are from the first half of the 1980s, when the total number of players was still quite small. Otherwise, there is again a very clear increasing trend with

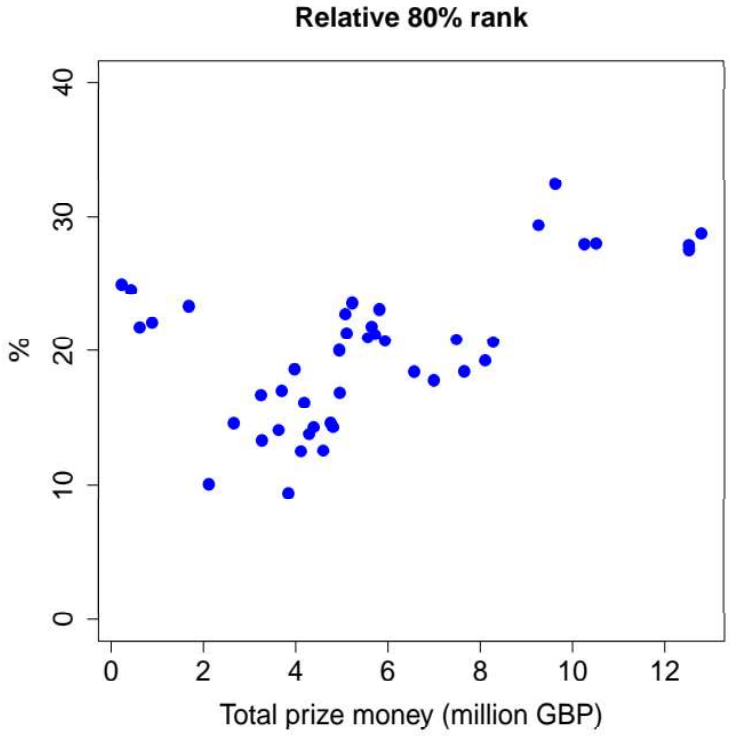

Figure 8: The relative 80% rank against the total amount of prize money

increasing total prize money, which also seems to level off once the total amount of prize money becomes about ten million GBP or more.

Note that these relative 80% ranks vary between, roughly, 10% and 30%. However, the average over all 43 seasons is 19.95%. Thus, on average snooker prize money rankings appear to have followed the Pareto principle, or 80-20 rule, very closely indeed over the past four decades.

3.7. UK Players Share

Finally, Figure 9 shows the share of UK players in professional snooker. The dark blue line represents the percentage of UK players among all players in the ranking in a given season. This percentage fluctuates between 50% and 90%, and is currently around 65%. The light blue line represents the percentage of the total amount of prize money that was earned by these UK players in each season. This percentage fluctuates between 70% and 90%, but with a slowly decreasing trend since the turn of the millennium.

As this chart indicates, the share of prize money earned by UK players is generally larger than the actual percentage of UK players, as the light blue line is mostly above the dark blue line. The main exception seems to be

in the middle range of the four decades, where the two lines are at a roughly equal height. Furthermore, in those seasons where the light blue line is above the dark blue line, the distance between the two lines seems to be larger than that in the few opposite cases.

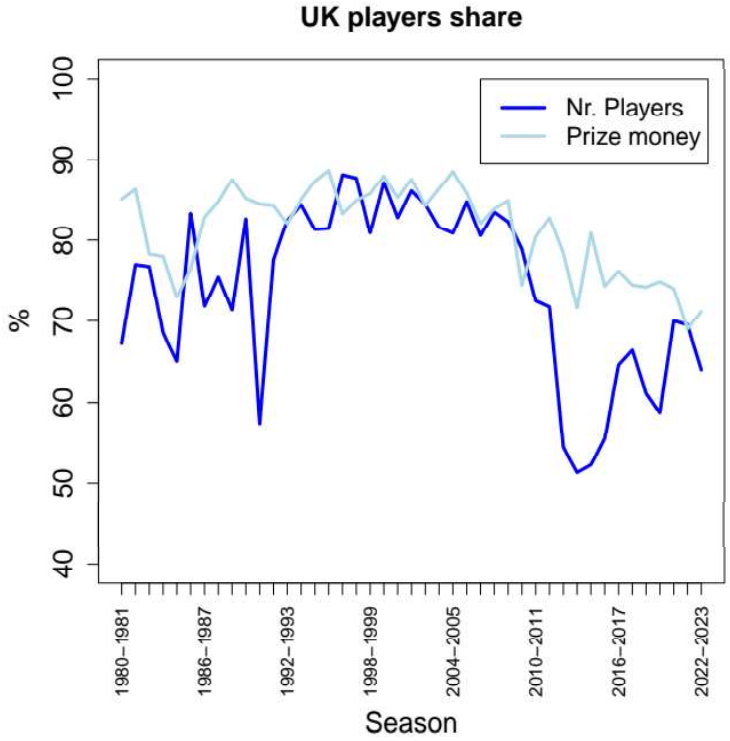

Figure 9: The share of UK players in prize money and total number of players

Figure 10 shows this more clearly, where the UK players prize money share (in percentage) is plotted against the corresponding percentage of UK players for each season. The diagonal line indicates where they would be equal. The majority of points is clearly to the left of this diagonal line, where the share in prize money is indeed larger than the percentage of players. Only a few points are to the right of the diagonal line, and mostly by a relatively small distance.

The average share in prize money earned by UK players (over all 43 seasons) is 81%, while the average percentage of UK players is 74%. A t-test on the hypothesis that these averages are equal results in a p-value of 0.0001 (i.e., a probability of 0.01%). This hypothesis can thus be rejected with full confidence, and the average UK share in prize money can be considered to be significantly larger than the average percentage of UK players. In other words, historically UK players have earned a significantly larger share of

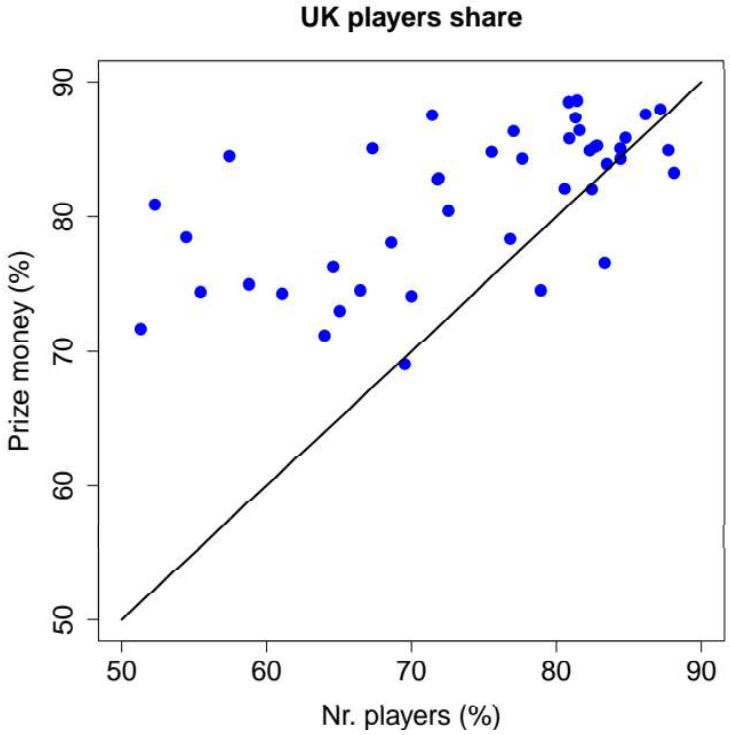

Figure 10: The share of prize money against the percentage of UK players

the available prize money than what could be reasonably expected given the actual percentage of UK players, assuming all playing conditions and circumstances being equal among all players.

4. CONCLUSIONS

There is no discernible trend over time in the number of tournaments per season, but there is a fairly steady decline in the number of players since the rapid initial increase during the 1980s. With a clear and significant overall increase in total amount of prize money per season, this means that the average amount of prize money both per tournament and per player has increased. In fact, the average amount of prize money earned per player in one season has increased by about one order of magnitude, from around 5,000 GBP to around 50,000 GBP, over four decades.

However, given the highly skewed distribution of prize money, with many players earning very little and a few players earning large amounts, a simple average is not very meaningful. A more informative measure is the (relative) 80% rank, which indicates how much a ranking is dominated by the top players. The relative 80% rank for snooker prize money distributions

varies between roughly 10% and 30%, but with an average (over all seasons) of 19.95%. The Pareto principle, or 80-20 rule, thus seems to apply perfectly well to these rankings, with (on average) 80% of the prize money being earned by the top 20% of players.

Moreover, the 80% rank has actually increased with an increasing total amount of available prize money (at least up to a certain point), both for the absolute and for the relative 80% ranks. In other words, with a larger amount of available prize money, the rankings become *less* dominated by the top players. More prize money is of course beneficial to all players, but relatively speaking even more so for the lower-ranked players, as they are able to earn an increasingly larger share of it. A similar conclusion was already drawn earlier (Hordijk, 2022), but from a mathematically more complicated analysis based on power laws. Here, a more straightforward and easier to understand analysis has been presented, and on a more complete data set.

Although skewed prize money distributions are the norm in professional sports, one can ask what an acceptable level of top-player dominance is. Indeed, public discussions have, and continue to be, centered around this issue. The 80% rank, based on the Pareto principle, does perhaps not give a direct answer to this question, but at least it provides a quantitative way of measuring such dominance.

Finally, the snooker tour is clearly still highly dominated by UK players, both in terms of the number of players (50-90%) and their share in the prize money earned (70-90%), but with a declining trend in the latter. Moreover, their share in prize money is statistically significantly larger than what could be expected given the actual percentage of UK players. Although it is not immediately obvious what an expected or "fair" percentage would be, it may be insightful to compare these statistics with for example badminton, another individual sport that was originally brought over from British India and then further developed into its modern form in the UK. Although snooker shares a very similar history in that respect (Everton, 1986), badminton seems to have become much more internationalized.

Hopefully these analyses and results will be helpful in any future discussions about prize money distributions in snooker or whether the tour is too UK-centric, by providing some objective and quantitative statistics over the past four decades that are directly relevant to these delicate issues.

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