

Analysis on the Trend in the Prize Money and Performance Factor of Tour Pro Golf Players (KLPGA centering on 2008-2017)

Sang-Hoon Lee, Ik-Ryeul Park*

Department of Liberal Arts, Gyeongnam National University of Science and Technology
irpark@gntech.ac.kr

Abstract

The purpose of this study is to analyze the trend of the prize money and the performance factors, based on the data of 1,000 pro golf players provided by KLPGA (Korea Ladies Professional Golf Association) for the past 10 years from 2008 to 2017. First, in terms of the prize money, it increased a lot if we compare the data from 2008 and from 2017. However, it is still disproportionately favorable to the top players and is extremely disadvantageous to the middle-low players. Therefore, it is necessary to considerately care middle-low players. Second, in terms of performance factors, the players' skill has been improved steadily based on all of the factors considered: the scoring average, average putting, the birdie average, par save, par break, and recovery for the past 10 years from 2008 to 2017. Despite the fact that both players' performance and income have increased, it is prominent that the inequality between the players in terms of prize money becomes severe, which should be mitigated by external systematic support to maintain the current level of world-class players of Korea.

Keywords: Prize Money, Performance Factor, Tour Pro Golf Players, KLPGA (Korea Ladies Professional Golf Association)

1. Introduction

On November 19, 2018, the ranking of the LPGA's (Ladies Professional Golf Association) announcement shows the status of South Korean female golfers. In the world ranking 1 to 50, there are 18 South Korean players, compared to (the second-most) 16 of the United States. In particular, there are four players in the top 10, Sung Hyun Park (2), So Yeon Ryu (3), In Bee Park (4) and Jin Young Ko (10). The excellent skills of these players came not only from the players' individual effort but also from the support of all the people supporting them, mainly the Korea Ladies Professional Golf Association (KLPGA). In particular, KLPGA website provides a number of data in the "All Records Report" category: the prize money, scoring averages, putting averages, averages birdie, green in regulation, par saves, par breakers, and recovery, which provide the help the establishment of training and planning of the players. However, it is difficult to recognize at a glance the records of individual players as they are presented only in rankings. Therefore, if one can confirm the records of other players as well as your own records by log-log scale or linear-scale presented in this study, you can analyze the prize money and performance from different perspectives. We expect this analysis to aid this direction of training and planning.

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Corresponding Author: irpark@gntech.ac.kr

Tel:+82 55-751-3463, Fax: +82 055-751-3538

Department of liberal arts, Gyeongnam National University of Science and Technology

2. Methodology

2.1 Subjects

The subjects of this study were selected as the 1,000 South Korean female professional golf players from the top 100 end of the prize in KLPGA for the past 10 years: from 2008 to 2017. The characteristics of the subjects of the study are shown in <Table 1>.

Table 1. Characteristics of the Subjects

Content	N	M	SD
Prize money (won)	1,000	127,040,970	158,873,478
Scoring averages (S)	1,000	73.41	1.40
Putting averages (S)	1,000	31.15	0.75
Averages birdie (%)	1,000	14.28	3.00
Green in regulation (%)	1,000	68.97	5.18
Par saves (%)	1,000	80.79	4.05
Par break (%)	1,000	14.39	3.03
Recovery (%)	1,000	53.16	6.37

2.2 Data Collection and Data Processing

The data collected in this study are cited in the “All Record Report” category among the records collected on the website of KLPGA as of November, 2018. The purpose of this study is to find the mean and standard deviation of statistical data, and analyze the tendency of the players’ prize money and performance factors of KLPGA players for the period of study. In order to sort by rank, we use the open source programming language Python (version 2.7.10) for scientific/statistical calculation. We use the numpy.average function and the numpy.std function in the Python package Numpy (version 1.14.0). In addition, we use Gnuplot (version 5.2 patchlevel 4) program to generate the plots in the EPS (encapsulated postscript) file, and then convert them to jpg image files with MacOS Preview program.

3. Results and Discussion

3.1 The trend of prize money

The trends of the prize money from 2008 to 2017 are $78,627,186 \pm 113,289,133$, $63,915,301 \pm 95,371,685$, $92,201,156 \pm 106,273,084$, $95,054,677 \pm 89,775,526$, $107,897,202 \pm 103,544,802$, $121,600,033 \pm 128,470,897$, $150,490,678 \pm 188,362,897$, $171,098,528 \pm 163,558,092$, $197,686,792 \pm 208,938,762$, $191,838,150 \pm 188,721,854$ and the total was $127,040,970 \pm 151,873,468$ won. Therefore, it can be seen that the amount of 191,838,150 won in 2017 increased by 113,210,964 won (about 111 thousand) compared with the 78,627,186 won in 2008. The increase in the amount of the prize money is due not only to the increase in the number of tournaments (26 to 32), but also to the increase in the amount of the prize money (about 10 billion → about 23 billion). <Figure 1> shows that the data from 2008 to 2017 are not near the average, and the standard deviation is very large. In addition, as noted above, the standard deviation is even greater for the years 2008, 2009, 2010, 2013, 2014, and 2016 than for the average (127,040,970 won) and standard deviation (151,873,468 won). It can be seen that it cannot be a representative value of the prize money. This is supported by the fact that when

the 100 ranking is leveled, the top 10% is about 200 ~ 1.4 billion won, which accounts for about 60% of the total prize money. This skewness of the prize money distribution method is clearly not fair to middle-and-lower-class players, and it is considered that they have a great influence on the morale promotion, motivation, and livelihood of these middle and lower players [5, 8, 11, 12].

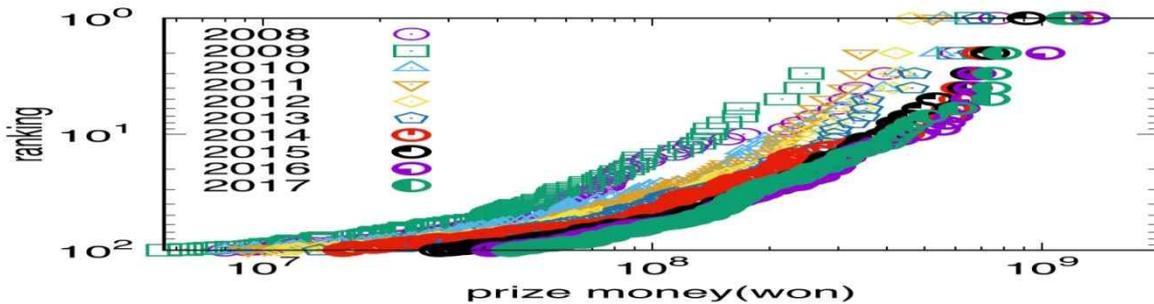


Figure 1. Trend of prize money

3.2 The trend of scoring averages

The trends of scoring average from 2008 to 2017 were 74.17 ± 1.39 , 73.87 ± 1.41 , 73.70 ± 1.43 , 73.91 ± 1.23 , 73.59 ± 1.34 , 73.75 ± 1.18 , 73.39 ± 1.19 , 72.81 ± 1.19 , 72.64 ± 1.21 , 72.24 ± 0.99 , and the overall score was $73.41 \pm 1.40(S)$. As a result, the performance was improved from 74.17 ± 1.39 in 2008 to 72.24 ± 1.40 in 2017 by about 1.93. As the scoring average performance is directly linked to the increase in the prize money, all players need to concentrate on reducing the scoring average [3, 6]. In addition, Kim [2] reports that the ranking has a significant correlation with the scoring average, average birdies, and par saves, which indicates the importance of scoring average management. As shown in <Figure 2>, it is lowered as the year progresses, thus supporting the overall improvement of the players' overall performance. In particular, the standard deviation is very small, indicating that there is no significant difference in the technical aspect between the players. In other words, it shows that the higher the level is, the better the skill is [5].

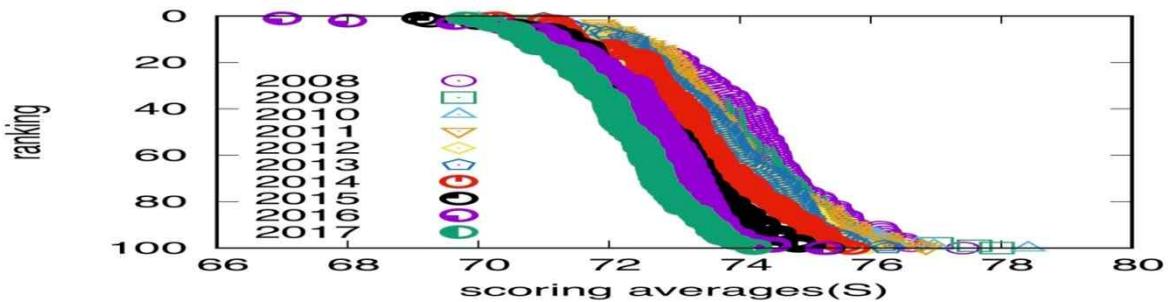


Figure 2. Trend of scoring average

3.3 The trend of putting averages

The trends of the putting averages from 2008 to 2017 was 31.81 ± 0.84 , 31.32 ± 0.64 , 31.46 ± 0.67 , 31.35 ± 0.64 , 31.24 ± 0.86 , 31.12 ± 0.60 , 30.90 ± 0.58 , 30.82 ± 0.52 , 30.72 ± 0.61 , 30.72 ± 0.59 and overall $31.15 \pm 0.75(S)$. In 2008, it decreased by about 1.09 from 31.81 ± 0.84 to 30.72 ± 0.59 in 2017. It can be seen that the average and standard deviation of the putting average are decreased evenly over the years. This means

improving the overall performance of the players. In particular, the 5% improvement in putting technology has a significant impact on the amount of the prize money over the same 5% improvement in driver distance or fairway in regulation. For example, when lowering the number of putts per round from 1.79 to 1.70, it is possible to raise the prize money by about 44 million won more than to drive 13 yards more, so there is no need to worry about whether putting is important or driver distance is important [6, 11].

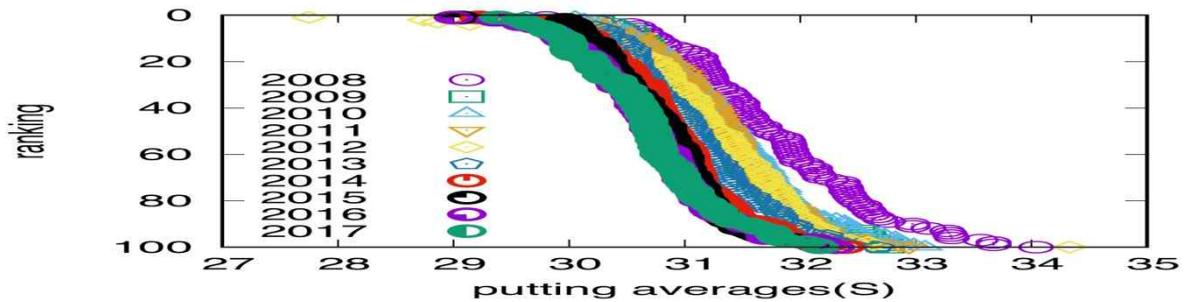


Figure 3. Trend of putting average

3.4 The trend of averages birdie

The trends of the average birdie from 2008 to 2017 were 13.13 ± 2.46 , 13.82 ± 2.92 , 13.34 ± 2.42 , 13.09 ± 2.42 , 14.01 ± 3.41 , 13.63 ± 2.43 , 14.13 ± 2.57 , 15.29 ± 3.03 , 15.77 ± 3.41 , 16.56 ± 2.48 and overall $14.28 \pm 3.00\%$. It was increased from $13.13 \pm 2.46\%$ in 2008 to $16.56 \pm 2.48\%$ in 2017 by about 3.43%. In 2011 and 2013 there was a slight decline, but the overall trend was increasing. This overall increase in the average birdie seems to have contributed to the more aggressive pinning strategy for entry into the top level, based on the individual skill improvement of the players. As shown in <Fig. 4>, the overall increase in the average birdie can be attributed to the strategic approach of the players. As stated in the tendency of the prize money, 60% of the prize money is in the 1st to 10th place, and 70% is in the 1st to 20th place. In other words, top-ranked players play stably to keep their lead in moving day and pay day, while mid-level players who have passed the cut day have a higher probability of birdie as they prefer aggressive pin attack [4, 7].

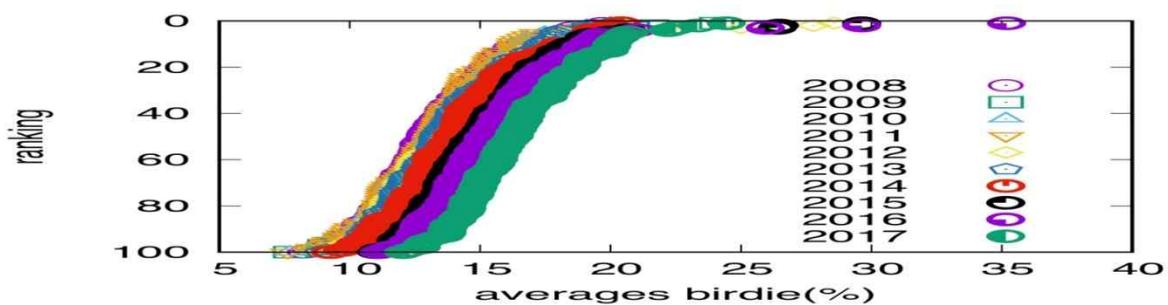


Figure 4. Trend of averages birdie

3.5 The trend of green in regulation

The trends of green in regulation from 2008 to 2017 were 68.56 ± 4.93 , 68.19 ± 6.02 , 69.15 ± 5.47 , 67.79 ± 4.90 , 68.99 ± 4.88 , 67.31 ± 5.11 , 67.98 ± 5.27 , 69.97 ± 5.32 , 69.91 ± 4.28 , 71.82 ± 3.77 and $68.97 \pm 5.18\%$, respectively. The green in regulation increased by 3.26% from $68.56 \pm 4.93\%$ in 2008 to $71.82 \pm 3.77\%$ in

2017, just like other performance factors. It is similar to the 71.81% of ARIYA JUTANUGAN, the 1st in the LPGA prize money ranking. Therefore, it is easy to get a glimpse of the status of Korean female golf. The increasing trend of the players' green in regulation can only be attributed to choices and judgments such as the player's ability to iron and green strategy. As shown in <Fig. 5>, the green in regulation showed a tendency to improve consistently over the course of the year. The improvement of the green in regulation affects the putting averages and the average birdie, resulting in a decrease in the putting average. Therefore, it is the opposite of the graph of the average number of players in <Figure 5>. If the competition is held on a different course each year, the length of the course is lengthened and the width of the fairway is narrow or jar-shaped, the green in regulation of the players will be very low, but the discriminating power between the players is likely to be higher [9, 10].

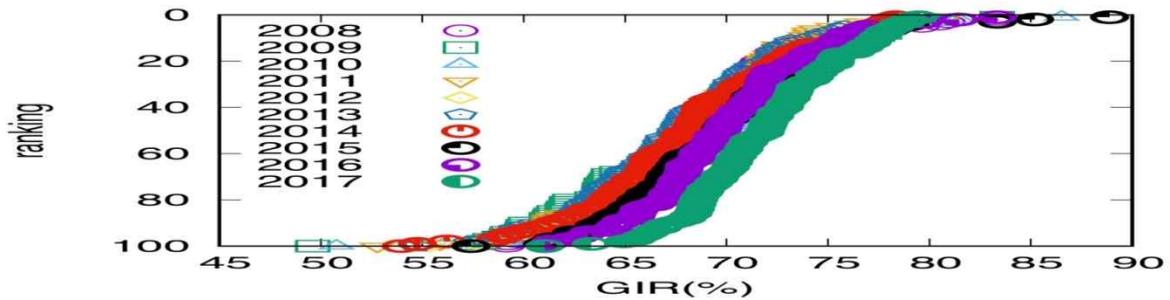


Figure 5. Trend of green in regulation (GIR)

3.6 The trend of par saves

The trends of par saves from 2008 to 2017 were 78.27 ± 4.29 , 79.49 ± 4.14 , 80.35 ± 4.43 , 79.59 ± 3.68 , 80.11 ± 3.84 , 79.79 ± 3.52 , 80.93 ± 3.61 , 82.61 ± 3.20 , 82.95 ± 3.02 , 83.80 ± 2.70 and $80.79 \pm 4.05\%$, respectively. The par saves increased from $78.27 \pm 4.29\%$ in 2008 to $83.80 \pm 2.70\%$ in 2017 by about 5.5%, showing an overall increase trend. As shown in <Figure 6>, the average save rate is more than 80%, which is about 84% in 2017. This also means concentration of players around the green. These par saves is positive (+) relationships with putting averages and recovery [7]. In addition, par saves are even greater implications as well as professional and amateur players. This is because weekly golfers feels par saves as the accomplishment similar to a birdie. Therefore, high-level amateurs are often recognized as 'good at washing dishes around green.'

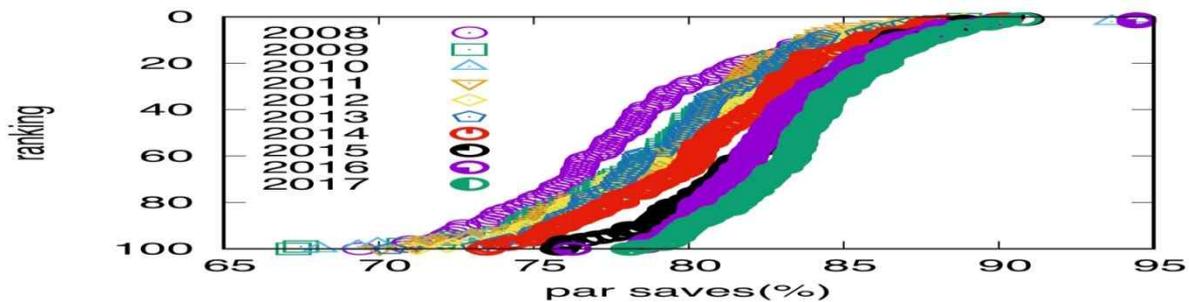


Figure 6. Trend of par saves

3.7 The trend of par break

The trends of par break from 2008 to 2017 were 13.36 ± 2.54 , 13.91 ± 2.94 , 13.41 ± 2.46 , 13.17 ± 2.44 , 14.12 ± 3.40 , 13.73 ± 2.46 , 14.21 ± 2.59 , 15.39 ± 3.04 , 15.90 ± 3.43 , 16.70 ± 2.51 and $14.39 \pm 3.03\%$ overall. The par break increased by about 3.34% from $13.36 \pm 2.54\%$ in 2008 to $16.70 \pm 2.51\%$ in 2017, showing an overall increase trend. These par break has very high positive (+) correlation birdie or eagle ($r = .753 \sim .998$). As a result, the overall score and prize money depend on who takes the eagle or the birdie in the four long holes (par 5) per round, so improving the driver’s distance and equipping it with appropriate equipment is also a way to increase par break and average birdie will be. It is necessary to remember that the players of the

LPGA and KLPGA are currently trying two – on in most of the long holes.

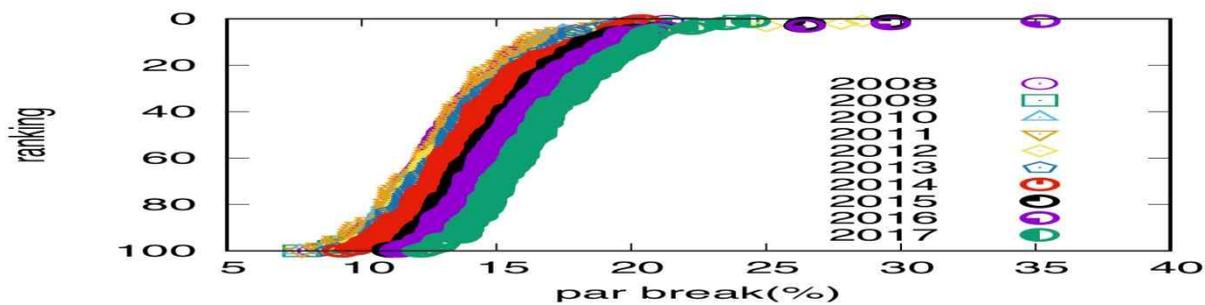


Figure 7. Trend of par break

3.8 The trend of recovery

The trends of recovery from 2008 to 2017 were 49.65 ± 6.24 , 51.50 ± 6.23 , 53.38 ± 7.90 , 51.54 ± 5.56 , 52.46 ± 6.03 , 51.51 ± 5.46 , 54.22 ± 5.21 , 55.68 ± 5.75 , 55.63 ± 4.98 , 56.05 ± 6.32 and $53.16 \pm 6.37\%$ respectively. The recovery also increased by 6.4% from $49.65 \pm 6.24\%$ in 2008 to $56.05 \pm 6.32\%$ in 2017, indicating an overall increase trend. As shown in <Figure 8>, it is more than 54% from 2014 to 2017. It will be held at 23 events by 2013, and is expected to have a lot of relationship with 28 events from 2014, 31 events in 2015, 34 events in 2016, and 32 events in 2017. Players record more than par with approach shots or bunker shots obtained from more competitions, giving the player his own confidence and even more joy to the crowd. In addition, because there is a report that ‘recovery’ is the most important factor for the scoring averages, which is the strongest performance factor in the prize money, it is considered that the attitude of interest in recovery is needed [1, 2, 3].

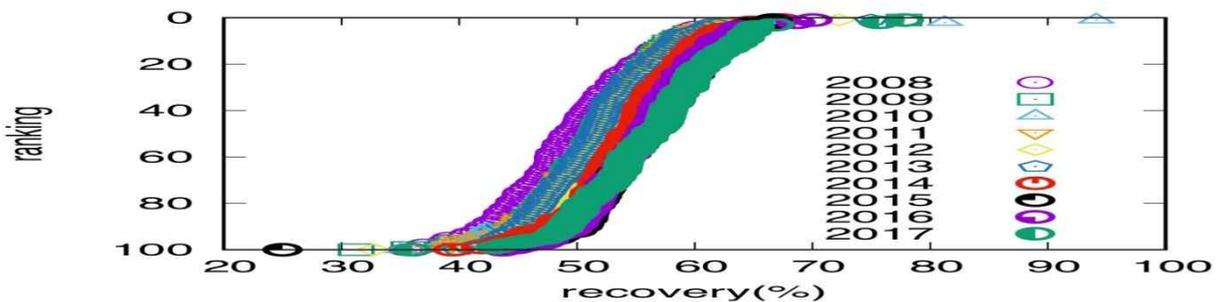


Figure 8. Trend of recovery

4. Conclusion

This study has analyzed the trend of the prize money and the performance factors based on the data of 1,000 South Korean female golf players provided by KLPGA for the past 10 years from 2008 to 2017, and we have obtained the following conclusions. First, the prize money has increased from 78,627,186 (₩) in 2008 to 191,838,150 (₩) in 2017, but There was an increase of about 113,210,964(₩). Second, the scoring averages decreased from 1.47 to 1.72, from 74.17 ± 1.39 in 2008 to 72.24 ± 1.40 in 2017, and the performance of the players was steadily improved. Third, the putting averages decreased from 31.81 ± 0.84 in 2008 to 30.72 ± 0.59 in 2017, to about 1.09. It seems that there was a shift in perception that 'putting is money'. Fourth, the average birdie increased steadily from $13.13 \pm 2.46\%$ in 2008 to $16.56 \pm 2.48\%$ in 2017 by about 3.43%. This seems to be due to the aggressive strategy as well as the improvement of the players' performance. Fifth, the green in regulation increased from $68.56 \pm 4.93\%$ in 2008 to $71.82 \pm 3.77\%$ in 2017, and the players' performance grew to be similar to that of the LPGA summit. Sixth, the par saves increased from $68.56 \pm 4.93\%$ in 2008 to $71.82 \pm 3.77\%$ in 2017 by about 3.26%. This steady increase is believed to be due to concentration around the green. Seventh, the par break increased by about 3.34% from $13.36 \pm 2.54\%$ in 2008 to $16.70 \pm 2.51\%$ in 2017. This steadily increasing tendency is attributed to the improvement of the players' ability and aggressive pinning. Finally, the recovery increased by 6.4% from $49.65 \pm 6.24\%$ in 2008 to $56.05 \pm 6.32\%$ in 2017. This steady increase tendency seems to be caused by the fact that it maintains the sense of concentration and concentration in green around and increased number of competitions.

In conclusion, we can confirm that Korean ladies professional golf players has grown to world-class, i.e., comparable to LPGA in terms of continuous increase of prize money and performance.

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