

## The application of tournament theory to analyze the importance of consistency on the PGA TOUR

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Abstract 287**

Tournament theory suggests that the prize structure affects the participation and effort of potential competitors and there are several papers in this area focused on professional golf. Hood (2006) finds that prize money, tournament scheduling, and past performance impacts the entrance decision and Rhoads (2007) adds that exemption status also affects the entrance decision. Ehrenberg and Bognanno (1990) find that performance improves when the rewards are greater. Tournament theory also suggests that the prize structure affects the risk taking behavior of competitors and this research is the first - to our knowledge - to study this for golfers. We do this by finding the rewards for consistency and inconsistency, an observable byproduct of risk taking behavior.

Consistency is a frequently stated goal for golfers and risk taking behavior is a frequent topic for analysts who generally believe that safe play is smart play. For example, Phil Mickelson, among the best players for the past decade, has taken considerable heat for his risky play. In a 2002 interview, fellow professional John Cook stated, "he [Phil Mickelson] is not as tight and rounded and consistent as Tiger [Woods] and Ernie [Els] are. He has some very good weeks and then some horrible weeks. If the standard is Tiger, he's not going to catch him being on and off" (Diaz, 2002). But, is risky and inconsistent play indeed harmful for golfers? Tournament theory predicts this may not be the case.

We sought to discover the value of consistency by simulating a typical tournament then altering each player's consistency, one at a time, to determine the change in the prize money, cuts made, and winning percentage. This tournament was typical in design, but not in its field. By selecting the top 144 players from the PGA TOUR in 2006 it makes for a very strong field, but it is equitable and includes the most followed golfers. All 144 will play two rounds and the field will be reduced to those whose cumulative score place them in the top 70, including ties. Two more rounds will be played and prizes awarded by total score according to the prize structure of a typical PGA TOUR tournament. The only tie that is broken in any PGA tournament is for first place. However, to ease the simulations, and perhaps create better approximations, not even that tie will be broken here rather each player will be awarded an appropriate fraction of the win.

One million simulations were done to determine the expected prize money and probabilities of making the cut and winning the tournament. Then, one player at a time, the consistency of the players was altered to determine the benefits and drawbacks of consistency for all types of players - both the strong and weak, the consistent and the inconsistent. The changes in consistency are costless, no extra effort nor gain or loss in stroke average is assumed.

The ability and consistency of each player is defined as their mean and standard deviation for scores on an ordinary course. If each player's score for one round is approximately normal and independent from their previous rounds and from their competitors then a simulated score can be produced from these statistics. The independence assumption is necessary and not implausible. Clark (2006) finds little evidence of momentum in daily scores in professional golf so independence from previous rounds is not misleading. The only scores that matter are relative (if a difficult course increases the scores evenly for competitors the final position of a player in the tournament is unaffected by the difficulty) so independence from other golfer's is not misleading either.

We conclude that inconsistent golf is more rewarding golf. All players want to win more prize money, and consistency reduces the likelihood of an extremely good performance. If inconsistency can be achieved costlessly - without affecting the expected number of strokes - it should be pursued. The best players place a high value on winning, and they will win less if they are more consistent. In fact, all players win less if they are more consistent. The worst players often seek to make more cuts and they also find that consistency will reduce their chances of making the cut. So, all players benefit from less consistency which they might be able to achieve by accepting more risk on the course.

This study supports tournament theory not golf analysts. Since the reward system is skewed to heavily favor excellent performances it also favors inconsistency. This research also supports the findings of tournament theory in mutual funds: those that are trailing should gamble to improve their odds at beating the benchmark, but in tournament golf everyone is trailing because the chances are good that at least one competitor will put together four good rounds. Even Tiger Woods must play better than normal to win this type of tournament.

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Consistency is sought after by professional golfers and commended by analysts. However, tournament theory predicts that risk taking behavior, which leads to inconsistency, can be beneficial when the reward scheme is top heavy. We simulate a typical tournament and then adjust each player's standard deviation to determine the effects of consistency. We find that all players earn more prize money and win more tournaments when they are less consistent. Although inconsistency is not appreciated by golfers and analysts, it is rewarding.