DISCUSSION PAPERS IN ECONOMICS

Working Paper No. 16-03

My Future or Our Future? The Disincentive Impact of Income Share Agreements

Greg Madonia
University of Colorado Boulder

Austin C. Smith
Miami University

October 18, 2016
Revised

Department of Economics

University of Colorado Boulder
Boulder, Colorado 80309

My Future or Our Future? The Disincentive Impact of Income Share Agreements

Greg Madonia[1] and Austin C. Smith[2]

October 18, 2016

Abstract

Liquidity constraints can distort efficient investment across a variety of domains, for both firms and individuals. While debt financing is often used to address liquidity constraints, especially at the individual level, there has been a recent push towards Income Share Agreements (ISAs) – equity contracts in which individuals can raise money today by selling shares of their future income. While ISAs eliminate the need for traditional collateral and allow liquidity constraints to be addressed in new markets, this tool brings with it the classical problems associated with asymmetric information - adverse selection and moral hazard. Individuals may select into an ISA if they have private information that their expected income is lower than it appears to investors (adverse selection), and participants may rationally choose to exert less effort or to deviate from otherwise optimal behavior, given that they only reap part of the reward (moral hazard). Using a novel panel data set that tracks individuals as they participate in very short-term ISAs - we find evidence of both issues, with a relatively larger decline in earnings due to moral hazard. *JEL Codes: J33, M52, J46*

We thank Brian Cadena, William Even, Jonathan Hughes, Terra McKinnish, Matthew Notowidigdo, and Jeffrey Zax for their valuable suggestions throughout the editing process. Seminar participants at Ohio University, Xavier University, Miami University, the University of Akron, and the 2014 Southern Economic Association Conference provided valuable comments and suggestions. Finally, we thank Scott Collier for help with the data gathering process. All remaining errors are our own.

[1]Madonia: Department of Economics, University of Colorado at Boulder, Box 256 UCB, Boulder, CO 80309 (e-mail: gregory.madonia@colorado.edu)

[2]Smith: Department of Economics, Miami University, 2054 FSB, Oxford, OH 45056. (e-mail: smitha83@miamioh.edu)

"If you start out by promising what you don't even have yet, you'll lose your desire to work toward getting it."

-The Alchemist, by Paulo Coehlo.

1 Introduction

Liquidity constraints can distort efficient investment across a variety of domains, for both firms and individuals (Evans and Jovanovic (1989); Whited (1992); Hubbard (1998); Calero, Bedi, and Sparrow (2009)). While debt financing is often used to address liquidity constraints, especially at the individual level, there has been a recent push towards an alternative tool – Income Share Agreements (ISAs). These are equity contracts in which individuals can raise money today by selling shares of their future income. ISAs are currently being advocated as a method to address an individual's need for funding when a lack of tangible assets for collateral make traditional debt financing less practical (Palacios, DeSorrento, and Kelly (2014)). By providing funding today, in exchange for a share of future income, ISAs overcome the liquidity constraint in a creative way. However, economic theory would suggest that they are subject to disincentive effects because they lower the marginal return to effort for participating individuals. That is, individuals may rationally choose to exert less effort, given that they are only reaping a portion of the reward.[1]

ISA markets have recently arisen in areas as disparate as higher education and professional athletics. Purdue University has become the first institution of higher education in the United States to experiment with ISAs on a large scale.[2,3] A participant receives free tuition as a substitute for student loans in exchange for a set percentage of income

[1] Judd (2000) and Jacobs and van Wijnbergen (2007) discuss moral hazard in an educational equity market setting, while Levitt and Syverson (2008) find that real-estate agents perform significantly worse when receiving a small commission relative to when selling their own house.

[2] The *Back a Boiler* program started in the Fall 2016 semester and allows students to help pay their tuition bill by selling a fraction of their future income over a limited time period. Length of the payback period and interest rate are based on major. For example, an Economics major pays back 6.76% of their income for 100 months in exchange for $20,000 of education funding today, while an Art History major pays back 7.84% for 112 months for that same amount of education funding.

[3] Higher education ISAs where first suggested by Friedman (1962) but have only recently caught on. On the national level, former US presidential candidate Marco Rubio proposed "Student Investment Plans", his terminology for ISAs, as a key part of his reform plan for US education eco (2015). Lawmakers in Oregon, Washington, New York, Vermont, and Pennsylvania are also considering such options Lawrence (2014).

following graduation, with the standard contract lasting nine years (Foundation (2016)). Another early innovator, Fantex, began offering ISAs for professional athletes in 2013. Nine early career National Football League players and one Major League Baseball Player have sold approximately 10% of their future career earnings to Fantex in exchange for millions upfront.

Empirical evidence on the impact of ISAs on future performance is scarce, primarily due to the lack of existing markets with sufficient data.[4] In both the Fantex and Purdue University ISAs, the contracts last for several years, and it will not be possible to gauge the overall impact of ISAs until the contracts are completed. Further, any across-person comparisons between those who do and do not participate in ISAs would be difficult to interpret, due to concerns regarding why some individuals would choose to enter into an ISA, and others not. By identifying a new ISA marketplace, staking markets for online poker tournaments, we examine the performance effects while directly addressing selection.

Until legal changes in 2011, millions of Americans played online poker, spending an estimated $6 billion per year (Levitt and Miles (2014)). The popularity of the online poker market led to the advent of a complementary market that allowed players to seek "staking" for individual poker tournaments, an arrangement in which investors pay players a fixed fee for participating in a tournament in return for an agreed upon percentage of prize money. The staking market is a market for very short-term ISAs. Liquidity constrained individuals seek out funding that enables them to undertake an inherently risky endeavor (higher education with uncertain labor market returns, a volatile career as a professional athlete, or a poker tournament with uncertain monetary returns).[5] Rather than selling a share of all future earnings for many years, a poker player sells a share of future earnings for one specific tournament or for a set of tournaments.

Staking markets for online poker tournaments provide an especially attractive setting

[4]A related market is crop-sharing, where workers must give a portion of the yield to the owner of the land. Shaban (1987) finds that the structure of these contracts leads to a significant reduction in the yield on sharecropped plots relative to owned plots.

[5]Poker players must pay an entry fee to participate in each tournament and typically only 10% of the entrants have any positive monetary return.

for estimating the disincentive impacts of ISAs. First, for each tournament played by an individual there are observable objective outcome measures: earnings and tournament finish position. Second, individuals participate in many poker tournaments, allowing for a straightforward comparison of the same player's performance with and without an ISA contract.[6] This type of comparison overcomes the challenge of across-individual selection wherein individuals participating in an ISA and those not participating in an ISA have different unobservable characteristics that affect performance. Third, there exists *ex post* data on the difficulty of the task - a measure of the average ability of all other tournament participants. This allows us to address the possibility that the task performed under an ISA is actually more difficult than one performed independently, even conditional on a rich set of observable tournament characteristics.

The analysis in this paper is based on data from over 96,000 player $\times$ tournament observations, of which roughly 3,100 are for staked-play. Exploiting variation in ISA status within a player, we adopt a player by entry fee tier fixed effects approach that compares results for a given player at a given entry fee tier (e.g. \$22-\$100) when participating in an ISA, to results for the same player at the same entry fee tier when not. Consistent with a reduction in effort, we find that return on investment falls substantially when participating in an ISA.

This result is consistent with a disincentive effect caused by participating in an ISA, but also with a competing hypothesis – within-player selection effects.[7] A player may seek staking only when they possess private information that makes staking advantageous for them. For example, a player seeks investment when they know a tournament is more difficult than it appears, or may know their performance will be worse than usual for some reason that is unobservable both to the potential investors and to the econometrician. This would bias our results towards our current finding of a lower return on investment when staked.

While it is not possible to rule out this selection interpretation entirely, we provide

[6]Tournament poker players often play multiple tournaments in the same day, and some will even engage in staked-play and unstaked-play at the same time.

[7]Selection effects have been shown to play a large role in sorting into incentive schemes *across* workers as well (Lazear (2000); Dohmen and Falk (2011)).

multiple pieces of evidence against this being the only explanation. First, we incorporate a measure of tournament difficulty. Although many characteristics of poker tournaments are known to any observer prior to players registering for a tournament, one that is not completely observable is the difficulty of the tournament. By including an *ex post* measure of tournament difficulty we reduce concerns that players have some special knowledge of a tournament's difficulty (that investors do not have), and that players are seeking staking in these more difficult tournaments that they would not have entered without investment. Second, online poker tournaments are listed with a highly descriptive title containing information on the tournament's structure. We exploit this feature to match tournaments based on their name and entry fee, and then employ a fixed effects strategy that compares a player's outcomes in staked tournaments to unstaked tournaments based on this match. This exact matching scheme provides a more refined comparison group, at the cost of statistical precession.[8] Third, we mitigate concerns that players seek staking when they have private knowledge about themselves that leads them to seek out staking. To do this, we look only at tournaments after the player's first staked tournament and before their last staked tournament. This reduces concerns that there is some fundamental difference about the player in time periods either before or after they engage in the staking marketplace. For example, this would rule out a mean reversion story where a player is on a "hot streak", decides to sell future winnings on the staking market, and then returns to their lifetime expected outcome. While selection likely plays a small role, all three tests suggest that the disincentive created by the income share agreement is the main driver of worse performance.

Finally, our paper builds on the empirical literature on incentives in the workplace (see Prendergast (1999) for a summary of the literature). Some form of performance pay was used in 39% of US private sector jobs during 2013 and is particularly prevalent among the highest quartile of wage-earners (Gittleman and Pierce (2013)).[9] We find that altering a performance pay scheme has a significant impact on performance in a

[8]For example, we compare a player's results in the "$12,000 guarantee knock out" tournament at the entry fee of $129 for both staked- and unstaked-play.

[9]Smith (2016) finds that a broad sample of professional online poker players have average hourly earnings that are higher than the median US wage.

cognitive based job, with poker players placing lower in tournaments when reaping a smaller share of their winnings. Our empirical tests suggest that this is primarily due to incentives. Further, our results support the prediction of tournament theory that larger spreads between prizes induce higher effort levels from competitors (Eriksson (1999)). This has implications for firms, where promotions often follow a tournament structure with employees promoted based on their performance relative to other employees (Lazear (1992); Baker, Gibbs, and Holmstrom (1993, 1994a,b); Bognanno (2001)). Our results suggest that increasing the marginal value of the prize (the promotion) can be an effective way to increase productivity, even when output is highly variable as is the case in poker tournaments.

The remainder of the paper is organized as follows. Section 2 briefly describes the features of online poker tournaments and the market for staking that are crucial for understanding our empirical analysis. Section 3 describes the data, while section 4 outlines our empirical framework and central estimation equations. Section 5 presents the results of our analysis, including tests that differentiate between potential mechanisms. Section 6 concludes with a discussion of the implications of our findings.

2 Online Poker Tournaments and the Market for Staking

2.1 Online Poker Tournaments

The typical online poker tournament is open to any individual willing to pay the entry fee. In exchange for the entry fee, participants receive a predetermined amount of tournament chips. Players are randomly assigned a table and the tournament plays out continuously, with participants being eliminated when they run out of chips, until only one player remains (with all of the chips). Prizes are awarded based on inverse order of elimination, with approximately 10% of the field receiving payouts. The winner receives the largest share of the prize pool, followed by the last player eliminated and so on.

The prize pool is funded by the entry fees of all competitors, with some portion of this fee going to the hosting site (about 8% is typical in our sample). Prizes increase nonlinearly with finish position and follow the general structure seen in figures 1 and 2.[10] Notably, the marginal return from moving up one finish position from 3rd to 2nd is worth 3.4% of the prize pool whereas moving up from 19th to 18th is worth only 0.07%.[11] Across tournaments the structure of prizes based on finish percentile is virtually identical; however, the level of prize money varies across tournaments based on the entry fee and number of participants. The top heavy prize structure and the stochastic component of poker create a high level of variance in the earnings of tournament players.[12] To reduce the probability of ending their workday with no monetary return, some poker players turn to a secondary market to reduce their risk.[13]

2.2 The Market for Staking

Staking is an arrangement in which an investor pays a portion of a player's entry fee for a specific poker tournament, in return for an agreed upon percentage of any prize money won by that player in that tournament. While informal staking arrangements have likely existed since the advent of poker, formal marketplaces are a relatively new phenomenon.[14] Our data come from the staking marketplace on twoplustwo.com, the largest poker strategy forum on the internet. Here, the market generally proceeds in three stages: (i) the player advertises the tournament(s) for which they are selling shares of their potential winnings and the terms of the deal; (ii) investors express their intention to purchase some or all of the available shares and send money to the player; and (iii) the player participates in the agreed upon tournament(s) and sends the investor their share of prize money.

Figure 3 walks through this process for a typical example. The advertisement includes

[10] Figure 2 omits the majority of tournament finishes that have a monetary return of $0 to better focus on the payout structure of tournament finishes where there is some monetary return.

[11] Marginal returns are based on a field size of 2358, the mean staked tournament in our sample.

[12] See Levitt, Miles, and Rosenfield (2012) for discussion of the relative importance of skill versus luck in poker.

[13] Many players specify in their advertisements why they are seeking staking, with reducing the the probability of ending their workday with no monetary return being the most common stated reason.

[14] The staking marketplace on twoplustwo.com opened in 2008.

the tournament(s) for which staking is being requested and the total amount requested. Often, shares of the potential winnings are sold with markup, meaning that an investor must pay more than 1% of the entry fee to be entitled to 1% of the prize money. Markup of 15%, a typical amount in our sample, means that an investor must pay 1.15% of the entry fee to be entitled to 1% of the prize money. Finally, advertisements provide evidence of previous success, linking to a complete history of all tournaments previously played by the player on the major online poker sites.

Once an advertisement has been posted, any member of the marketplace may post to purchase some (or all) of the stake. As seen in Figure 3, it is common for investors to purchase only a portion of the total amount for sale. Hence, to sell out, a player often receives staking from multiple investors.[15] Once the sale is complete (or the tournament is about to start if the stake does not sell out), the player confirms the receipt of all investor funds. Upon completion of the tournament(s), the player sends the appropriate percentage of prize money to each investor.[16]

While staking can take various forms, the transactions in our sample are all one-off arrangements. The player does not owe investors anything if they do not earn a prize in the staked tournament(s) and the player is not obligated to seek staking again or to give current investors any preference in future sales. Once the stake has been settled, the relationship between player and investor is effectively over.

3 Data

Our staking data come from the staking marketplace on twoplustwo.com. We recorded every transaction occurring from August 2009 through May 2010 for tournaments played on one online poker site, Full Tilt Poker (FTP). We choose Full Tilt Poker because it was the largest online site during this time frame for which a complete history of tournament

[15]This system creates situations in which a player receives only some, but not all of their requested level of staking. In Appendix B, we use this variation, generated on the investor side of the market, to try to differentiate between competing mechanisms.

[16]It should be noted that this is a reputation-based market and there is no formal enforcement mechanism that guarantees investors will be sent the money that they are due. That being said, 1) during the time frame analyzed, it was very rare that a player did not pay their investors, 2) we exclude any player where we found evidence that said player did not fully pay back their investors.

finishes by player is available. To increase the number of observations we extended coverage for this sample of staked players backwards, using archived posts, to the first staking incident which occurred in May 2009, and forward through the end of 2010.[17] Players that specifically mention being staked privately for unidentified tournaments were dropped from the sample. Finally, we cross-checked each player in our sample with the two alternative staking websites during this period, Part Time Poker and Chip Me Up. We augmented our staking records with any additional staked tournaments sold in either of those alternative marketplaces.[18] This leaves us with 97 players and over 3,000 staked player $\times$ tournament observations.

We merged this staking data set with tournament results for these players, gathered from OfficialPokerRankings.com. The tournament results are comprehensive, with one record for every tournament played on FTP for each player in our sample. Each record includes entry fee, number of entrants, finish position, prize won, and tournament characteristics.[19] Over the 20-month period, from May 2009 through Dec 2010, our 97-player sample played a total of 96,371 tournaments.[20] Of these, 3,097 were successfully matched as staked-play. The remaining player $\times$ tournament records without corresponding staking records are assumed to be unstaked-play.[21]

Table 1 provides the summary statistics for our sample. Unconditionally, performance for staked-play is significantly worse. This is seen in a lower return on investment (ROI), a worse finish percentile, and reduced likelihood of having a large win (a prize of at least 3 entry fees), or very large win (a prize of at least 10 entry fees). However, some of this performance gap might be due to the different tournament characteristics for staked-play

[17] Online poker in the United States was shut down on Friday, April 15th 2011. We choose to end our sample at the end of 2010 as rumors about the solvency of FTP began in early 2011 when it became common for a dollar on FTP to be sold for less than $1.

[18] There are only 39 such tournaments (12 from Part Time Poker and 27 from Chip Me Up).

[19] We adjust *entry fee* for tournaments where players have the opportunity to re-enter the tournament at least once more (known as rebuy tournaments). Hence, the average amount spent per participant is higher than a single entry fee. We adjust by multiplying the entry fee for rebuy tournaments by one plus the average number of rebuys made in a representative rebuy tournament.

[20] A small subset of tournaments (qualifiers and sit-n-gos) were dropped from the sample because there were exceedingly few staked observations and the payout structure differs markedly from the standard structure seen in Figure 2. An additional 214 incomplete records were dropped.

[21] To the extent that we may misattribute a tournament that was staked privately (not on a marketplace) as unstaked, our estimates represent a lower bound for the impact of staking on performance.

relative to unstaked-play. On average, entry fees are higher ($154 compared to $79) for tournaments where players participated in staked-play relative to their unstaked counterparts. The staked tournaments also have larger average field sizes (2,358 compared to 1,453). Figure 4, which shows how ROI varies for staked- and unstaked-play across entry fees, provides initial descriptive evidence against this explanation. Notably, performance is worse for staked-play across all entry fee tiers, suggesting there is more to the story than differences in tournament characteristics. In the following section, we outline our empirical strategy for estimating the causal impact of staking on performance.

4 Empirical Strategy

The practice of staking alters the incentives a player faces. As seen in Figure 2, a player's marginal return to improving their finish position by one rank is lower when staked, because some percentage of the prize is reserved for the investor. Assuming that concentration/effort provision is costly for the player, muted incentives created by staking should lead the player to rationally choose a lower effort level when staked.[22] Indeed, Ehrenberg and Bognanno (1990a,b) find that effort provision by professional golfers is lower when the spreads between tournament prizes are smaller. Empirically, the impact of muted incentives should reveal itself in worse performance when staked. Further, if the marginal cost of effort is increasing, meaning that it is harder to maintain concentration the longer a tournament goes on, this impact should be increasingly evident in the right-tail of the performance distribution. To estimate these disincentive effects, we define our main variable of interest, *staked*, as an indicator variable equal to one if a player engaged in an income share agreement for a poker tournament, and zero otherwise.

Given that the payout structure of the tournaments is nonlinear, we explore several outcomes. First, we look at the return on investment (ROI) for an individual tournament. This is defined as the profit from the tournament divided by that tournament's entry fee (represented as a percentage). To investigate some of the convexity in the prize structure,

[22]Players may attempt to improve performance by carefully observing the habits of opponents, allowing them to make decisions conditional on their opponents' playing style. The average tournament in our sample lasts over eight hours, making this type of concentration difficult to maintain.

we use a set of binary variables as outcomes.[23] The first binary outcome is an indicator equal to one if the prize won from the tournament is at least ten times that of the entry fee, and zero otherwise. Since the choice of ten entry fees is somewhat arbitrary, we also include an indicator equal to one if the prize won in the tournament is at least three times that of the entry fee. Both of these indicators are meant to capture the idea of a large win. The next binary variable outcome is an indicator equal to one if the player wins some amount of money, but no more than three entry fees – a small win. The last binary outcome we include is an indicator equal to one if the player wins any amount of money. We also explore the impact of engaging in an income share agreement on the player's final rank in a tournament. We measure this variable as a percentage since tournaments vary in the number of entrants.

To estimate this disincentive effect, we employ a player by skill tier fixed effects strategy. Player fixed effects allow the comparison of a player's tournament outcomes when they are staked to their tournament outcomes when they are not staked. Additionally, by interacting the player fixed effects with three different tournament skill levels (proxied by entry fee tiers), we allow for differences in a player's average outcomes based on the skill level of the tournament.[24] The inclusion of the skill level fixed effects reduces concerns that players seek out staking for tournaments that have skill levels above the types of tournaments in which they normally participate, which would bias our estimates toward finding a disincentive effect.

In addition to the indicator for whether or not a player is engaging in an ISA for a given tournament and the player by skill tier fixed effects, we also include a set of

[23]Unfortunately, due to the large number of fixed effects, we cannot estimate this specification with a conditional logit. However, we find that less than 2% of our predicted values for any outcome fall outside the 0 to 1 range.

[24]The level of skill for the tournament entrants is not known for our entire sample, thus we make the assumption that larger entry fee tournaments are generally more difficult than lower entry fee tournaments. Later in the paper we introduce a measure of tournament difficulty that we have for a subset of our data set. Regressing this measure of tournament difficulty on the entry fee and a set of other tournament characteristics, we find a strong positive relationship between tournament difficulty and entry fee ($t = 124.6$). Our categorization of the entry fee tiers is defined as follows: low tier is composed of the 0th though the 25th percentile ($0 through $22) of the variable *entry fee*, mid tier is the 25th to 75 percentile (more than $22 but no more than $109) and high tier is the 75th percentile through the 100% percentile. We experimented with alternative categorizations and found that our results were not sensitive to these alterations.

tournament characteristics as controls. These variables include the adjusted entry fee of the tournament, and a quadratic polynomial in the number of tournament entrants. We also include indicators for tournament rebuy features and indicators for the speed of the tournament.[25] The rebuy indicators are composed of an indicator for whether or not a tournament allowed unlimited rebuys up until a certain point in time, and an indicator for whether or not the tournament allowed either a single rebuy or an add-on.[26] The set of indicators for tournament speed are an indicator for whether or not a tournament increased mandatory bets more quickly than a standard tournament (*fast*) and an indicator for whether or not a tournament started with double the normal amount of chips (*slow*).

Finally, we include an indicator for whether or not a tournament was played on the weekend, and indicators for whether or not the tournament was part of a special tournament series. Not including these variables would raise concerns of omitted variable as they are positively correlated with a player being staked, and tournaments with these characteristics typically have very different player pools than a standard weekday tournament.

4.1 Monetary Outcomes

To investigate the impact of being staked on the aforementioned monetary outcomes, we use the following specification:

$$\mathbf{outcome}_{it} = \beta staked_{it} + (\mu_i \times EntryFeeTier_t) + \mathbf{X}_t\mathbf{B} + \varepsilon_{it} \tag{1}$$

Here **outcome** is one of the previously defined variables: ROI, an indicator for at least ten entry fees won, an indicator for at least three entry fees won, an indicator for returning some money but no more than three entry fees, and an indicator for winning some money. If being staked in a tournament disincentivizes a player, then we expect β to be negative

[25] A rebuy allows a player to re-enter a tournament, for an additional entry fee, after they lose all of their chips.

[26] Unlike rebuys, add-ons allowed the purchasing of additional chips without first having to lose all your initial chips.

for the overall return on investment and the probability of a large win. If being staked decreases the probability of returning any money, then we expect β to be negative when looking at small win outcomes. However, if playing while staked does not change the overall probability of returning any money, then we expect β to be *positive* for small wins as large wins are reallocated to small wins when effort decreases.[27]

4.2 Finish Position

In addition to the aforementioned monetary tournament outcomes, we also look at the rank that a player finishes in the tournament. Unlike the monetary outcomes in the previous section, finishing rank outcomes do not have a convex payout structure. Therefore, specifications with this outcome are less likely to be affected by outliers. A player that wins the tournament has a rank of 1, a player that finishes second has a rank of 2, and so on. Since poker tournaments vary in size, even within a given entry fee tier, we create a measure of the percentile at which a player finishes a tournament. The variable *finishpercentile* measures the percentile at which a player finishes the tournament:

$$\mathit{finishpercentile} = \left(1 - \frac{\mathit{rank}}{\mathit{entries}}\right) \times 100$$

and thus a higher *finishpercentile* is a better tournament outcome for a player.[28] We rewrite Equation 1 but with *finishpercentile* as the dependent variable for our specification to estimate the relationship between being staked and a player's finishing position:

$$\mathit{finishpercentile}_{it} = \beta \mathit{staked}_{it} + (\mu_i \times \mathit{EntryFeeTier}_t) + \mathbf{X}_t\mathbf{B} + \varepsilon_{it} \tag{2}$$

If staking leads to disincentives, then we expect that β is negative at the upper end of the distribution of the outcome *finishpercentile*. However, beyond the upper end of the

[27]We remain agnostic about the expected sign of β when the outcome is whether or not a player wins any prize as there are several factors that could determine the overall sign. Both disincentives and selection would would have a negative influence, but it could be the case that players exert just enough effort to return some prize money to investors so that they can find can maintain their playing reputation in order to find future investors.

[28]Note that, as constructed, *finishpercentile* is biased downward - it never takes on a value of 100; an alternative measure is also considered where *finishpercentile* is biased upward - it can never be zero.

distribution, we remain agnostic about the effect of staking on *finishpercentile*. Given the payout structure, even if staking disincentives players, changes in lower regions yield no change in monetary outcomes. Evidence of this type of behavior is seen in figures 5 and 6. In Figure 5 we see that unstaked *finishpercentile* outcomes are greater than their staked counterparts in the right-most tail. Figure 6, which is the density of *finishpercentile* for players that win some amount, yields a similar pattern – unstaked outcomes are greater than staked outcomes at the right-most tail. Thus, while we estimate Equation 2 with OLS to provide a benchmark, it should be noted that average finishing position in our sample is the 58th percentile for unstaked-play and the 57th percentile for staked-play - both of which have a monetary return of $0. In general, monetary returns of greater than $0 only begin happening around the 90th percentile. That is, the conditional expected mean is not closely related to monetary outcomes. Therefore, we also estimate Equation 2 using quantile regression (QREG) to asses how changes in staking status are associated with changes of *finishpercentile* at different finishing rank quantiles. This allows to observe changes in outcomes in the right tail of the distribution of *finishpercentile* - where changes in this outcome lead to real monetary differences.

5 Results

5.1 Main Results

5.1.1 Monetary Outcomes

The main set of empirical results that we present can be found in Table 2. The impact of staking is derived from comparing, within a given entry fee tier, a player's outcomes in tournaments where they received staking to the outcomes in tournaments where they did not receive staking. In Column 1, we find that tournaments where a player was staked have a return on investment that is 58 percentage points lower than an equivalent tournament where the player was not staked, *ceteris paribus*. This is of similar size to the difference in results between pro and amateur players in the World Series of Poker (Levitt and Miles (2014)). Columns 2 and 3 show that a player's chance of having a large win are significantly reduced under staked-play. The probability of winning at least 10 entry fees is reduced by .83 percentage points when staked (an almost 40 percent decrease), while the probability of winning at least 3 entry fees is reduced by .87 percentage points (more than a 17 percent decrease). Although both the overall return on investment is negative and the probability of a large win is diminished under staked-play, we do find that the probability of a small win (a positive return but no more than 3 entry fees won) increases under staked-play. When staked, the probability of having a small win increases by 1.3 percentage points (a 16 percent increase). Finally, in Column 5 we find no evidence to suggest that the probability of having any monetary return changes under staked-play relative to unstaked-play.

In addition to average return on investment being significantly lower under staked-play, we find a pattern of results for the binary outcomes that conform to the predictions in Section 4.1. Relative to staked-play, we see that under staked-play, 1) the probability of a large win decreases, 2) the probability of a small win increases, and 3) the probability of winning any amount is unchanged. This is evidence in favor of large wins being reallocated into small wins when the player is staked in a tournament. While these results are consistent with a decrease in effort from a reduction in incentives, at this point we cannot rule out that selection may also play a role in the difference between outcomes under staked- versus unstaked-play. We attempt to disentangle these mechanisms in Section 5.2.

5.1.2 Finishing Rank Outcomes

Turning our attention to the results in Table 3, we see that the part of the distribution of *finishpercentile* where the difference between staked-play and unstaked-play has any statistically significant magnitude is in the extreme right tail (95th quantile and higher). That is *finishpercentile* is lower at the 95th, 97.5th, and 99th quantiles for staked-play compared to unstaked-play within player by entry fee tier. Although these differences are precisely estimated, the magnitudes of the coefficients are somewhat small. For example, the estimated coefficient on *staked* at the 95th quantile is -0.469, less than half of a percentage point. For reference, the unconditional values of *finishpercentile* at the 95th and 99th quantiles are 96.40 and 99.29, respectively. However, the convexity of the payout structure does make these small differences more important than they would be in a setting with a linear payout structure. At the 90th quantile we find that *finishpercentile* is larger for staked-play than unstaked-play; however, given the lack of precision, no difference cannot be ruled out. While these findings are interesting in and of themselves, their main purpose is to complement the results for the monetary outcomes. That is, these results provide further evidence that a reduction in incentives, induced by staking, leads to worse outcomes.

5.2 Addressing Issues of Selection Bias

Adverse selection is a mechanism that has the potential to produce the same results in tournament performance that disincentives do. Thus, additional work is required to disentangle these two mechanisms and to further understand how engaging in an ISA can alter behavior. Although our player by entry fee tier fixed effect estimation strategy eliminates concerns about across-player selection, we must take additional steps to address within-player selection. Selection in our setting equates to a player seeking staking for a tournament based on some unobservable factor. Specifically, we identify and address two channels that within-player adverse selection could act through. First, we explore the idea that there is something different about the tournaments for which the player is choosing to seek staking relative to the tournaments for which they do not seek staking. Second, we look into whether or not there is something different about the player in time periods either before or after they seek staking relative to the time period when they are actively seeking staking. Our findings suggest that adverse selection does play a role in explaining the worse tournament outcomes for the players when staked. However, we also find that the disincentive effect is still present and typically larger in magnitude than the effect from adverse selection.

5.2.1 Including Tournament Difficulty

Intuitively, the reason for our concern is that individuals select into staking, only posting an advertisement for tournaments of their choosing. Even within an entry fee tier, the tournaments they seek staking for may be more difficult than those they do not seek staking for. Thus, instead of a disincentive effect, the worse performance we find for staked-play could be due, at least in part, to participating in more difficult tournaments when staked.

We begin addressing issues of adverse selection by introducing tournament difficulty as a control variable into our main specification. Unfortunately, true tournament difficulty cannot be known, as it would depend on the unoberservable skill level and effort decisions of all other participants. However, we do have access to two measures that serve as strong proxies: 1) the average lifetime ROI of all the entrants in the tournament, and 2) an average lifetime ability score of all the entrants in a tournament. Tournament difficulty is expected to increase when either of these measures increase.[29] Tournament difficulty measures come from sharkscope.com - a maintainer of both live and online poker results. Unfortunately, we lose 28,116 observations (29.2%) due to these measures not being available for all tournaments.[30]

The results from incorporating tournament difficulty are found in Table 4. Panel A, while restricting the sample to only those observation for which tournament difficulty is available, does not include either of the difficulty measures. Here we see that changing the sample does not substantively change the results found in the specification with all available observations. Staked-play, relative to unstaked-play, reduces return on investment, and the probability of a large win. It also leads to an increase in the probability of a small win, and no change in the probability of returning any amount of money. While the magnitudes of these results are different than the full sample results, the signs and significance are the same.

In Panel B we include the average lifetime ROI of all tournament entrants and in

[29] These measures are, not surprisingly, highly correlated ($\rho = 0.84$)

[30] We regress an indicator for whether or not a record was missing tournament difficulty on *staked* and all the other regressors from Equation 1. We find that being staked does not explain whether or not a record was missing (a t-stat on *staked* of 0.21).

Panel C we include the lifetime average ability of all tournament entrants.[31] Comparing the results in Panel A to those in panels B and C, we find that the inclusion of tournament difficulty generally reduces the magnitude of the estimated coefficients on *staked* – which is equivalent to a reduction in the disincentive effect as a component of the overall effect of being staked. Simultaneously we see that, in both panels B and C, our measures of tournament difficulty have a negative and statistically significant relationship with the majority of the outcome variables. The reduction in magnitude of the estimated coefficients on *staked* and the significance of the estimated coefficients on the tournament difficulty measures is an indication that within-person selection is occurring. However, the estimated coefficients on *staked* remain generally significant and of the same sign as both the main set of results in Table 2 and the results found in Panel A of this table. In fact, if we compare the size of the coefficient on *staked* in Column 1 of Panel A to those in Column 1 of Panel B, we see that the including tournament difficulty reduces the size of the coefficient by only 17 percent. That is, the disincentive effect of being staked far outweighs the effect that within-person selection has on the differential outcomes between staked- and unstaked-play. Similar results are true when the probability of a large win is the outcome of interest.

In this section, we have found evidence consistent with the possibility that players are seeking staking for tasks that are more difficult than they appear (*i.e.* factors beyond tournament characteristics such as the speed at which mandatory bets increase). However, we must remember that within-player selection is only part of the overall effect of being staked, as the results continue to show that the disincentives generated by being staked are an important part of this story.

[31] While we present this set of results, as we proceed we will only focus on lifetime average ROI as a control variable. The reason for doing so is that we are sure of how this variable is created. As for the lifetime average ability score, it is a propriety measure generated by sharkscope.com As mentioned in an earlier footnote, these variables are highly correlated and results that use lifetime ability instead of lifetime ROI are substantively the same.

5.2.2 Matching Tournaments

In this section we continue our investigation into the roles of both the disincentive effect of staking and the effect of selection into staking. Although the player by entry fee tier fixed effects employed in prior sections allow fairly narrow comparisons of outcomes for staked- and unstaked-play, we will now employ an even narrower comparison. The tournaments in our sample have names that contain information about the amount of money guaranteed to be in the prize pool (if any) and the structure of the tournament. For example, one of the tournaments in our sample is the "$25,000 Guarantee (Rebuy)", which implies that, regardless of how many entrants, Full Tilt Poker is guaranteeing there will be at least $25,000 in the prize pool and that the tournament has a time limited rebuy structure. Not only are these names descriptive of the structure of the tournament, but another feature present in our data set is that the same tournaments were played repeatedly over the course of the sample.[32] We exploit these two characteristics to further disentangle disincentives from within-player adverse selection by comparing a player's staked outcomes to the same player's unstaked outcomes only for tournaments with the same tournament name and entry fee. This narrow comparison allows us to only look at tournaments that a player has played in when staked and unstaked. This mitigates concerns that a player is seeking staking for tournaments in which they do not normally play.

Results using the matched tournament specification are found in Table 5. Panel A is the estimation of Equation 1, the monetary outcomes specification, but instead of player by entry fee tier fixed effects, we use player by matched tournament fixed effects. Although these estimates are not as precise as the full sample, the estimated coefficients tell the same story: staked-play, relative to unstaked-play, yields a lower return on investment, a lower probability of a large win, a higher probability of a small win, and no change in the likelihood of winning any amount of money. When tournament difficulty is included (Panel B), we again see the same pattern that occurred in the full

[32]For example, the "Sunday Brawl" was a $256 entry fee tournament played every Sunday, starting at 2:00 P.M. Eastern. Given that these tournaments are often played at the same time each day or each week, matching in this manner likely provides a more consistent pool of opponents.

sample and the results produced in the prior section (Table 4). That is, both selection effects and disincentive effects are required to understand the differences in outcomes between staked- and unstaked-play.

5.2.3 Time Frame

Another threat to our empirical strategy would be if there was some fundamental difference about the player when they engage in unstaked-play compared to when they engage in staked-play. For example, it is possible to envision a scenario where a player goes on a hot streak and then seeks out staking because they can sell an income share at a markup relative to the entry fee, as their investment appears more attractive than it really is. Upon receiving staking the player returns to their normal results (mean reversion). This would show up in our results in the same way as a negative effect caused by disincentives. Another potential concern, is that our assumption that unobservable player characteristics are time invariant does not hold. This would be the case if an individual's relative ability was changing across time. While it seems reasonable to assume that ability is fairly constant over a 20 month time frame, it is worth exploring potential violations of our assumptions. If a player is improving across time and seeks staking only towards the end of our time frame, staked results would appear better than unstaked results, independent of any incentive effect (upward bias). Likewise, if a player is getting worse across time and only seeks staking towards the end of our time frame, staked results would appear worse than unstaked, independent of any incentive effect (downward bias). To mitigate these concerns, we create a "staking window" where we eliminate observations before a player's first incident of staking and after a player's last incident of staking.[33] Thus, we create a narrower time frame where a player is playing in both staked and unstaked tournaments to compare performance in staked- versus unstaked-play.

Table 6 presents the results of estimating Equation 1 with only observations that fall inside the "staking window". The results in Panel A provide further evidence that there is a negative relationship between being staked in a tournament and both return

[33] This decreases our sample by over 60%, taking us from 96,371 observation to 34,816 observations.

on investment, and the probability of achieving a large win. Similar to the main set of results, when a player is staked in a tournament the probability of achieving a small win increases and there is no significant change in the probability of winning any amount of money. Panel B adds a measure of tournament difficulty (the lifetime average return on investment for all tournament players). Coinciding with the results over the full time period, we find the presence of both a disincentive effect and a selection effect induced by staking, as the estimated coefficient of *staked* decreases in magnitude and we also find an estimated coefficient on tournament difficulty that is both negative and statistically significant.

Despite the fact that the coefficient sizes on *staked* are smaller than their full sample counterparts, the general pattern is the same: being staked is associated with lower return on investment for a tournament, smaller probability of a big win, larger probability of a small win, and no change in the probability of returning any win. Unfortunately, this sample restriction leads to a large reduction in observations and a corresponding loss in power.[34] In summation, when we compare staked- to unstaked-play inside the "staking window" our results are consistent with the full sample, though noisier. This provides further evidence that engaging in an income share agreement can result in worse outcomes through both disincentive and selection effects.

6 Conclusion

While individual debt contracts are the most common way to alleviate liquidity constraints, searches for alternatives are ongoing, especially as a means to relax these constraints for individuals with little collateral. Recently, one of these alternatives, income share agreements, has gained some attention. Income share agreements are equity contracts that allow individuals to raise money by selling shares of their future income. This model has been discussed by policymakers as a way to address increasing costs of higher

[34] In Appendix A we consider an alternative method to reduce the concern that player ability, or some other factor, is changing over time and that these changes are causing us to find a negative effect of staking when none is present. Using only unstaked tournaments, we compare outcomes in the "staking window" to outcomes not in the window. We find no evidence to suggest that there is a difference in player outcomes across these time periods.

education, and it has been used on a small scale in professional sports.[35] To assess the impact of ISAs on subsequent performance, we make use of a unique setting, the advent of a formal market for online poker players that allowed these individuals to sell shares of their future earnings from poker tournaments. Our central finding is that players perform significantly worse when participating in an ISA, relative to their baseline against similar competition. Specifically, return on investment is 58 percentage points lower for those that participate in an ISA relative to their return on investment when they do not participate in an ISA.[36]

To address the concern that selection bias is the sole driver of our results, we conduct three empirical tests. First, we intrude a measure of task difficulty for a large subset of our data. Second, we match the different tasks that an individual can participate in as closely as possible and only compare outcomes within these tasks for each individual. Both of these first two tests are intended to mitigate concerns that our results are being completely induced by selection into harder tasks when engaged in an ISA. Finally, to reduce concern that something changes about individual over time, we restrict our sample to the time periods where an individual was both participating and not participating in ISAs. The balance of the evidence suggests that, while selection is a part of the overall decrease in both return on investment and relatively large monetary outcomes, the disincentives generated by participating in an ISA are a major factor.

Our results suggest that ISAs generate large disincentive effects and any sustainable equity market for future performance would need to appropriately price-in this disincentive. Many of the current markets where ISAs are being adopted or considered are in areas where individual productivity could lead to positive externalities. Highly educated citizens help advance knowledge, create new jobs, and pay higher taxes, while highly trained professional athletes bring joy to fans and motivate children to exercise.[37] Even if

[35]In 2013, Fantex began offering securities tied to cash flows of professional athletes including Vernon Davis, tight end for the San Francisco 49ers.

[36]We expect this behavioral response, reduced effort due to muted incentives, to translate to other settings. However the magnitude is unlikely to directly translate to settings such as ISAs for higher education, where payoffs are less convex than poker tournaments.

[37]Acemoglu and Angrist (1999) estimate very small social returns to education, generally less than 1%.

the disincentives can be effectively priced for a functioning market, these contracts could be inefficient from a standpoint of social welfare.

Finally, our results are consistent with the prediction of tournament theory that larger marginal returns to an increase in rank induce higher effort levels from competitors. This has implications for firms, where promotions often follow a tournament structure with employees promoted based on their performance relative to other employees. Our results suggest that increasing the marginal value of a promotion can be an effective way to increase productivity. Tournament theory also suggests that the higher the variance in the mapping between effort and output, the less impact tournament prizes will have on effort levels Lazear and Rosen (1981); Eriksson (1999). Despite the high variance in poker tournament outcomes, we still find economically meaningful impacts from varying tournament prizes. This suggests that tournament incentives can still play an important role in industries where output is highly variant.

References

2015. “Graduate Stock.” *The Economist* :http://www.economist.com/news/finance–and–economics/21661678–funding–students–equity–rather–debt–appealing–it–not.

Acemoglu, Daron and Joshua Angrist. 1999. “How large are the social returns to education? Evidence from compulsory schooling laws.” Tech. rep., National bureau of economic research.

Baker, George, Michael Gibbs, and Bengt Holmstrom. 1993. “Hierarchies and compensation: A case study.” *European Economic Review* 37 (2):366–378.

———. 1994a. “The internal economics of the firm: evidence from personnel data.” *The Quarterly Journal of Economics* :881–919.

———. 1994b. “The wage policy of a firm.” *The Quarterly Journal of Economics* :921–955.

Bognanno, Michael L. 2001. “Corporate tournaments.” *Journal of Labor Economics* 19 (2):290–315.

Calero, Carla, Arjun S Bedi, and Robert Sparrow. 2009. “Remittances, liquidity constraints and human capital investments in Ecuador.” *World Development* 37 (6):1143–1154.

Dohmen, Thomas and Armin Falk. 2011. “Performance pay and multidimensional sorting: Productivity, preferences, and gender.” *American Economic Review* :556–590.

Ehrenberg, Ronald G and Michael L Bognanno. 1990a. “Do Tournaments Have Incentive Effects?” *Journal of Political Economy* :1307–1324.

———. 1990b. “The incentive effects of tournaments revisited: Evidence from the European PGA tour.” *Industrial and Labor Relations Review* :74S–88S.

Eriksson, Tor. 1999. “Executive compensation and tournament theory: Empirical tests on Danish data.” *Journal of Labor Economics* 17 (2):262–280.

Evans, David S and Boyan Jovanovic. 1989. “An estimated model of entrepreneurial choice under liquidity constraints.” *The Journal of Political Economy* :808–827.

Foundation, Purdue Research. 2016. “Back A Boiler Program Overview.” URL `http://www.purdue.edu/backaboiler/overview/index.html`.

Friedman, Milton. 1962. *Capitalism and Freedom*. University of Chicago Press.

Gittleman, Maury and Brooks Pierce. 2013. “How Prevalent is Performance-Related Pay in the United States? Current Incidence and Recent Trends.” *National Institute Economic Review* 226 (1):R4–R16.

Hubbard, R Glenn. 1998. “Capital-Market Imperfections and Investment.” *Journal of Economic Literature* 36:193–225.

Jacobs, Bas and Sweder JG van Wijnbergen. 2007. "Capital-market failure, adverse selection, and equity financing of higher education." *FinanzArchiv/Public Finance Analysis* :1–32.

Judd, Kenneth L. 2000. "Is education as good as gold? A portfolio analysis of human capital investment." *Unpublished working paper. Hoover Institution, Stanford University* .

Lawrence, Julia. 2014. "Oregon Considering Income-Based Repayment Plan for College." *Education News* .

Lazear, Edward P. 1992. "The job as a concept." *Performance measurement, evaluation, and incentives* :183–215.

———. 2000. "Performance Pay and Productivity." *American Economic Review* 90 (5):1346–1361.

Lazear, Edward P and Sherwin Rosen. 1981. "Rank-Order Tournaments as Optimum Labor Contracts." *Journal of Political Economy* :841–864.

Levitt, Steven D and Thomas J Miles. 2014. "The Role of Skill Versus Luck in Poker: Evidence From the World Series of Poker." *Journal of Sports Economics* 15 (1):31–44.

Levitt, Steven D, Thomas J Miles, and Andrew M Rosenfield. 2012. "Is Texas Hold'Em a Game of Chance-A Legal and Economic Analysis." *Georgetown Law Journal* 101:581.

Levitt, Steven D and Chad Syverson. 2008. "Market distortions when agents are better informed: The value of information in real estate transactions." *The Review of Economics and Statistics* 90 (4):599–611.

Palacios, Miguel, Tonio DeSorrento, and Andrew P Kelly. 2014. "Investing in Value, Sharing Risk: Financing Higher Education through Income Share Agreements." AEI Series on Reinventing Financial Aid.

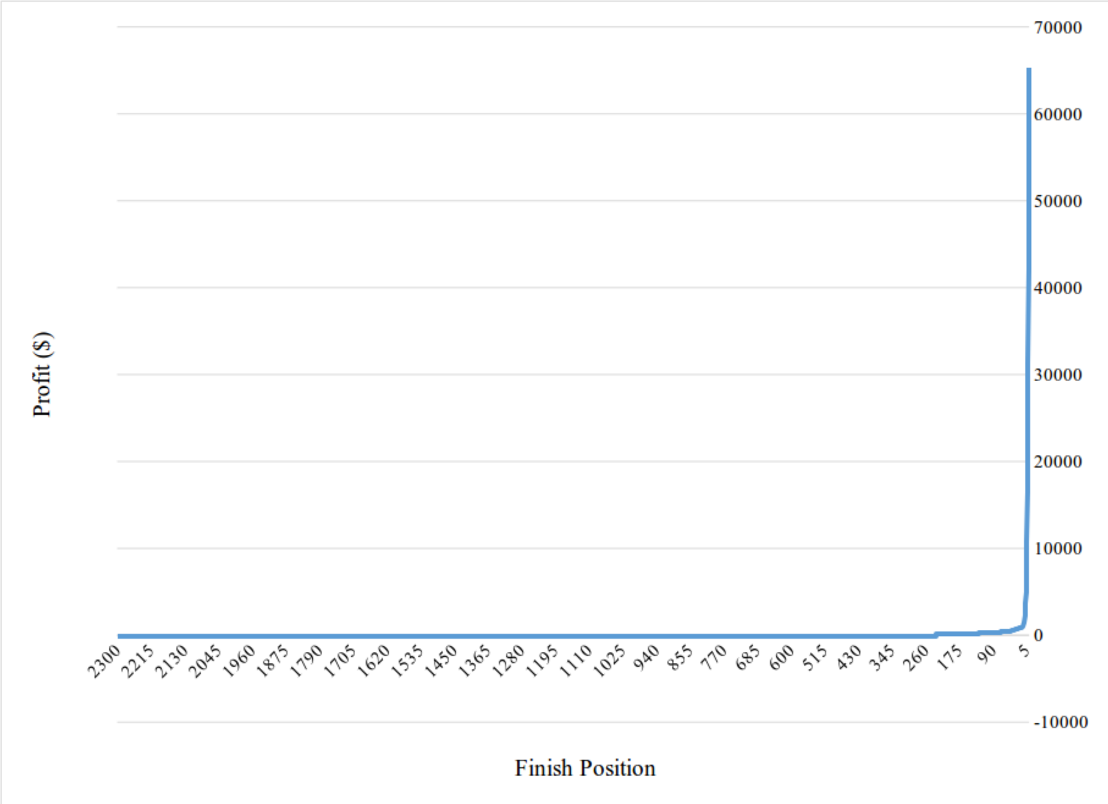
Prendergast, Canice. 1999. "The provision of incentives in firms." *Journal of Economic Literature* :7–63.

Shaban, Radwan Ali. 1987. "Testing between competing models of sharecropping." *The Journal of Political Economy* :893–920.

Whited, Toni M. 1992. "Debt, liquidity constraints, and corporate investment: Evidence from panel data." *The Journal of Finance* 47 (4):1425–1460.

7 Figures and Tables

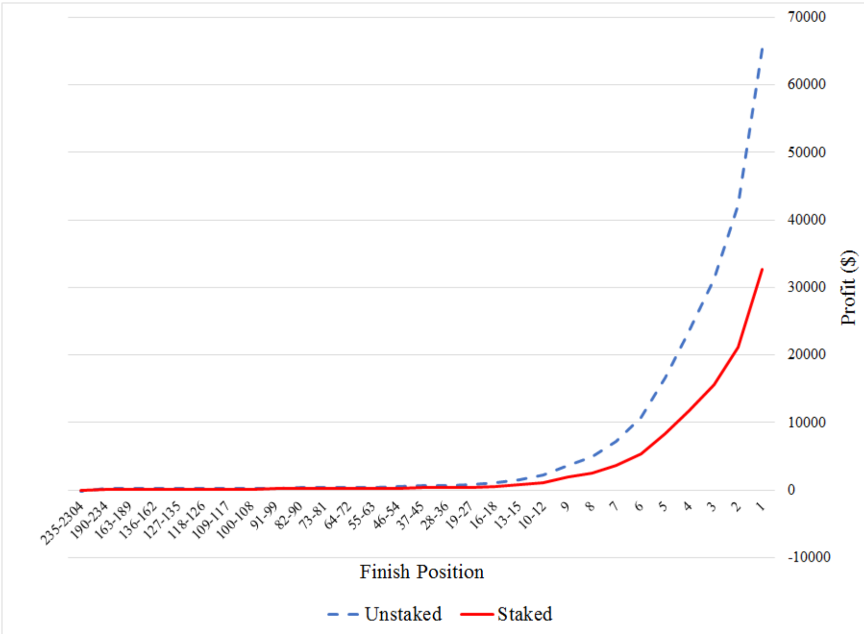
Figure 1: Payout Structure



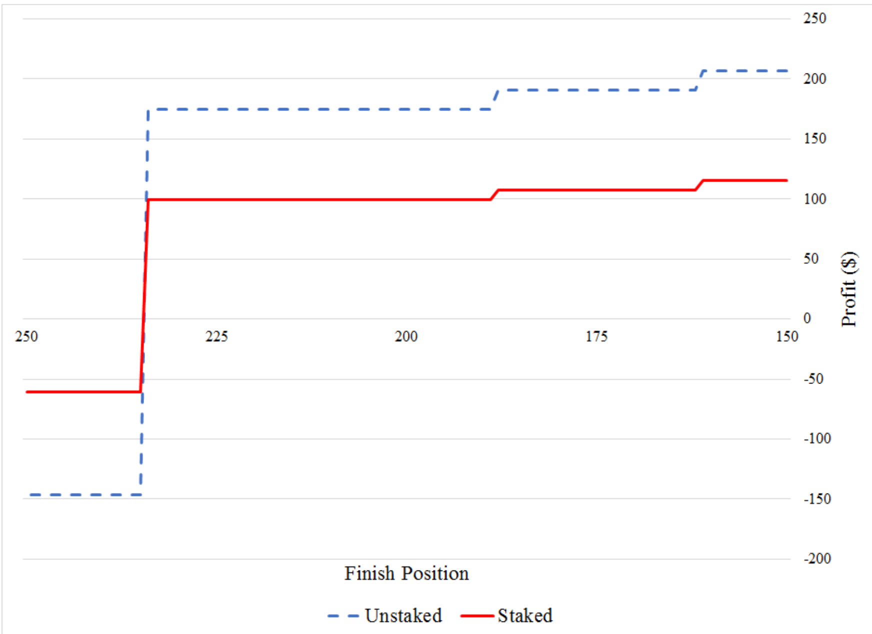
Notes: The blue line represent the payout schedule for a tournament with 2,358 entrants. This is the average field size for a tournament in our sample.

Figure 2: The Impact of Staking on Poker Tournament Prizes

(a) Full Distribution of Prizes



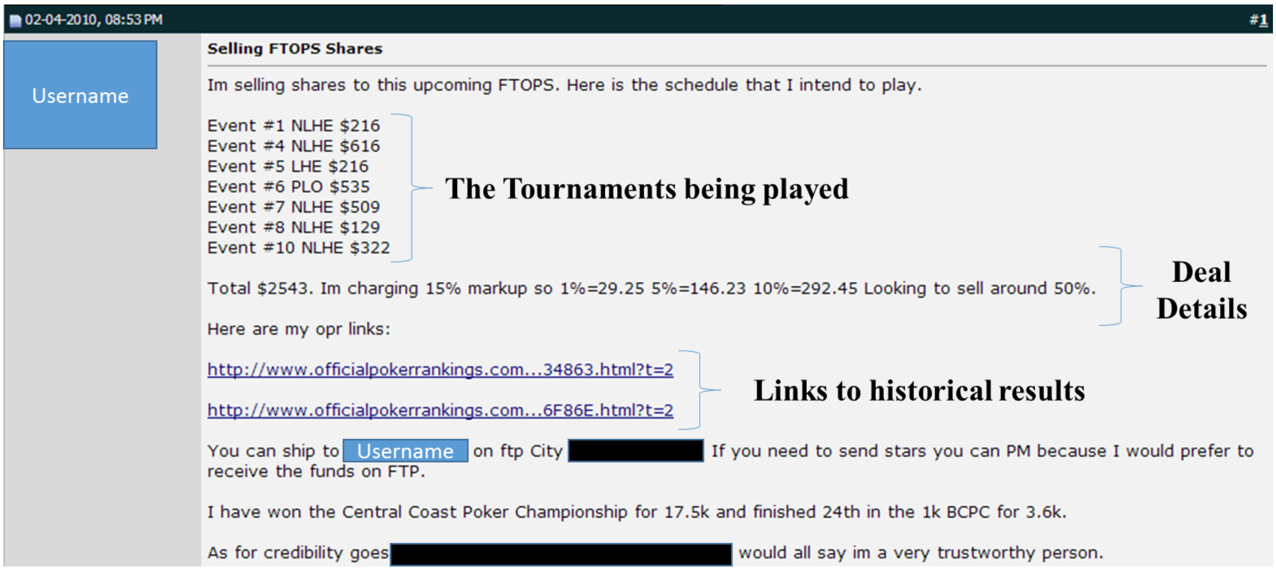
(b) At First Prize Level



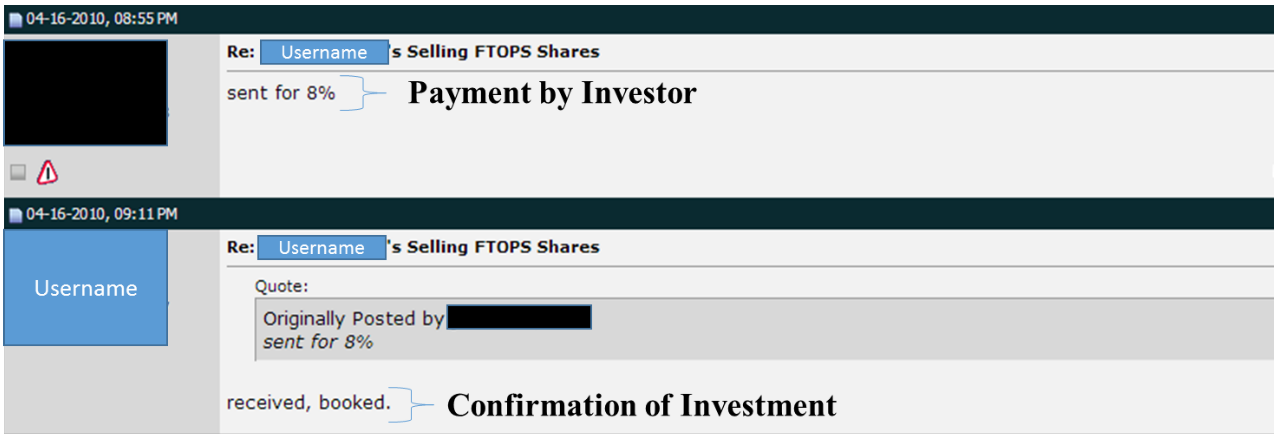
Notes: Figure 2a depicts the distribution of profit for the mean staked tournament in our sample, under the conditions of no staking and staking of 50% with average markup. Figure 2b zooms in on finish positions near the first prize.

Figure 3: Typical Staking Transaction

(a) Phase 1: Advertisement



(b) Phase 2: Investment



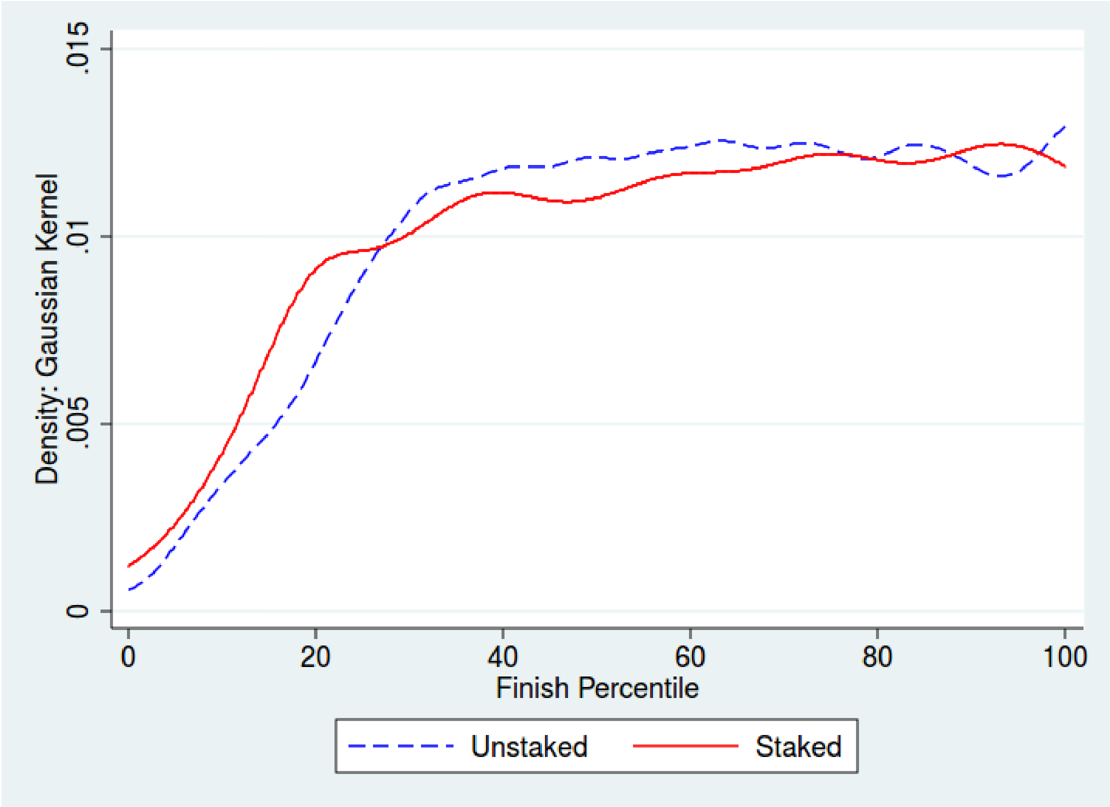
(c) Phase 3: Payout

Notes: Staking data come from the marketplace forum on twoplustwo.com. This example, which follows the typical structure of a staking transaction, comes directly from our sample.

Figure 4: ROI for Staked- versus Unstaked-play Across Entry Fee Tiers

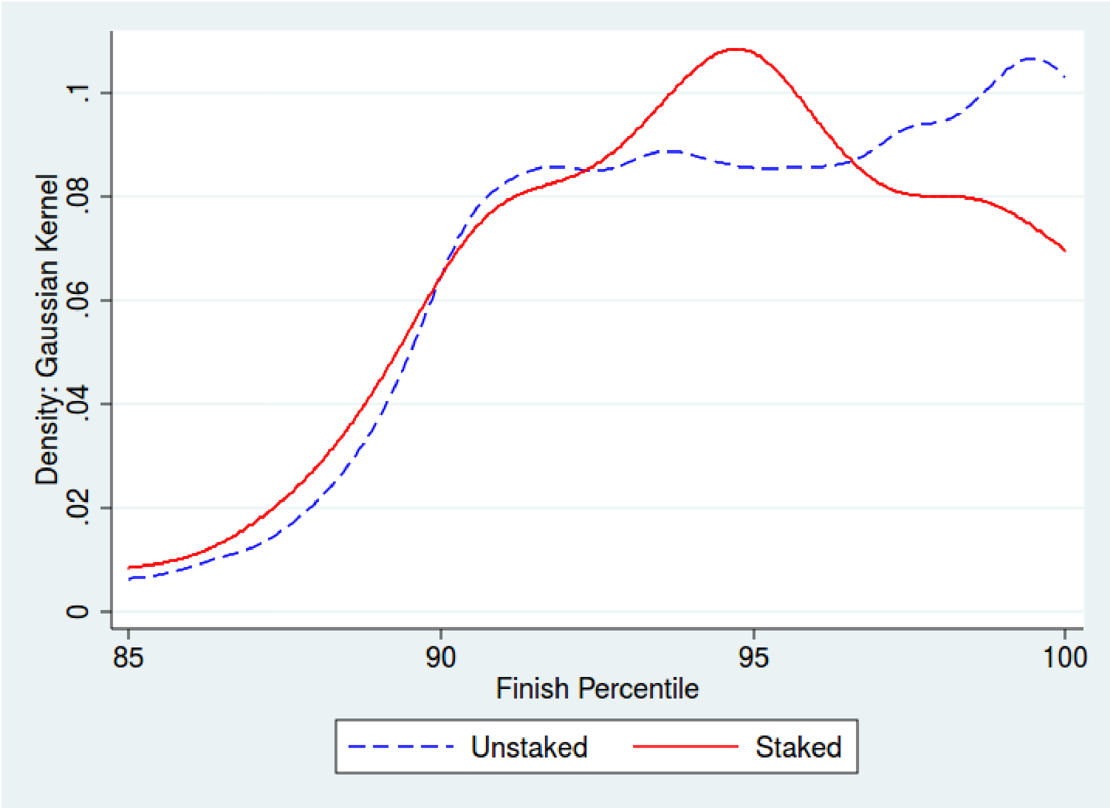
Notes: Figure 4 displays the average ROI by entry fee tier for staked and unstaked-play. Circle size represents the relative number of observations. Entry fee tiers are defined as \$0-22, \$22.01-\$109, and above \$109. These cutoffs are based on the quartiles of of *entry fee*.

Figure 5: Distribution of Finish Percentile for Staked and Unstaked Tournaments



Notes: The above kernel density estimations were done using a Gaussian kernel (results were not substantively different under various other kernels). The solid red line represents the density of a player's tournament finishing percentile under staked-play, while the dashed blue line does the same but for unstaked-play. The values chosen for the upper limit and lower limit of the distribution were 100 and 0, respectively.

Figure 6: Distribution of Finish Percentile for Staked and Unstaked Tournaments: Players Finishing the Tournament with Some Amount of Money



Notes: The above kernel density estimations were done using a Gaussian kernel (results were not substantively different under various other kernels). The solid red line represents the density of a player's tournament finishing percentile under staked-play, while the dashed blue line does the same but for unstaked-play. The sample is restricted to those that won some amount of money. The values chosen for the upper limit and lower limit of the distribution were 100 and 85, respectively.

Table 1: Summary Statistics

Variable	**Full Sample**	**Unstaked**	**Staked**	**t-Statistic**
Return on Investment	47.41	49.39	-12.20	**3.35**
	(3037.22)	(3083.29)	(853.32)	
Finish Percentile	58.55	58.59	57.39	**2.56**
	(24.78)	(24.75)	(25.63)	
At least 10 buyins won	0.021	0.021	0.011	**5.56**
	(0.143)	(0.144)	(0.103)	
At least 3 buyins won	0.049	0.049	0.040	**2.61**
	(0.215)	(0.216)	(0.195)	
No more than 3 buyins won	0.085	0.084	0.098	**-2.53**
	(0.279)	(0.278)	(0.298)	
Won some amount of money	0.134	0.133	0.138	-0.70
	(0.340)	(0.340)	(0.345)	
Tournament entry fee	81.47	79.04	154.64	**-19.58**
	(110.48)	(104.44)	(214.05)	
Tournament entrants	1481.7	1452.6	2357.5	**-14.61**
	(2938.6)	(2917.4)	(3404.6)	
Tournament winnings	95.81	95.59	102.42	-0.42
	(1037.51)	(1042.38)	(878.29)	
Low Entry Fee Tier	0.262	0.265	0.170	**13.68**
	(0.440)	(0.441)	(0.376)	
Mid Entry Fee Tier	0.526	0.531	0.389	**15.93**
	(0.499)	(0.499)	(0.488)	
High Entry Fee Tier	0.212	0.204	0.441	**-26.20**
	(0.409)	(0.403)	(0.497)	
Weekend Tournament	0.488	0.481	0.697	**-25.68**
	(0.500)	(0.500)	(0.460)	
Average ROI of tournament	6.584	6.467	9.949	**-23.68**
entrants[a]	(6.915)	(6.884)	6.942	
Average ability of	73.151	73.07	75.47	**-15.50**
tournament entrants[a]	(7.206)	(7.188)	(7.330)	
Package Details:				
Mark-up[b]	16.74	20.80	16.68	-
	(10.77)	(6.51)	(10.81)	
Percent Requested[b]	55.44	53.17	55.47	-
	(17.42)	(9.86)	(17.50)	
Percent Staked	1.69	-	52.59	-
	(9.92)	-	(19.58)	
Observations	96,371	93,274	3,097	

Standard deviations appear in parentheses below the mean.

The t-statistics are from the null hypothesis that there is no difference between the unstaked mean and the staked mean, and that the variances of the two samples are unequal. T-statistics in **bold** are significant at the 5% level.

[a]: There are 65,949 unstaked observations and 2,306 staked observations
[b]: There are 41 unstaked observations and 3,097 staked observations

Table 2: Monetary Outcomes

VARIABLES	(1) *Return on Investment*	(2) *At least 10 entry fees won*	(3) *At least 3 entry fees won*	(4) *No more than 3 entry fees won*	(5) *Won some money*
Dependent Variable Mean	49.39	0.021	0.049	0.084	0.133
staked	-58.024***	-0.0083***	-0.0087*	0.0136**	0.0049
	(20.667)	(0.0018)	(0.0046)	(0.0056)	(0.0068)
Tournament Characteristics:					
entry fee	-0.171*	-0.0000	0.0000	0.0000**	0.0000
	(0.102)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
entrants	-0.084	-0.0000***	-0.0000	0.0000***	0.0000**
	(0.106)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
entrants^2	0.000	0.0000***	0.0000***	-0.0000***	0.0000
	(0.000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
time limited rebuy	38.681	0.0096***	0.0180***	0.0142***	0.0322***
	(24.730)	(0.0019)	(0.0026)	(0.0030)	(0.0040)
entry limited rebuy	-37.414	0.0059**	0.0070	0.0139***	0.0209***
	(57.240)	(0.0029)	(0.0051)	(0.0043)	(0.0068)
fast	-31.903**	-0.0062***	-0.0120***	-0.0009	-0.0129***
	(13.298)	(0.0016)	(0.0021)	(0.0026)	(0.0029)
slow	8.120	-0.0059*	-0.0092**	-0.0132*	-0.0224***
	(46.274)	(0.0033)	(0.0039)	(0.0073)	(0.0076)
Observations	96,371	96,371	96,371	96,371	96,371
R-squared	0.029	0.007	0.007	0.007	0.008

Standard errors are clustered at the player level
*** p<0.01, ** p<0.05, * p<0.1

Notes: All regressions include player by entry fee tier fixed effects and indicators for whether or not the tournament was part of special tournament series, and whether or not the tournament was played on the weekend.

Table 3: Finishing Position Outcomes

Dependent Variable: *finishpercentile* (unstaked mean: 58.59)

Estimation	OLS	Quantile						
Quantile	n/a	25	50	75	90	95	97.5	99
staked	-0.0119	-0.6631	-0.4709	0.7919	0.1761	-0.4689**	-0.3246***	-0.1888***
	(0.7162)	(0.5887)	(0.6296)	(0.6748)	(0.2910)	(0.2071)	(0.1072)	(0.0489)
Tournament Characteristics:								
entry fee	-0.0054***	-0.0146***	-0.0055**	-0.0008	-0.0002	-0.0001	-0.0010***	-0.0013***
	(0.0013)	(0.0015)	(0.0022)	(0.0017)	(0.0007)	(0.0007)	(0.0003)	(0.0001)
entrants	0.0002*	0.0000	0.0001	0.0002***	0.0000	0.0000	0.0000***	0.0000**
	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
entrants^2	-0.0000**	-0.0000***	-0.0000*	-0.0000	0.0000	-0.0000	-0.0000	-0.0000*
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
time limited rebuy	7.2592***	11.1389***	8.2567***	4.9996***	2.0429***	1.0466***	0.5182***	0.1059***
	(0.4193)	(0.3121)	(0.3287)	(0.2593)	(0.2009)	(0.1181)	(0.0701)	(0.0240)
entry limited rebuy	4.5591***	7.4056***	5.3240***	3.4244***	1.4362***	0.4775	0.0743	-0.0168
	(0.4630)	(0.6412)	(0.6368)	(0.4497)	(0.3210)	(0.2904)	(0.0931)	(0.0456)
fast	-1.6616***	-0.7903***	-5.4347***	-2.5848***	-1.1264***	-0.7283***	-0.4310***	-0.2399***
	(0.4271)	(0.2491)	(0.3272)	(0.3737)	(0.2151)	(0.1413)	(0.0812)	(0.0255)
slow	0.1395	-0.5398	0.0773	-0.6822	-0.5135	-0.4979	0.0737	-0.0571
	(0.5980)	(0.7200)	(0.8645)	(0.8171)	(0.5504)	(0.3377)	(0.1861)	(0.0448)
Observations	96,371	96,371	96,371	96,371	96,371	96,371	96,371	96,371
R-squared	0.0361							

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Notes: All regressions include player by entry fee tier fixed effects and indicators for whether or not the tournament was part of special tournament series, and whether or not the tournament was played on the weekend.

Table 4: Monetary Outcomes: Including Tournament Difficulty

VARIABLES	(1) *Return on Investment*	(2) *At least 10 entry fees won*	(3) *At least 3 entry fees won*	(4) *No more than 3 entry fees won*	(5) *Won some money*
Dependent Variable Mean	110.3	0.030	0.069	0.12	0.187
Panel A: Restricted Sample					
staked	-79.60***	-0.0114***	-0.0127*	0.0202**	0.0076
	(29.673)	(0.0027)	(0.0064)	(0.0079)	(0.0102)
Panel B: Including Tournament Difficulty (*ROI*)					
staked	-66.17**	-0.0089***	-0.0098	0.0200**	0.0102
	(33.203)	(0.0026)	(0.0064)	(0.0079)	(0.0102)
Average *ROI*	-6.172**	-0.0011***	-0.0013***	0.0001	-0.0012***
of all entrants	(2.414)	(0.0001)	(0.0002)	(0.0003)	(0.0003)
Panel C: Including Tournament Difficulty (*ability score*)					
staked	-64.55*	-0.0103***	-0.0107*	0.0216***	0.0108
	(36.38)	(0.0026)	(0.0063)	(0.0079)	(0.0101)
Average *ability*	-15.07	-0.0012***	-0.0019***	-0.0013***	-0.0032***
of all entrants	(9.67)	(0.0002)	(0.0003)	(0.0003)	(0.0005)
Observations	68,255	68,255	68,255	68,255	68,255
R-squared	0.044	0.0099	0.0095	0.0110	0.0127

Standard errors are clustered at the player level
*** p<0.01, ** p<0.05, * p<0.1

Notes: Panel A restricts the sample to only observations where tournament difficulty is known. Panel B includes the lifetime return of investment of all tournament entrants as a control and Panel C includes the lifetime ability score rating of all tournament entrants as a control. All regressions include player by entry fee tier fixed effects and indicators for whether or not the tournament was part of special tournament series, and whether or not the tournament was played on the weekend. All regressions also include controls for the entry fee, a quadratic polynomial in the number of entrants, indicators for rebuy structure and indicators for tournament speed.

Table 5: Monetary Outcomes: Matched Tournaments

VARIABLES	(1) *Return on Investment*	(2) *At least 10 entry fees won*	(3) *At least 3 entry fees won*	(4) *No more than 3 entry fees won*	(5) *Won some money*
Dependent Variable Mean	111.8	0.027	0.063	0.113	0.176
Panel A: Restricted Sample					
staked	-112.25**	-0.0088***	-0.0037	0.0209**	0.0172
	(54.63)	(0.0032)	(0.0069)	(0.0097)	(0.0111)
Panel B: Including Tournament Difficulty					
staked	-100.93*	-0.0063*	-0.0013	0.0209**	0.0196*
	(54.98)	(0.0035)	(0.0070)	(0.0094)	(0.0109)
Average *ROI* for all entrants	-9.282**	-0.0021***	-0.0020***	0.0001	-0.0019**
	(3.911)	(0.0004)	(0.0005)	(0.0008)	(0.0010)
Observations	14,666	14,666	14,666	14,666	14,666

Standard errors are clustered at the player level
*** p<0.01, ** p<0.05, * p<0.1

Notes: Panel A restricts the sample to only observations where tournament difficulty is known. Panel B includes the lifetime return of investment of all tournament entrants as a control. All regressions include player by matched tournament fixed effects and indicators for whether or not the tournament was part of special tournament series, and whether or not the tournament was played on the weekend. All regressions also include controls for the entry fee, a quadratic polynomial in the number of entrants, indicators for rebuy structure and indicators for tournament speed.

Table 6: Monetary Outcomes: Staking Window

VARIABLES	(1) *Return on Investment*	(2) *At least 10 entry fees won*	(3) *At least 3 entry fees won*	(4) *No more than 3 entry fees won*	(5) *Won some money*
Dependent Variable Mean	127.9	0.028	0.067	0.124	0.190
Panel A: Main Specification with Restricted Sample					
staked	-49.917	-0.0092***	-0.0122*	0.0112	-0.0010
	(72.175)	(0.0033)	(0.0066)	(0.0089)	(0.0102)
Observations	24,430	24,430	24,430	24,430	24,430
Panel B: Including Tournament Difficulty					
staked	-37.546	-0.0075**	-0.0100	0.0122	0.0021
	(76.475)	(0.0030)	(0.0063)	(0.0090)	(0.0098)
Average *ROI*	-8.552*	-0.0011***	-0.0015***	-0.0007	-0.0022***
of all entrants	(4.464)	(0.0002)	(0.0004)	(0.0005)	(0.0006)
Observations	24,430	24,430	24,430	24,430	24,430

Standard errors are clustered at the player level
*** p<0.01, ** p<0.05, * p<0.1

Notes: Panel A restricts the sample to only observations where tournament difficulty is known. Panel B includes the lifetime return of investment of all tournament entrants as a control. Both panels further restrict the sample to only include tournaments in between a player's first incident of staking and their last incident (inclusive). All regressions include player by entry fee tier fixed effects and indicators for whether or not the tournament was part of special tournament series, and whether or not the tournament was played on the weekend. All regressions also include controls for the entry fee, a quadratic polynomial in the number of entrants, indicators for rebuy structure and indicators for tournament speed.

Appendices

Appendix A: Staking Window Dummy

In Section 5.2.3 we address the concern that there is something different about the player during the time period where they seek out staking compared to time periods where they only engage in unstaked-play. In the main text we only compare outcomes on the basis of staking status if they occurred in the time frame where a player was engaging in both staked- and unstaked-play (*i.e.* in the "staking window"). As an alternative method, we propose the following specification:

$$\mathbf{outcome}_{it} = \alpha \cdot \textit{In Staked Window}_{it} + (\mu_i \times \textit{EntryFeeTier}_t) + \mathbf{X}_t\mathbf{B} + \varepsilon_{it} \tag{3}$$

Here, *In Staked Window* is an indicator for whether or not a tournament was played inside a player's "staking window" (in window = 1). All other variables are as specified in the main text. Additionally, we restrict our sample to only *unstaked* tournaments. Therefore, we are comparing a player's outcomes in unstaked tournaments inside the time frame when they were playing in staked tournaments to their outcomes in unstaked tournaments outside this time frame. If something about a player is different inside the window (*e.g.* relative ability has diminished) then we would expect the coefficient on *In Staked Window* (α) to be different from zero. If there is nothing different about the player in these two time periods then we expect α to be a precisely estimated zero.

Table A1 displays the results from estimating Equation 3. In Panel A we restrict the sample to the observations that have valid values of tournament difficulty, but we do not include this variable. In general, the estimated coefficients on the indicator for whether or not a tournament took place inside a player's staking window suggest that there is no difference between the outcomes in these two different time periods. The only concerning result is that the standard error for the coefficient on *In Staked Window* is quite large for the outcome of return on investment. The 95% confidence interval ranges from -84 to 83. Panel B, which includes a measure of tournament difficulty tells the same story as Panel A. No estimated coefficient on *In Staked Window* is statistically significant, but the confidence interval when the outcome is return on investment is large.

In Panel C we continue to use tournament difficulty as a control variable, but we change the fixed effects structure. In this specification we use the player by tournament match fixed effects found in Section 5.2.2. Thus, we are comparing a player's outcome in an unstaked tournament outside the staking window to that *same* unstaked tournament inside the staking window. Upon employing this fixed effect structure, we find results similar to panels A and B. While the coefficient on all of the outcomes are not statistically different from zero, the coefficient on *In Staked Window* is imprecisely estimated for both the outcomes of return on investment and the indicator for whether or not the player won three times the entry fee.

In summation, while these estimates found in these three panels are not without caveats, they do provide evidence that player outcomes in unstaked tournaments are relatively consistent both inside and outside a player's staking window. Although these tests are not conclusive, these results suggest that our main findings are not being driven by player ability changing over time.

Appendix B: Staking Gap

An ideal way to measure the incentive impact of staking would be to randomize the amount of staking an individual receives for each tournament, and measure how outcomes change based on staking level. From the player's perspective, the marketplace does impose variation in staking levels upon them. While a player can request financing for any tournament, the amount of staking received is determined by investors. Hence, the difference between how much staking a player sought out for a poker tournament and how much staking a player received for that same poker tournament, provides quasi-random variation in percent staked.[38] We create the variable *gap* for player i playing in tournament t, which we define as:

$$gap_{it} = percent\ requested_{it} - percent\ staked_{it}$$

As this difference increases, a player's marginal return to finishing position also increases, restoring some of their incentives.[39] Therefore, we expect return on investment and the probability of large poker tournament wins to increase as *gap* increases.

To investigate the relationship between the monetary outcomes and *gap* we introduce the following specification:

$$\textbf{outcome}_{it} = \gamma_1 gap_{it} + \gamma_2 percent\ requested_{it} + (\mu_i \times EntryFeeTier_t) + \mathbf{X}_t\mathbf{B} + \varepsilon_{it} \quad (4)$$

As with the main specification, $\textbf{outcome}_{it}$ is the set of monetary outcomes: return on investment, an indicator for at least 10 entry fees won, an indicator for at least 3 entry fees won, an indicator for some positive winnings but no more than 3 entry fees, and an indicator for winning any amount of money. This specification allows us to compare results for the same player when receiving different levels of stakings (different gaps), holding their percent requested constant. Since we include the amount of staking that

[38] This difference between how much the player was requesting and how much they actually received is most likely due to two main sources. First, investors may see this opportunity as a bad investment. Second, the player may not have posted the ad with enough time to sell as much as they wanted.

[39] The distribution of *gap* can be found in Figure A1.

the player requested when they posted their advertisement on twoplustwo.com, concerns regarding adverse selection are further mitigated. Thus, the estimate of γ_1, the coefficient on *gap*, will provide more insight into how incentives play a role in the tournament outcomes of poker players.

Estimating Equation (4) by OLS yields the results found in Table A2. The sample is restricted to only players that received staking for a poker tournament and whose staking gap was known. In Panel A, we restrict the sample further to only include those observations for which we have a measure of tournament difficulty, although we do not employ that variable in this specification. As predicted as *gap* increases, so do return on investment and the probability of a winning at least 10 entry fees. While the coefficient on *gap* is positive in Column 3, where the outcome is an indicator for whether or not the player won at least 3 entry fees, it is not precisely estimated. We also see imprecise estimates for *gap* when the outcome is a small win and for the indicator for whether or not a player won any amount of money.

Panel B, which includes a measure of tournament difficulty, displays results that are almost identical to Panel A with respect to the estimated coefficients, and standard errors, for *gap* and *percent requested*. This is not surprising since we have already conditioned on whether or not the observation was staked and thus reduced the selection effect. Thus, we are only left with the disincentive effect. Unfortunately, we only have 2306 observations so much of the power is lost, especially given the number of fixed effects that we employ. Yet still, it is encouraging to see the effect of disincentives appear for the outcomes of return on investment and the indicator for at least 10 entry fees won, and that the sign on the coefficient was, as expected, positive.

Appendix C: Percent Staked

Another way to reduce the impact of selection would be to restrict our sample to only those that received staking. We could then use the variation in how much staking a player received as a way to measure the disincentive effect of staking. The distribution of *percent staked* can be seen in Figure A2. We proceed using the following specification:

$$\mathbf{outcome}_{it} = \delta \cdot \textit{percent staked}_{it} + (\mu_i \times \textit{EntryFeeTier}_{it}) + \mathbf{X}_t\mathbf{B} + \varepsilon_{it} \quad (5)$$

Where $\mathbf{outcome}_{it}$ is either return on investment, an indicator for whether or not a player won at least 10 entry fee, an indicator for whether or not a player won at least 3 entry fees, an indicator for whether or not a player won some money but no more than 3 entry fees, and an indicator for whether or not a player won some amount of money. As *percent staked* increases, we have the same expectations that we have for *staked*. That is, we expect δ to be negative for return on investment, and the large win variables – as incentives decrease, effort decreases, and the likelihood of a large win decreases. The effect of *percent staked* on the remaining two variables remains ambiguous (see Section 4.1).

Table A3 shows how the amount of staking received for a tournament impacts the aforementioned monetary outcomes. The first thing we see is the lack of precision across almost all of the estimated coefficients. The only statistically significant coefficient on *percent staked* is in Column 2 – where the outcome is an indicator for whether or not a player won at least 10 entry fees. The general lack of statistical significance is most likely due to the small number of observations. That being the case, we do see signs of the coefficients are in line with our expectations.

As was the case in Appendix B, we see that the inclusion of tournament difficulty in Panel B does not substantively change the estimated coefficients on *percent staked*. This was to be expected as we have already conditioned on whether or not a player has engaged in staking, thus mitigating the selection effect. This leaves us with only the disincentive effect, but a lack of power does not allow us to say much.

Appendix D: Number of Games

When looking at the staking advertisements posted by players, one of the commonly listed reasons for seeking staking is that the player wishes to play in more poker tournaments in a given time frame than they normally would.[40] If players indeed play additional tournaments on a given day when receiving staking, and playing additional tournaments alters performance, our base specifications would suffer from omitted variable bias. That is, there may be a positive correlation between staking and the number of games played *and* a negative correlation between the number of games and the outcome of a poker tournament. This negative correlation could be due to less concentration devoted to any one tournament as the number of tournaments that a player participates in for a given day increases. If omitted variable bias of this type is a problem for our main specifications, then our estimates would be downward biased, leading us to overestimate the negative relationship between *staked* and the outcome of interest. To mitigate these concerns we will include the number of poker tournaments in which player participates on a given day as an additional regressor.

The results in Table A4 were generated by re-estimating Equation (1) with the addition of controlling for the number of games played by a player on a given date.[41,42] Thus, we will compare these results to those found in tables 2 and 4. We begin by focusing on Panel A where we do not include tournament difficulty, but restrict our sample to only observations for which we have that variable. First, the number of tournaments played on a given date has a negative and statistically significant relationship with all outcomes except for return on investment, where it has an imprecisely estimated small positive coefficient. This provides some evidence that playing more games in a given day reduces

[40] As mentioned in the main text, many players want to reduce the variance in their monetary outcomes in a given time frame by playing in more tournaments.

[41] Given the nature of the data, the variable *games* contains measurement error, as the listed date of the poker tournament is actually the date on which the poker tournament finished. For example, if a tournament starts on a Sunday, but finishes on a Monday, then the listed date of the tournament is Monday.

[42] We also used an additional measure of games: the number of tournaments that a player participated in that do not appear in our sample. Among other restrictions, the sample that we use to produce our results does not include "sit-n-go" tournaments (a mini tournament, typically consisting of 6 or 9 players) or tournaments where no monetary outcome is observed - these prizes include entries into other tournaments. Neither of these types of tournaments were listed as items in staking packages. The results (not shown) were substantively similar.

the monetary outcome of any one poker tournament. The most likely explanation is that players are devoting less time and effort to any one tournament as the number of games played on a given date increases, and that relaxing their liquidity constraint amplifies this problem. Second, and more importantly for the scope of this paper, adding in a control for the number of games played has virtually no effect on the sign and the significance of the estimated coefficients for *staked* in any column when compared to the main set of results.

In Panel B we include tournament difficulty as another regressor. When comparing the results in Panel B to those in Panel A, we see that these results are similar to the main set of results: including tournament difficulty reduces the magnitude on *staked* when the outcomes is return on investment or the indicators for a large win. As with the main set of results, we again find evidence that players do worse in tournaments where they are staked compared to tournaments where they are not staked, and that both the disincentive mechanism and the selection mechanism are needed to explain this difference.

Appendix E: Interaction with Rebuy Characteristics

Whether or not a player is staked in a tournament may lead to different behavior with respect to how they use rebuys. When the player is not staked, they must pay the full cost of any rebuys; whereas when they are staked, the player pays only a fraction of the cost for the rebuy and they can charge markup on the rebuy as well. This suggests that receiving staking for a tournament with a rebuy structure may change a player's incentives during the rebuy period, beyond the baseline change in incentives from a player's staking status. For example, in a tournament with rebuys, a player may play a higher variance strategy as any one lost pot has less overall impact on their odds of winning, which in turn could lead to different tournament outcomes. To address this scenario, we re-estimate the main specification for the monetary outcome (Equation 1) while including an interaction between the staking indicator (*staked*) and the rebuy characteristics (*time limited rebuy* and *entry limited rebuy*).

Comparing the results in Panel A of Table A5 to tables 2 and 4, we find that the inclusion of the interaction between the rebuy characteristics with the staking indicator, *staked*, yields little difference from the main results. To asses the overall impact of being staked, we must perform a joint hypothesis test that the coefficient on *staked* and the two indicators it is interacted with are all equal to zero. In Panel A, we see that being staked is negatively related to return on investment, and the probability of a large win. We also see that being staked is positively related to the probability of a small win. While these results are similar to those found in the main text, a joint hypothesis test examining the statistical significance of the interactions suggests that the empirical results are not improved by including these interactions. The only outcome that contradicts this is the probability of a very large win. The results in Panel B are extremely similar to both the main set of results without the staked-rebuy interactions, and to the results in Panel A. when *prize* is the outcome.

The balance of the evidence suggests that the inclusion of the interaction between the staked indicator and the rebuy characteristics is not necessary. Additionally, even when these interactions are included as regressors, the results are qualitatively similar to the results found in our main specifications.

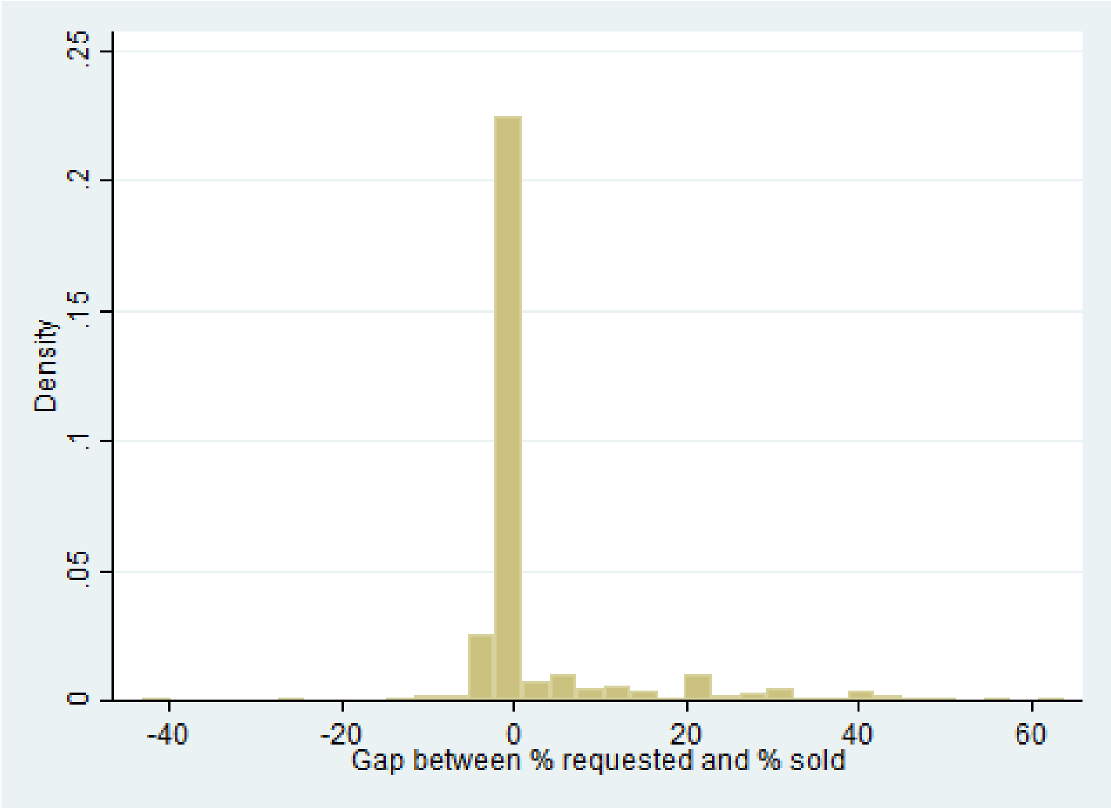
Appendix F: No Top 3 Finishes

Given the convex nature of the tournament payouts (as seen in Figure 1), we want to reduce the concern that our results are being driven by random differential finishes at the very end of the tournaments. To address these types of concerns, we re-estimate Equation 1, but exclude any observation that finishes in 1st, 2nd, or 3rd place. While the estimated coefficient have smaller magnitudes than their full sample counterparts, the results found in Table A6 provide evidence that our main set of findings are not the result of outlier effects. Prior to including a measure of tournament difficulty, we see in Panel A that when a player is staked, relative to when they are not staked, they: have a lower return on investment, and a lower likelihood of having a large win, a higher likelihood of a small win, and no change in their likelihood of any win. This is the pattern of results that we observe in our main findings.

In Panel B, we restrict our sample to the observations for which we have a measure of tournament difficulty, and then in Panel C we incorporate that measure of tournament difficulty. Our results in these two panels mirror our estimates in from Panel A and our main set of results. That is, we find evidence of a disincentive effect due to the player being staked, and we also find that adverse selection explains part of the reduction in monetary outcomes when comparing staked- to unstaked-play. As with our main set of results, the disincentive effect is found to be larger than the selection effect. Interestingly, when comparing the estimated coefficients on *staked* in Panel B to Panel C, we see very small changes in magnitude. With respect to the results in Column 1 (ROI), this may provide more evidence that large wins are re-allocated to small wins when comparing staked- to unstaked-play.

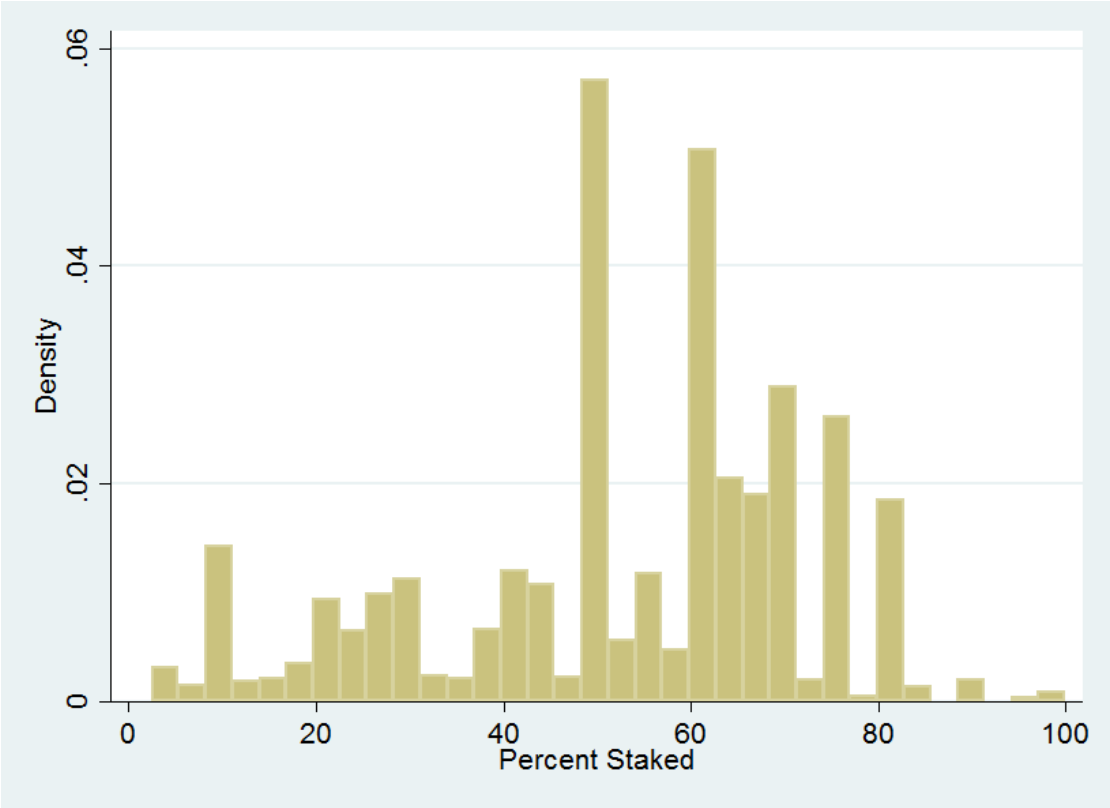
Appendix: Figures and Tables

Figure A1: Distribution of the Difference between the Amount of Staking Requested and the Amount Actually Received



Note: Histogram shows the distribution of the difference between the amount of staking that the player requested in their ad and the amount of staking they were able to sell before the tournament began (*gap*). The sample is restricted to those observations where both the amount requested and the amount received are known.

Figure A2: Distribution of the Amount of Staking the Player Received



Note: Histogram shows the distribution of the amount of staking the player was able to sell before the tournament began (*percent staked*) for all staked observations.

Table A1: Monetary Outcomes: Staking Window Alternative

VARIABLES	(1) *Return on Investment*	(3) *At least 10 entry fees won*	(5) *At least 3 entry fees won*	(6) *No more than 3 entry fees won*	(7) *Won some money*
Panel A: Restricted Sample					
Dependent Variable Mean	110.3	0.0297	0.0686	0.119	0.187
In Staked Window	-0.718	-0.0034	-0.0043	0.0087	0.0045
	(42.389)	(0.0021)	(0.0032)	(0.0068)	(0.0082)
Observations	65,949	65,949	65,949	65,949	65,949
Panel B: Including Tournament Difficulty					
Dependent Variable Mean	110.3	0.0297	0.0686	0.119	0.187
In Staked Window	7.789	-0.0018	-0.0025	0.0085	0.0060
	(45.463)	(0.0023)	(0.0034)	(0.0067)	(0.0086)
Average *ROI* of all entrants	-6.209**	-0.0011***	-0.0013***	0.0001	-0.0011***
	(2.569)	(0.0002)	(0.0002)	(0.0003)	(0.0004)
Observations	65,949	65,949	65,949	65,949	65,949
Panel C: Matched Tournaments					
Dependent Variable Mean	110.3	0.0297	0.0686	0.119	0.187
In Staked Window	-73.593	0.0033	0.0018	0.0114	0.0132
	(91.424)	(0.0058)	(0.0085)	(0.0095)	(0.0145)
Average *ROI* of all entrants	-17.977**	-0.0021***	-0.0019***	-0.0001	-0.0020**
	(6.831)	(0.0004)	(0.0007)	(0.0007)	(0.0010)
Observations	13,015	13,015	13,015	13,015	13,015

Standard errors are clustered at the player level
*** p<0.01, ** p<0.05, * p<0.1

Notes: In Panel A we restrict the sample to only those observations where tournament difficulty is known and Panel B includes tournament difficulty as a control variable. All regressions include indicators for whether or not the tournament was part of special tournament series, and whether or not the tournament was played on the weekend. All regressions also include controls for the entry fee, a polynomial in the number of entrants, indicators for rebuy structure and indicators for tournament speed. Panels A and B use player by entry fee tier fixed effects. In Panel C we use player by matched tournament fixed effects.

Table A2: Monetary Outcomes: Staking Gap

VARIABLES	(1) *Return on Investment*	(3) *At least 10 entry fees won*	(5) *At least 3 entry fees won*	(6) *No more than 3 entry fees won*	(7) *Won some money*
Dependent Variable Mean	16.99	0.0139	0.0520	0.131	0.183
Panel A: Restricted Sample					
gap	5.469*	0.0005**	0.0001	-0.0010	-0.0009
	(3.241)	(0.0002)	(0.0004)	(0.0012)	(0.0012)
percent requested	-8.622	-0.0007*	-0.0012	0.0007	-0.0005
	(7.250)	(0.0004)	(0.0010)	(0.0013)	(0.0014)
Observations	2,306	2,306	2,306	2,306	2,306
Panel B: Including Tournament Difficulty					
gap	5.463*	0.0005**	0.0001	-0.0010	-0.0009
	(3.220)	(0.0002)	(0.0004)	(0.0012)	(0.0012)
percent requested	-8.618	-0.0007*	-0.0012	0.0008	-0.0005
	(7.221)	(0.0004)	(0.0010)	(0.0013)	(0.0014)
Average *ROI*	-0.435	-0.0001	-0.0003	-0.0034*	-0.0037
of all entrants	(4.212)	(0.0007)	(0.0015)	(0.0020)	(0.0024)
Observations	2,306	2,306	2,306	2,306	2,306

Standard errors clustered at the player level
*** p<0.01, ** p<0.05, * p<0.1

Notes: In both panels, we restrict the sample to only those tournaments where the player was staked. Panel A further restricts the sample to only those observations where tournament difficulty is known and Panel B includes tournament difficulty as a control variable. All regressions include player by entry fee tier fixed effects and indicators for whether or not the tournament was part of special tournament series, and whether or not the tournament was played on the weekend. All regressions also include controls for the entry fee, a polynomial in the number of entrants, indicators for rebuy structure and indicators for tournament speed.

Table A3: Monetary Outcomes: Percent Staked

VARIABLES	(1) *Return on Investment*	(3) *At least 10 entry fees won*	(5) *At least 3 entry fees won*	(6) *No more than 3 entry fees won*	(7) *Won some money*
Dependent Variable Mean	16.99	0.0139	0.0520	0.131	0.183
Panel A: Restricted Sample					
percent staked	-6.612	-0.001**	-0.001	0.001	0.000
	(4.487)	(0.000)	(0.001)	(0.001)	(0.001)
Observations	2,306	2,306	2,306	2,306	2,306
Panel B: Including Tournament Difficulty					
percent staked	-6.607	-0.001**	-0.001	0.001	0.000
	(4.456)	(0.000)	(0.001)	(0.001)	(0.001)
Average *ROI* of all entrants	-0.378	-0.000	-0.000	-0.003*	-0.004
	(4.212)	(0.001)	(0.002)	(0.002)	(0.002)
Observations	2,306	2,306	2,306	2,306	2,306

Standard errors are clustered at the player level
*** p<0.01, ** p<0.05, * p<0.1

Notes: In both panels, we restrict the sample to only those tournaments where the player was staked. Panel A further restricts the sample to only those observations where tournament difficulty is known and Panel B includes tournament difficulty as a control variable. All regressions include player by entry fee tier fixed effects and indicators for whether or not the tournament was part of special tournament series, and whether or not the tournament was played on the weekend. All regressions also include controls for the entry fee, a polynomial in the number of entrants, indicators for rebuy structure and indicators for tournament speed.

Table A4: Monetary Outcomes - Including Number of Games

VARIABLES	(1) *Return on Investment*	(2) *At least 10 entry fees won*	(3) *At least 3 entry fees won*	(4) *No more than 3 entry fees won*	(5) *Won some money*
Dependent Variable Mean	110.3	0.030	0.069	0.119	0.187
Panel A: Restricted Sample					
staked	-80.138***	-0.0112***	-0.0121*	0.0204**	0.0083
	(27.512)	(0.0027)	(0.0064)	(0.0080)	(0.0102)
numuber of games on same day	0.167	-0.0002***	-0.0004***	-0.0002*	-0.0006***
	(2.121)	(0.0001)	(0.0001)	(0.0001)	(0.0002)
Observations	68,255	68,255	68,255	68,255	68,255
Panel B: Including Tournament Difficulty					
staked	-66.749**	-0.0087***	-0.0093	0.0202**	0.0109
	(30.905)	(0.0026)	(0.0064)	(0.0079)	(0.0102)
number of games on same day	0.404	-0.0002**	-0.0003***	-0.0001	-0.0005*
	(2.627)	(0.0001)	(0.0001)	(0.0002)	(0.0003)
Average *ROI* of all entrants	-6.179**	-0.0011***	-0.0013***	0.0001	-0.0012***
	(2.450)	(0.0002)	(0.0002)	(0.0003)	(0.0003)
Observations	68,255	68,255	68,255	68,255	68,255

Standard errors are clustered at the player level
*** p<0.01, ** p<0.05, * p<0.1

Notes: Panel A restricts the sample to only those observations where tournament difficulty is known and Panel B includes tournament difficulty as a control variable. All regressions include player by entry fee tier fixed effects and indicators for whether or not the tournament was part of special tournament series, and whether or not the tournament was played on the weekend. All regressions also include controls for the entry fee, a polynomial in the number of entrants, indicators for rebuy structure and indicators for tournament speed.

Table A5: Monetary Outcomes - Interacting Staked with Rebuy Characteristics

VARIABLES	(1) *Return on Investment*	(2) *At least 10 entry fees won*	(3) *At least 3 entry fees won*	(4) *No more than 3 entry fees won*	(5) *Won some money*
Dependent Variable Mean	110.3	0.0297	0.0686	0.119	0.187
Panel A: Restricted Sample					
staked (β_1)	-64.755*	-0.0075***	-0.0118*	0.0210**	0.0092
	(33.191)	(0.0029)	(0.0065)	(0.0093)	(0.0106)
entry limited rebuy	-27.802	-0.0168	0.0008	0.0423	0.0430
$\times$ *staked* (β_2)	(37.635)	(0.0102)	(0.0191)	(0.0376)	(0.0393)
time limited rebuy	-100.473	-0.0225***	-0.0070	-0.0220	-0.0290
$\times$ *staked* (β_3)	(75.957)	(0.0058)	(0.0151)	(0.0293)	(0.0347)
$H_0 : \beta_1 = \beta_2 = \beta_3 = 0$ (p-value)	0.01	0.00	0.27	0.07	0.53
$H_0 : \beta_2 = \beta_3 = 0$ (p-value)	0.41	0.00	0.89	0.45	0.46
Observations	68,255	68,255	68,255	68,255	68,255
Panel B: Including Tournament Difficulty					
staked (β_1)	-53.071	-0.0054*	-0.0093	0.0208**	0.0115
	(36.202)	(0.0028)	(0.0066)	(0.0093)	(0.0107)
entry limited rebuy	-18.949	-0.0151	0.0027	0.0421	0.0448
$\times$ *staked* (β_2)	(36.206)	(0.0101)	(0.0192)	(0.0376)	(0.0395)
time limited rebuy	-91.150	-0.0208***	-0.0050	-0.0221	-0.0271
$\times$ *staked* (β_3)	(75.938)	(0.0058)	(0.0150)	(0.0294)	(0.0346)
Average *ROI*	-6.152**	-0.0011***	-0.0013***	0.0001	-0.0012***
of all entrants	(2.413)	(0.0001)	(0.0002)	(0.0003)	(0.0003)
$H_0 : \beta_1 = \beta_2 = \beta_3 = 0$ (p-value)	0.08	0.00	0.50	0.07	0.45
$H_0 : \beta_2 = \beta_3 = 0$ (p-value)	0.49	0.00	0.93	0.45	0.46
Observations	68,255	68,255	68,255	68,255	68,255

Standard errors are clustered at the player level
*** p<0.01, ** p<0.05, * p<0.1

Notes: Panel A restricts the sample to only those observations where tournament difficulty is known and Panel B includes tournament difficulty as a control variable. All regressions include player by entry fee tier fixed effects and indicators for whether or not the tournament was part of special tournament series, and whether or not the tournament was played on the weekend. All regressions also include controls for the entry fee, a polynomial in the number of entrants, indicators for rebuy structure and indicators for tournament speed.

Table A6: Monetary Outcomes - No Top 3 Finishes

VARIABLES	(1) *Return on Investment*	(2) *At least 10 entry fees won*	(3) *At least 3 entry fees won*	(4) *No more than 3 entry fees won*	(5) *Won some money*
Panel A: Full Sample					
Dependent Variable Mean	-40.22	0.0106	0.0384	0.0854	0.124
staked	-18.76**	-0.00405**	-0.00481	0.0133**	0.00852
	(8.024)	(0.00167)	(0.00447)	(0.00562)	(0.00703)
Observations	95,325	95,325	95,325	95,325	95,325
Panel B: Restricted Sample					
Dependent Variable Mean	-15.54	0.0150	0.0541	0.120	0.175
staked	-27.401**	-0.0061**	-0.0075	0.0198**	0.0122
	(11.711)	(0.0024)	(0.0063)	(0.0079)	(0.0104)
Observations	67,238	67,238	67,238	67,238	67,238
Panel C: Including Tournament Difficulty					
staked	-27.588**	-0.0056**	-0.0065	0.0198**	0.0132
	(11.761)	(0.0024)	(0.0063)	(0.0079)	(0.0104)
Average *ROI* for all entrants	0.087	-0.0002**	-0.0005**	-0.0000	-0.0005
	(0.389)	(0.0001)	(0.0002)	(0.0003)	(0.0003)
Observations	67,238	67,238	67,238	67,238	67,238

Standard errors are clustered at the player level
*** p<0.01, ** p<0.05, * p<0.1

Notes: All panels have restricted the sample to note include 1st, 2nd, and 3rd place finishes. Panel A includes all remaining observations. Panel B further restricts the sample to only those observations where tournament difficulty is known and Panel C includes tournament difficulty as a control variable. All regressions include player by entry fee tier fixed effects and indicators for whether or not the tournament was part of special tournament series, and whether or not the tournament was played on the weekend. All regressions also include controls for the entry fee, a polynomial in the number of entrants, indicators for rebuy structure and indicators for tournament speed.