Tournament Behavior and High-Water Marks: Evidence from Social Trading Networks

Doering, Philipp*
Jonen, Alexander°

This Draft: November 11, 2016

Abstract:
Our analysis will extend the body of empirical literature on tournament behavior among portfolio managers, i.e. their tendency to increase risk following poor performance. We will use a sample of exchange-traded investment certificates managed by users in social networks, so-called “wikifolios”, and study their dynamic risk-taking behavior. Wikifolios provide an innovative delegated portfolio management setting most comparable to hedge funds, as their managers face largely no investment constraints and are paid performance fees tied to a high-water mark. However, unlike hedge funds, every single trade executed within a wikifolio is recorded. We were provided a sample of 5,057 wikifolios and their full transaction histories. In contrast to the existing literature on tournament behavior among hedge fund managers, the depth of our sample allows us to explicitly analyze whether the observed risk-shifting was intended by the manager or simply due to exogenous factors. For those that intentionally increased risk, we examine how risk-shifting is put into practice, i.e. we can study how previous underperformance affects the subsequent use of leverage, trading frequency, and diversification. In addition, our sample allows us to control for differences in the risk-shifting behavior between managers that use leverage and short exposures, and those that committed to employ long-only, unlevered strategies. We will also control for differences between institutionally and individually managed wikifolios. Besides contributing to the literature on tournament behavior, our results will also be of interest for investors and regulators, as we provide information on the risks associated with investing via social trading networks.

JEL Classification Codes: G11, G23, G32

Keywords: tournament behavior, risk-shifting, risk-taking, high-water mark, hedge funds, delegated portfolio management, social trading, fintech

* University of Bochum, Department of Finance and Banking, Universitätsstrasse 150, 44801 Bochum, Germany; telephone: +49(0)234-32-21739, e-mail: phillipp.doering@rub.de.
° Helmut Schmidt University, Holstenhofweg 85, 22043 Hamburg.
**Introduction**

Institutionally managed savings grew considerably over the last decades. It is thus not surprising that politicians and central bankers are increasingly concerned with the agency relationship occurring between investors and portfolio managers (see e.g. Stracca, 2006). A well-documented observation for both mutual and hedge funds that may contradict investor interest is “tournament behavior”: portfolio managers performing poorly relative to their peer funds in the first half of the year tend to increase risk in the second half in order to catch up again (Aragon and Nanda, 2012; Brown et al., 1996). Fund managers are induced to behave like this by the convex incentives they typically face. While mutual funds are only paid a fixed management fee, convex incentives can result implicitly from the asymmetric flow-performance relationship extensively discussed in the literature (Spiegel and Zhang, 2013; Ferreira et al., 2012; Sirri and Tufano, 1998; Chevallier and Ellison, 1997). Unlike mutual funds, most hedge funds also charge a performance fee that explicitly provides convex incentives.

In either case, the fund manager is effectively facing a call option on investor wealth, providing an incentive to increase risk following poor performance to get into the money by the end of the period. In other words, the manager has an incentive to increase portfolio volatility in order to maximize the value of this option (Carpenter, 2000). As such a behavior is unlikely to be in the interest of interest, a question of particular interest in academia is thus how such a risk-shifting behavior can be mitigated or offset by providing other incentives. For example, there is evidence that managerial ownership, reputational concerns or, in the case of hedge funds, tying the performance fee to a high-water mark can reduce (but not eliminate) tournament behavior (Jiang et al., 2016; Aragon and Nanda, 2012; Boyson, 2010). The latter makes the payment of the incentive fee only apply to net profits, i.e. contingent upon recovering previous losses.

The ongoing digital transformation yielded new players in the asset management industry, offering innovative business models that aim to compete with traditional asset managers. Besides the automated investment solutions offered by robo-advisory services, social networks explicitly for the purpose of sharing investment ideas within an online community recently experienced an increasing popularity. The literature refers to these platforms as “social trading networks” (Oehler et al., 2016; Doering et al., 2015). The primary feature of these networks is the possibility of an automated execution of user-generated investment ideas: users can subscribe to the recommendations provided by other users (henceforth “signal providers” or simply “managers”), which are then automatically copied into their brokerage account without further confirmation. Signal providers receive a network-specific fee for their service. Thus, subscribing to another user implies a delegation of investment decisions, constituting an agency relationship similar to those between investors and “traditional” asset managers (see Doering et al., 2015).

One of the major platforms in Europe is wikifolio. Wikifolio offers a widely accessible solution in that it follows a securitization approach. After the successful completion of an evaluation period, the trading
activities of a user are mirrored to an exchange-traded product, so-called “wikifolios”. Wikifolios are open-ended index certificates tradable on the Stuttgart Stock Exchange (EUVAX), the leading trading place for certified derivatives in Europe. As of September 15, 2016, EUWAX counts 5,057 wikifolio certificates, with assets under management summing to approximately 160 million Euros. Investors can trade any wikifolio certificate through a common brokerage account. Wikifolio managers can access all common types of derivatives and short exposures, allowing for dynamic investment strategies beyond a simple buy and hold. For providing their service, they receive a performance fee tied to a high-water mark, providing an incentive setting comparable to hedge funds. However, unlike hedge funds, wikifolio offers in-depth track records for all of its signal providers, allowing other users to analyze their performance up to a single transaction level and in real time.

Using a comprehensive sample provided by wikifolio, covering approximately 14,500 wikifolios and summing to approximately 3.5 million trades in total, we will be the first to study the dynamic risk-taking behavior of signal providers in social trading networks. Our sample covers single transaction data, daily fund flows, portfolio holdings and capital invested, the current high-water mark, and several qualitative information such as age and traded instruments.

We will first analyze the dynamic risk-taking behavior of signal providers, i.e. examine whether below-median returns or being below their high-water mark motivates wikifolio managers to subsequently increase portfolio risk. Our sample allows us to be the first to explicitly distinguish between intended and unintended risk-shifting in a hedge funds-like incentive setting. For mutual funds, several papers documented that the evidence on tournament behavior is largely due to a sorting bias (Karoui and Meier, 2015; Schwarz, 2012; Cullen et al., 2012). When intended risk-shifting is separated from the overall change in portfolio risk, evidence for tournament behavior among mutual funds is at best mixed. For hedge funds, however, such a distinction is not possible due to the lack of publicly available portfolio holding data.

Second, if an intended risk-shifting linked to performance can indeed be observed, we will re-examine a few previously researched questions on how risk-shifting interacts with other incentives, such as managerial stake or reputational concerns. Besides the relevance of managerial stake, two questions of particular interest are (i) whether, due to differing reputational concerns, there is a difference in risk-shifting among institutionally and privately managed wikifolios, and (ii) if there is a difference in the risk-shifting behavior between managers that employ derivatives and short exposures and those that do not.

Third, and closely related to (ii), we will use the depth of our sample to study precisely how risk-shifting is put into to practice. Do wikifolio managers rather increase leverage or put a higher weight on assets with an inherently higher risk? How does underperformance affect derivative usage and trading frequency? The notion is that poorly performing managers do not simply shift risk in a purely mechanical way, but rather come under pressure in a more general sense (“shaky hands”).
Our overall contribution will be twofold. First, our results provide insights regarding the risks associated with investing via social trading networks, and are thus of interest for both investors and regulators. Second, we contribute to the more general literature on tournament behavior among portfolio managers. Though we are aware that our results do not have immediate implications for the corporate governance of traditional asset managers, it should be noted that our results are based on an incentive setting quite comparable to hedge funds.

The remainder of this research proposal is organized as follows. Section 1 provides a brief review of the literature on tournament behavior among asset managers. Section 2 describes our sample and the methodology we plan to employ.

1. Review of Literature on Tournament Behavior

Our paper is related to the vast literature that examines the impact of past performance and managerial incentives on the risk-taking of portfolio managers. The common notion is that portfolio managers may have an incentive to make investment decisions that solely intend to increase portfolio risk. Such a risk-shifting behavior may contradict the interest of investors. Brown et al. (1996) were among the first to argue that fund managers might be especially concerned about their performance relative to their peer-group, implying a “tournament behavior”: managers of relatively poor performing funds tend to increase risk to catch up with other funds again. This risk-shifting may however be mitigated by providing the “right” incentives.

A substantial part of the empirical literature on risk-shifting is concerned with mutual funds. By regulation, mutual funds are prohibited to impose convex performance fees, i.e. fees that reward a positive performance, but do not penalize the fund manager on the downside. Instead, mutual funds typically charge a management fee proportional to the assets under management. It is however well-documented that fund flows are typically more sensitive towards a good than a bad past performance. Thus, a convex fee structure can implicitly arise from this disproportion in fund in- and outflows, providing poorly performing mutual fund managers the incentive to increase portfolio risk (see e.g. Chevalier and Ellison, 1997; Sirri and Tufano, 1998).

More recent papers challenge the hypothesis that mutual fund managers are prone to a tournament behavior. Schwarz (2012) shows that previous evidence on tournament behavior is due to a sorting bias, as sorting on mid-year returns also mean sorting on mid-year risk. Thus, even without risk-shifting, mean-reversion in risk leads to a detection of tournament behavior. Using portfolio holdings to isolate the intended part of the change in portfolio variance, Schwarz (2012) still finds significant, but substantially weaker evidence on tournament behavior among mutual fund managers. Karoui and Meier (2015) and Cullen et al. (2012) follow a similar holdings-based approach, but find no evidence for tournament behavior after correcting for the sorting bias anymore.
In contrast to mutual funds, hedge funds typically explicitly charge a convex performance fee, implying that a risk-shifting incentive directly follows from the fee structure. A characteristic feature for hedge funds is the imposition of a “high-water mark” (HWM hereafter) that makes the performance fee only applying to net profits, i.e. contingent upon recovering previous losses. The rapid growth of assets managed by hedge funds over the last two decades led to an increasing research on the relation between risk-taking, fee structure and other managerial incentives provided to hedge fund managers. Hodder and Jackwerth (2007) show analytically that in some situations, hedge funds managers are prone to an excessive risk-taking. This is especially the case when the fund is below its HWM and the manager has a short horizon, for example due to retirement plans. They also find that risk-taking may be moderated if the manager has a personal capital stake in his fund, effectively exposing him to some downside risk. In a more recent paper, Panageas and Westerfield (2009) show that if, however, the horizon is long enough, excessive risk-taking is even mitigated for risk-neutral managers. The notion is that a HWM contract provides the manager with a sequence of call options: gambling to exceed the HWM during the current period, i.e. to get into the money, comes at the risk of starting even further out of the money in upcoming periods.

Empirical research on risk-shifting among hedge funds is concerned with both types of convex incentives, fund flows and performance fees. Thus, the literature analyzes the interaction of risk-shifting with both relative mid-year performance and absolute mid-year performance (distance to HWM). In a seminal paper, Brown et al. (2001), using variance ratio tests, were the first to document that a tournament behavior can also be observed among hedge funds. However, they find no evidence that risk-taking is associated with the distance to the HWM. Clare and Motson (2009) also report tournament behavior, and in contrast to Brown et al. (2001) find that the moneyness of the incentive fee does play a role in risk-taking. They show that while managers whose incentive option is well in the money tend to decrease risk in order to “lock in” the performance fee, managers that are below their HWM do not “put it all on black” to end up in the money. Aragon and Nanda (2012) use a regression framework to analyze whether risk-shifting is related to the manager’s incentive contract, personal stake, and the risk of fund closure. In their sample, only 65% of all hedge funds utilize HWMs, providing a control group for analyzing how a HWM affects risk-shifting in contrast to incentive fees without HWM. They find that managers whose incentive pay is tied to a HWM indeed are less prone to increase risk following poor performance. Additionally, such a behavior is less likely for managers with a personal capital stake in the fund, and more common among managers whose funds are likely to be liquidated, implying a limited downside of gambling for resurrection. More recently, Jiang et al. (2016) use a sample of commodity-trading advisors to show that the tendency to increase risk following bad performance is higher during times of market stress, when mortality rates shoot up and survivorship concerns dominate. Besides, they show that risk-shifting is less prevalent for funds employing algorithmic instead of discretionary strategies.

---

\(^1\) Previous research simply assumed that every hedge fund in the sample imposed a high-water mark.
However, unlike research on risk-shifting among mutual fund managers, none of the papers concerned with hedge funds explicitly controls for intended versus unintended risk shifting in line with Schwarz (2012). The reason is that the required portfolio holding data is not disclosed by hedge funds.\footnote{Instead, to account for this, Aragon and Nanda (2012) and Jiang et al. (2016) simply include the lagged portfolio standard deviation as an approximation in their regression frameworks.}

While all of the aforementioned papers take an agency-theory perspective and assume that gaming explicit and implicit incentives induces risk-shifting, Borisov and Lueg (2016) recently demonstrated that behavioral economics may also provide a plausible explanation for tournament behavior. They simulate fund investment decisions in a setting without tournament incentives, and find that tournament behavior is still observable. The authors conclude that tournament behavior is the result of a manager’s internal conflict closely related to the disposition effect, rather than a conflict between the fund manager and investors. However, they admit that their study suffers from several shortcomings, especially a relatively small sample size, and suggest that further research has to be conducted on the behavioral explanation on tournament behavior.

Our paper contributes to the agency theory-based literature. We thus assume that if a tournament behavior is observable within social trading networks, then this is the result of signal providers gaming their incentives. We will however, as far as possible, use the in-depth information of our sample to validate this assumption.

2. Data and Methodology

2.1 Data

We were provided data on approximately 14,500 wikifolios, of which 5,057 are already investable, i.e. securitized to an open-ended index certificate and tradable on EUWAX. The remaining part is either dead or currently under evaluation to be investable soon. Our sample contains all single transactions ever executed within a wikifolio, daily cash holdings, wikifolio quotes, capital invested and fund flows, and the current HWM. The single transaction data contain the ISIN of the traded security, the quantity traded and the execution price. In contrast hedge funds, were individual HWMs are set up for each investor, the HWM of a wikifolio is the same to all investors, providing a clear-cut incentive for its manager. The fact that we always know the current HWM allows us to precisely study how the risk-taking behavior changes with the distance to the HWM. Previous papers examining risk-shifting among hedge funds needed to proxy the current HWM (Aragon and Nanda, 2012; Clare and Motson, 2009, to name a few).

Besides, we were provided several qualitative information on each wikifolio, such as the publication status, a flag highlighting whether the trader has a personal capital stake, and a flag marking if the
wikifolio also trades derivatives or committed to hold long-only, unlevered portfolios. Such a commitment has to be made before the wikifolio is issued and indeed permanently bans its manager from trading derivatives. While for these wikifolios the investment universe is indeed similar to the one faced by mutual funds, they are still not subjected to any allocation constraints. This is in contrast to mutual funds, who always have to act in compliance with the investment guidelines defined in their prospectus.

Overall, our sample is free of any biases especially present in the hedge fund samples employed in the literature. First, as we are provided both active and dead wikifolios, there is no survivorship bias. Second, a wikifolios trading activities, whether already investable or not, are tracked from the first day on. Thus, our sample is unaffected from any kind of backfilling bias. This is important, since it is documented that risk-shifting among hedge funds is especially prevalent for periods that are known to contain backfilled data (Aragon and Nanda, 2012). Third, as wikifolios can only trade highly liquid instruments, our sample does not suffer from the return smoothing typically present in hedge fund returns.

2.3 Methodology

The literature provides two major approaches for analyzing tournament behavior. In either case, the relevant measure is a risk-adjustment-ratio (RAR), typically defined as the difference or quotient of the return standard deviation before and after a specific assessment date. It became a common practice to focus on the change in volatility from the first to the second half of the year. The baseline approach provided by Brown, Goetzmann, and Park (2001) utilizes variance ratio tests within a contingency table framework. Specifically, 2x2 contingency tables are constructed, where the sample of all funds is split into those with above-median and below-median RAR, conditioned upon past performance. The null hypothesis is that the percentages of funds falling into each of the high or low RAR categories are independent of past performance, either measured relative to a peer-group or in absolute terms as distance to the current HWM (Clare and Motson, 2009). Based on the constructed contingency table, a chi-squared test is performed.

However, as pointed out in the mutual fund literature, the above procedure is subject to a sorting bias (see Schwarz, 2012) and thus, the results commonly interpreted as “tournament behavior” are largely due to a mean-reversion of portfolio variance. To avoid our results being biased, we follow the approach provided by Karoui and Meier (2015) and first decompose the portfolio standard deviation into a buy-and-hold and a volatility gap. The buy-and-hold volatility is simply the projected portfolio volatility during the second half of the year, based on the holdings observable by the end of June. The volatility gap (VG) is then the difference between the realized portfolio volatility during the second half of the year minus the buy-and-hold volatility. The VG measures the actual risk-shifting, i.e. the intended share of the in- or decrease in portfolio risk.

We will then use the VG to first compute an intentional risk-adjustment ratio (IRAR). Based on this IRAR instead of the raw RAR, we will then construct two contingency tables as outlined above in order
to examine whether wikifolio managers actually shift risk following poor performance in either relative or absolute terms.

However, the contingency table approach is not appropriate to analyze how risk-shifting is related to performance and other incentives simultaneously. These other factors e.g. include managerial capital stake, fund flows, or fund age. Thus, we will to follow Aragon and Nanda (2012) and Jiang et al. (2016) and employ a regression framework of the following kind:

\[ \text{IRAR} = \alpha + \beta_1 \text{Perf} + \beta_2 \text{PC} \times \text{Perf} + \beta_3 \text{Size} \times \text{Perf} + \text{Control Variables} \]

where IRARs the intended risk-adjustment-ratio as outlined above, PC is a dummy equaling 1 if the signal provider has a personal capital stake in his wikifolio and 0 else, Size is the log of the assets under management at mid-year, and Perf measures the performance of the fund during the first half of the year. Following Aragon and Nanda (2012), we use both relative performance (to test for tournament behavior in a narrower sense) and absolute performance as measured by the mid-year distance to the HWM.

Control Variables accounts for other factors that might influence the measured change in risk (see Aragon and Nanda, 2012). First, it includes a variable Flow measuring the percentage net flow during the second half of the year (see Ferson and Warther, 1996). Second, we include \( \Delta \rho \), the change in the wikifolio’s return autocorrelation to account for mean-reversion that may be induced by mismeasurement (Aragon and Nanda, 2012; Busse, 2001).

In further regressions, we plan to modify the above specification in a plenty of ways in order to take advantage of the depth of our sample. Specifically, we aim to introduce further indicator variables to interact with Perf:

- **Inst**: 1 if the wikifolio is managed by an institutional asset manager and 0 else. The hypothesis is that “professional” wikifolios are less prone to risk-shifting, as they have stronger reputational concerns and are subject corporate governance codes, compared to wikifolios managed by individuals.
- **Derivatives**: 1 if the wikifolio is eligible to trade derivatives and 0 else. This will provide insights on whether there is a difference in the risk-shifting behavior between wikifolios that use derivatives and those committed to hold long-only, unlevered portfolios. The notion is that the former can shift risk more easily by simply de- or increasing leverage.
- **Wow**: 1 for a “wikifolio of wikifolios”, that – similar to a fund of funds – solely invests in other wikifolios, and 0 else. As these umbrella wikifolios face a smaller investment universe, risk-shifting may require a little more effort compared to individual wikifolios.
- **Investable**: Is there a difference among wikifolios that already passed the evaluation and are investable and those that did not yet?
Besides controlling for differences in the risk-shifting behavior among wikifolios, we will also analyze how an underperformance leads to a shift in investment behavior more generally, rather than focusing only on risk. The notion is that an underperformance does not simply translate into higher risk in an unemotional, rational manner, but rather puts pressure on portfolio managers in a more general sense (“shaky hands”). A possible approach would be to replace $\Delta Risk$, the dependent variable, with other variables that rather focus on the change in investing behavior. Possible variables include:

- $\Delta AvgPosSize$ or $\Delta Diversification$: Is a change in the average position size or in the diversification level, e.g. measured by the Herfindahl index, related to underperformance?
- $\Delta Frequency$: How does a change in the number of trades relates to previous performance?
- $\Delta DerivativeUsage$ and $\Delta LeverageEmployed$: Does underperformance explain an increasing usage of derivatives and/or leverage?
References


