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JEL Classification: G01, G11, G23, G32

Keywords: Hedge Funds, Disclosure, Secrecy, transparency, risk premia

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Does Secrecy Signal Skill? Characteristics and Performance of Secretive Hedge Funds

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March 29, 2020

Abstract

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> Hedge funds are investment pools that are relatively unconstrained in what they do. They are relatively unregulated (for now) ... and will generally not tell you what they do.
>
> Cliff Asness – Hedge fund manager and co-founder of AQR Capital Management

1. Introduction

Secrecy is the hallmark of the hedge fund industry. Owing to the Investment Company Act of 1940, hedge funds in the U.S. are exempt from many disclosure requirements under the rationale that the savvy and sophisticated clientele permitted to invest in hedge funds is well qualified to evaluate funds' governance and investment strategies without the interference of government regulation. The greater secrecy that is afforded hedge funds may allow them to pursue proprietary investment strategies with less concern that others might mimic and free ride on their strategies. However, hedge fund secrecy is not only limited to relief from mandatory disclosure from the public, but often extends to a reluctance of hedge fund managers to disclose information about the operations and performance of the fund even to their *own investors* (henceforth, "secrecy from the fund's investors"). This is the aspect of secrecy we explore in this paper.

The existing literature is unable to examine the differences in the characteristics and performance between hedge funds that are secretive from the fund's own investors and those hedge funds that are more transparent. This distinction is important because of the natural tension between secrecy and the ability of a hedge fund's investors to monitor the managers. In the absence of monitoring the hedge fund managers may deviate from strategies which are optimal for the investors resulting in worse return performance or greater exposure to risk. Through the use of a proprietary database from a fund of funds, that wishes to remain anonymous, in this paper we address previously unanswerable questions: What are the differences between the characteristics of funds that are secretive from the fund's own investors and their more transparent peers; and does secrecy from the fund's investors signal differences in hedge-fund performance and manager skill?

What we know from the empirical research about the differences between more secretive

and more transparent hedge funds and whether secrecy signals superior skill is largely limited to studies examining how hedge fund performance differs when hedge fund managers are able to delay regulated disclosure of their holdings. In particular, Aragon, Hertzel, and Shi (2013) and Agarwal, Jiang, Tang, and Yang (2013b) show that when hedge funds request "confidential treatment" from the Securities and Exchange Commission (SEC) to delay the disclosure of their holdings on Form 13F, those holdings and those funds are able to generate abnormal returns during those periods of secrecy *vis à vis* the public suggesting that such secrecy does signal superior managerial skill. Similarly, Shi (2017) finds evidence that mandated disclosure to the public reduces the performance of hedge funds.

The novelty of our paper is to instead explore secrecy from the fund's own investors, rather than secrecy from the public. This particular aspect of secrecy is of key importance to hedge fund investors and other practitioners (see Anson, 2002, Hedges, 2005, and Goltz and Schröder, 2010). Using a proprietary data base first used by Ang, Gorovyy, and van Inwegen (2011), we compare the characteristics and performance of hedge funds that are secretive from the fund's own investors to those that are more transparent. We find that secretive funds are larger, less liquid, and more complex; but it is the similarities that are perhaps more surprising than the differences. There are no appreciable differences between the concentration or leverage of secretive and more transparent funds, nor are there differences in the types of assets that the different funds invest in, at least for those that file Form 13F with the SEC. These secretive funds also appear to have no more exposure to tail risk or to the non-linear payoffs of market put- and call-return portfolios.

The question is then whether investors benefit from investing in secretive funds, e.g. does secrecy enable these funds to exploit proprietary strategies? Similar to prior research on secrecy *vis à vis* the public, we first focus on contemporaneous secrecy, and we find that while secretive funds perform similarly in the up market, they significantly underperform their more transparent strategy- and substrategy-matched peers in the down market. [1] Using measures of past secrecy, we also find that secrecy from the fund's own investors does not predict future outperformance. The performance of secretive and transparent funds is indistinguishable both economically and statistically. Together these findings are inconsistent with secrecy signalling superior skill.

Consistent with their more secretive nature, we find that secretive funds are more likely

[1] The prior literature on secrecy *vis à vis* the public does not typically examine whether secrecy predicts future performance and instead focuses on secrecy as a signal about managers making contemporaneously skillful selections.

to file a request for confidential treatment from such disclosure, though only 17% of the 123 secretive funds in our sample ever do. Funds that are secretive from the fund's own investors are nonetheless more likely to disclose hedge fund information to a public marketing database (Lipper TASS).

One may be concerned that our secrecy measure just represents noise, either in an unbiased or biased manner. If the noise is unbiased, then as with any non-directional-measurement-error argument, such noise would only work against the findings described above, making the results only stronger. Similarly, if the noise were biased, for example because secrecy captures the fund of fund's endogenous choice to engage in more stringent monitoring of bad funds (and hence more communication), then we would expect to see these "more transparent" funds under-performing during the crisis, and yet, as noted above, we find the opposite.

Evidence from flow-to-performance regressions strongly suggests that hedge-fund investors view the signals provided by past returns differently for secretive and transparent funds. Regressing fund flows on past performance, we find that flow-to-performance sensitivity is lower for secretive funds than for transparent ones in the up market. It may be that, as Brown, Goetzmann, Liang, and Schwarz (2008) argue, investors are less responsive to the past returns of funds they view as "problem funds" or, following a model by Huang, Wei, and Yan (2012), it may be that flow-to-performance sensitivity is lower when it is more difficult to make inferences from past returns. During the down market, the flow-to-performance sensitivity of transparent funds decreases to the same level as that of the more secretive funds, which stays constant. This is consistent with more transparent funds restricting outflows after the 2008 crash as well as with changes in the quality of the signal of skill that is sent by transparent funds.

This paper adds to three areas of the literature. First and foremost, this paper contributes to the empirical literature on hedge fund secrecy and disclosure. Our paper is unique in that it investigates own-investor secrecy, or secrecy *vis à vis* a hedge fund's own investors, and how own-investor secrecy translates to performance of the entire fund. We are able to examine this type of secrecy because of our proprietary data set obtained from a fund of funds, and first used in Ang et al. (2011). With these data we are able to directly measure the level of secrecy of a fund – a qualitative characteristic that is missing from public hedge fund databases. The level of secrecy describes the willingness of the hedge fund manager to disclose information about its positions, trades and immediate returns to its own investors. These data allow us to examine how secrecy from the fund's own investors relates to fund characteristics and hedge

fund performance. By contrast prior work, such as that of Aragon et al. (2013) and Agarwal et al. (2013b) examine secrecy *vis à vis* the public, by looking at the performance of stocks during the periods when fund managers have requested "confidential treatment" on SEC's 13F disclosure forms.[2] In contrast with the literature on secrecy *vis à vis* the public, we find no evidence that own-investor secrecy is associated with superior skill or performance.

Second, we contribute to the literature on disclosure and managerial incentive alignment. We examine whether hedge fund managers use their discretion over disclosure for the benefit of their clients. Prior research provides evidence that managers often use their discretion for the benefit of their investors. Agarwal, Daniel, and Naik (2009) find that hedge fund returns are higher when managers have more discretion as proxied by the length of lockup, notice and redemption periods. Using a contemporaneous measure of secrecy *vis à vis* the public, Aragon et al. (2013) and Agarwal et al. (2013b) provide evidence that managers use their discretion to delay the reporting of fund holdings to the U.S. Securities and Exchange Commission (SEC) for the benefit of their investors, generating higher abnormal returns during period when they keep their holdings secret. Shi (2017) finds evidence that newly mandated disclosure of hedge funds' holdings reduces the funds' performance. By contrast we find no evidence that hedge fund manager use own-investor secrecy to improve performance or otherwise benefit their clients.

Our findings differ for two reasons. First and most importantly, we are looking at a different aspect of secrecy – secrecy from the fund's own investors, and, as we show, this implies different performance rankings in the down market. Second, we use the crisis period to investigate differences in performance. We find that secretive funds significantly underperform transparent funds during the down market, through the Global Financial Crisis. This suggests that at least a part of the performance differential between secretive and transparent funds can be attributed to higher risk taking by secretive funds or possibly with various sorts of misbehavior. In this way our work makes its third contribution, by contributing to the literature on hedge fund performance measurement by emphasizing the value of measuring performance across up and down markets. As such, our work builds on Schmalz and Zhuk (2019) who find that downturns make it easier for investors to distinguish firms with high and low exposure to systematic risk.[3]

[2]Section 13F of the Securities Exchange Act of 1934 requires investment companies with more that $100 million in assets to report holdings on a quarterly basis. Managers may request to delay disclosure of the holdings for up to a year.

[3]Our paper is among the first to make this point for hedge funds performance measurement, although, other papers have made similar points regarding performance measurement for individual assets and mutual funds. See Schmalz and Zhuk, 2019, for a discussion of literature relating measuring performance across up and down markets.

While few papers in the asset pricing literature have raised the issue of secrecy from the fund's own investors, presumably due to the absence of adequate data to explore this question, some prior research has examined aspects of this important issue. Anson (2002) outlines different types of transparency and discusses why investors may want a higher degree of transparency; Hedges (2005) overviews the key issues of hedge fund investment from a practitioner's perspective; Goltz and Schröder (2010) survey hedge fund managers and investors on their reporting practices and find that the quality of hedge fund reporting is considered to be an important investment criterion. Relatedly, Aggarwal and Jorion (2012) study the effects of hedge funds' decisions whether to provide or not to provide managed accounts for their investors. They interpret the incidence of accepting managed accounts as an indicator of the willingness of the fund to offer transparency. In contrast, we are able to directly measure the level of own-investor secrecy (and transparency) of a fund by using proprietary scores from a fund of fund that are based on formal and informal interactions with hedge funds, such as internal reports, meetings with managers and phone calls. Our findings are arguably important for hedge fund investors as they indicate that greater hedge fund secrecy is not a signal of superior managerial skill and hedge fund performance.

There are some limits to this analysis. First, it would be reasonable to expect that the fund of funds providing these data may have selected funds based on past performance and the expectation of future performance. However, Ang et al. (2011), who have used the same data in their study of hedge fund leverage, provide evidence that these data are representative of the broad population of hedge funds. Furthermore, the fund of funds keeps the funds in the database for some time after the disinvestment, further mitigating such concerns. Finally, even if one would expect our sample to be biased in favor of better performing funds, we see no obvious reason that this would bias the measurement of the differences in performance across funds.

Second, given that this fund of funds is an expert investor with the wherewithal to implement any strategies gleaned from the hedge funds they invest in, we would expect that hedge funds with outperforming strategies would have a particular strong incentive to keep such profitable strategies secret from this savvy investor.[4] As such, it would be unsurprising to find evidence

[4]In a theoretical model Glode and Green (2011) examine the relation between secrecy and performance in a model in which secrecy from competing hedge funds endogenously arises as a function of decreasing returns to scale of the strategies hedge fund managers execute. However, their model does not apply to our empirical environment because in Glode and Green (2011) there is no information asymmetry between hedge fund managers and their investors.

that secretive funds outperform their less secretive peers. In this paper, however, we find the opposite: Secretive hedge funds underperform. Given that such a bias most likely works against our findings, it makes the result only more notable.

As already mentioned, our paper is closely related to Agarwal et al. (2013b) and Aragon et al. (2013), which examine contemporaneous secrecy *vis à vis* the public, through the use of "confidential treatment" requests, which permit 13F filers to delay the disclosure to the public of some or all of their holdings. Using data up to 2007, they find that those holdings for which hedge fund managers request confidential treatment outperform on a risk-adjusted basis (e.g. using the Carhart, 1997, four-factor alpha). They interpret this finding as evidence of greater stock-picking skill among hedge funds requesting confidential treatment. Our paper compliments this earlier work by examining secrecy *vis à vis* the funds' own investors. In addition, we are able to make additional inferences about the nature of risk secretive and transparent funds take as a result of the period our data set covers. We do this by separately examining performance during an up market and a down market in our sample. This enables us to infer the presence of risk premia with respect to potentially unmeasured factors, which would not be distinguishable from skill during good times.

Our paper is also close in spirit to Brown, Goetzmann, Liang, and Schwarz (2009) who use SEC filing data to construct a so called ω-score, which is a combined measure of conflict of interests, concentrated ownership, and leverage, and show that it is a significant predictor of the projected fund life. In a subsequent paper, Brown, Goetzmann, Liang, and Schwarz (2012) use proprietary due diligence data to construct an operational risk variable as a linear combination of variables that correspond to mistakes in statements, internalized pricing, and presence of an auditor in the Big 4 group. We consider operational risk in a broader sense, where the willingness of hedge fund managers to provide details of their strategies, as well as hedge fund liquidity, investment concentration, and the ability of the investors to understand fund's operations are important.

Our paper is organized as follows: Section 2 describes the data; Section 3 examines the difference in fund characteristics between secretive and transparent funds; Section 4 discusses differences in performance between secretive and transparent funds, the ability of secrecy to predict future fund performance, and, finally, the differences in flow-to-performance sensitivity; and Section 5 concludes.

2. Data Description

The data in this study come from four sources. First and most importantly, we use a unique self-reporting-bias-free data set obtained from a fund of funds, which was first used in Ang, Gorovyy, and van Inwegen (2011). This fund of funds is one of the largest in the U.S., but the fund management asks that we do not disclose the identity of the fund. The data set is an unbalanced monthly panel that contains detailed information for 192 unique funds and fund families, henceforth "hedge funds", including funds that cease due to poor performance. These funds are spread across five broad hedge-fund strategies over the 36-month period from April of 2006 to March of 2009. Though the sample is small, this sample size compares favorably to other hedge-fund studies. For example, Aragon et al. (2013) have 250 funds in their study and 32 quarters of fund data, while Aiken, Clifford, and Ellis (2013) have a 24-quarter sample period, with 1445 funds. Furthermore, the short sample reduces the likelihood that funds significantly deviate from their stated strategies during the sample period. However, even if they do, this is precisely the type of change we hope to capture with our secrecy measure.

Second, while the fund of funds tracked hedge fund returns both prior to their investment in the hedge fund and continued to track returns following disinvestment, we also use Lipper TASS hedge fund data from Refinitiv, formerly Thomson Reuters, to supplement the few instances of hedge fund returns missing from the sample provided by the fund of funds. Third, we use Form 13F holdings data available through the U.S. Security and Exchange Commission's (SEC) Edgar website, to obtain holdings information for the 143 funds in our sample that are required to file Form 13F at some point during our sample and to gather information on so called "confidential treatment" requests and other evidence of funds seeking to withhold information from their public Form-13F disclosures about their investments. Fourth, we use data from CRSP to verify the accuracy of the 13F-based holdings valuation data and the asset classifications where possible, as well as to calculate the returns to the long equity holdings of stock reported on Form 13F.

The data from the fund of funds provide information on hedge fund returns net of fees, assets under management, long and short exposure, and the principal strategy of the fund. Crucially, these data include a novel score for hedge fund secrecy unavailable to previous researchers, in addition to qualitative measures of illiquidity, concentration, complexity, and leverage. To be included in our sample, funds must have both returns and the secrecy score.[5]

[5]For ease of exposition through the remainder of the paper, we will use the terms secrecy and secretive to refer

The definitions of secrecy, illiquidity, concentration, and complexity as used by the fund of funds are natural and intuitive. Hedge fund secrecy represents the lack of willingness of the hedge fund manager to share information about the fund's current activities and investments with its investors. Specifically, in March of each year the fund of funds grades all the hedge funds it invests in based on the information that funds provide during the interactions with it over the previous twelve months. These interactions can take form of weekly or monthly reports to the fund of funds, meetings with managers, phone calls, etc. Funds are originally graded on a scale from 1 to 4. A score of 1 means that the funds are the most willing to reveal information, for example to provide their return instantaneously upon a call when a certain market event happens. While those that are most unrevealing, receive a 4.[6]

We convert the secrecy measure to a zero-one dummy, setting it to zero for the most transparent funds (those with a score of one on the four-point scale). We set the dummy to one for the remaining more secretive funds. We convert this four-valued indicator to a dichotomous dummy variable for three reasons. First, exceptionally few hedge funds received the most secretive score of four, so we merge it with the score of three to increase power. Second, having a dummy variable, rather than a three-valued indicator, greatly simplifies our discussion of the findings (especially in the multiple-interactions specifications). Finally, the differences among the more secretive groups of two and three are statistically indistinguishable at 5% level in all specifications in our main results in Table 3, meaning that no important information is in fact lost. For all these reasons, we opted to contrast the most transparent funds with the remaining (which we will call "secretive"). Our main findings are nevertheless qualitatively similar when we use the three-valued indicator and compare the most transparent funds to the medium and high secrecy funds separately (please see the Internet Appendix for replications of Tables 2 and 3 with the three-valued indicator).

This measure of private interactions is not available in any other databases and is distinct from measures of hedge fund secrecy used in prior studies (cited above). While measures of secrecy used in prior studies focus on withholding information from *the public*, in the form of delaying or avoiding mandated disclosure, the secrecy measure that we use captures how forthcoming fund management is with one of its *own investors*. To the best of our knowledge,

to the secrecy of a hedge fund from the fund's own investors, except when we are discussing both secrecy *vis à vis* the public and secrecy *vis à vis* the fund's own investors.

[6]Interestingly, this numbering from most transparent (1) to most secretive (4) reflects the fact that the fund of funds views secrecy as a "negative" characteristic of a fund, and this numbering similarly applies to its view of illiquidity, leverage, complexity and concentration.

there is no prior research which has explored this aspect of secrecy – the secrecy of a hedge fund manager *vis à vis* the fund's own investors.

The other qualitative characteristics are measured in a similar 1-to-4 manner, which we also convert into dummy variables for ease of interpretation. Hedge fund illiquidity measures the illiquidity of investments in the hedge fund from the point of view of investors. It comprises of both the illiquidity of the fund's assets and restrictions on investment withdrawal, such as the presence and the length of lockup periods. Hedge fund concentration represents how little diversification there is within the hedge fund holdings. Hedge fund complexity corresponds to the complexity of hedge fund strategy and its operations. For example, a hedge fund that uses derivative instruments and swap agreements is considered to be complex, since it is harder for investors to understand exactly the kinds of exposures they face by investing with such a fund, while a fund that simply goes long European equity is considered less complex. Finally, hedge fund leverage combines leverage due to margin trades, typically provided by a prime broker, and leverage that results from derivative contracts, i.e. calls, puts, futures and swaps, similar to Ang et al., 2011.

The hedge fund developed these scores as part of their due diligence efforts and were not intended for public distribution, which minimizes concerns that the fund-of-funds manager would have an incentive to bias these measures in one way or another. Due to the nature of the scoring process and the significant level of effort put into the construction of the scores, we feel confident that they represent unique information about funds' operations that cannot be captured by the quantitative data alone. Such qualitative measures are not present in public hedge fund databases, such as CISDM, HFR, or TASS. Therefore, we think our data are especially well-suited for studying the characteristics and performance associated with hedge fund secrecy.

One may be concerned that our measure merely captures the number of meetings the fund of funds has with the hedge fund managers, rather then their quality, and, as such, transparent funds may not truly be better in any sense. If this were true, we would expect transparent funds to underperform during the crisis period of 2008-09; however, what we find is the opposite, and, as such, it only emphasises the significance of our results. Similarly, one might argue that what we are capturing is the fund of fund's endogenously chosen higher monitoring of bad funds (and hence more communication), so that these lower quality funds would be measured as more transparent. If this were the case, however, we would expect to see these funds underperforming during the crisis, and yet we find the opposite. Finally, we should note that, on top of these

directional biases, any non-directional-measurement-error concern, which might argue that our secrecy score represents noise, would only work against us, making our results even stronger.

Since our qualitative grades are assigned at the end of March, we use yearly periods starting every April. For example, the monthly returns of a fund from April 2006 to March 2007 are matched to secrecy, illiquidity, concentration, and complexity grades that the fund of funds issued at the end of March 2007. Although primarily emerging as a result of the grading month, this April to March time frame also corresponds nicely to three distinct periods, that allow us to distinguish performance relative to unmeasured risks that manifest during an extreme market downturn, the Global Financial Crisis.

The data from the fund of funds contains funds that may be managed by the same manager and may follow the same strategy. In order to avoid inflating our test statistics, we conduct our analysis at the level of fund families, where each "family" corresponds to a number of funds (usually 2 or 3) that are characterized by the same returns in all periods, same strategy, and same long and short exposures. Essentially, these are different copies of the same fund having the same portfolio, but targeted at different investors: e.g. onshore vs. offshore funds, funds denominated in different currencies, and additional fund copies potentially created after the maximum number of partners has been achieved.[7]

Importantly, all funds in our database report their returns (i.e. there is no selective disclosure of returns). In addition, those that terminate due to poor performance are also covered in the data. Ang et al. (2011) describe the hedge fund selection criteria and note that the criteria are not likely to introduce selection bias. In addition, they note that these hedge fund data include both funds that are listed in the common hedge funds data sets, such as TASS, CISDM, and Barclay Hedge, and funds that are not. This mitigates concerns about selection bias associated with voluntary performance disclosure (see Agarwal, Fos, and Jiang, 2013a, and Aiken et al., 2013, among others). Furthermore, survivorship bias is mitigated by the fact that hedge funds enter the database several months prior to the fund of fund's investment and the hedge funds exit the database several months after disinvestment. Therefore, we are confident that our data set is broadly representative of the hedge fund industry and suffers from less bias than is typical.

Panel A of Table 1 reports summary statistics: the mean, median, standard deviation, and

[7]This approach is very similar to conducting the analysis at the fund level, but properly accounting for perfect correlation within each fund family in a given month (e.g. by clustering errors) to avoid artificial significance of the results. We decided to conduct analyses at the family level instead, because we are also interested at looking at assets under management that, given the same fund manager and strategy, are ultimately a fund family characteristic.

the number of observations for hedge fund monthly returns, the natural log of assets under management (lnAUM), and each variable that is included as an independent variable in subsequent regressions. The average of the natural log of fund size in sample is 20.56, which translates to $849 million. This is somewhat larger, than funds in CISDM, HFR, or TASS databases, because we aggregate total assets under management across funds in the same family (corresponding to the same managed portfolio). Ang et al. (2011) use the same data to explore hedge fund leverage. They note that the composition of funds by strategy is similar to the overall weighting (as reported by TASS and Barclays Hedge), and the aggregate performance of the fund of funds is similar to that of the main hedge fund indexes.

Panel B of Table 1 reports pairwise correlations between all of our qualitative scores (using one observation per fund-year), secrecy, illiquidity, leverage, complexity, and concentration. We observe that more secretive funds are also more illiquid, with this correlation statistically significant at 1% level. More secretive funds are also slightly more complex on average, while more illiquid funds are also more concentrated. More leveraged funds are more complex and more concentrated. These relations between our qualitative scores are quite expected and give even more credibility to our measures of secrecy, illiquidity, concentration, complexity, and leverage. In our empirical estimation we will account for these within-fund correlations accordingly.

Hedge funds in our data set represent a broad set of strategies, with each fund being identified by a single strategy. This characteristic is time-invariant for a given hedge fund (at least during the periods considered), which is not surprising given that funds are created in order to pursue a particular strategy and investors expect the fund to follow it continuously over time. There are credit, event-driven, equity, relative-value, and tactical-trading hedge funds. Credit hedge funds trade mostly corporate bonds and CDS on those bonds. Event-driven hedge funds seek to predict market moves based on specific news announcements. Equity hedge funds trade equities (e.g. having high/low net exposure to sectors and regions). Relative-value hedge funds seek pair trades where one asset is believed to outperform another asset independent of macro events (e.g. capital-structure or convertible-bond arbitrage). Finally, tactical trading funds seek to establish favorable tactical positions using various combinations of the above strategies. These five strategies are further divided into 37 substrategies, such as "Equity: High Net Exposure - Sector (Real Estate)", which are not tabulated.

As we see in Panel C of Table 1, just over half (3022) of the fund-month observations in the database are from the 102 equity funds in our sample. Relative value and event driven as the next

most common strategies with 979 and 816 fund-months representing 33 and 26 funds respectively. This distribution of strategies across funds is comparable to other databases, as reported, for example, by Bali, Brown, and Caglayan (2011) for TASS. Important for later empirical tests in which we include strategy-month fixed effects, we have both high- and low-secretive funds in each strategy (this is also true for up-market and down-market periods separately). This means that we can identify differences in performance across these two groups of funds within each (sub)strategy, and do not simply rely on some fund (sub)strategies performing differently in various periods and accidentally being intrinsically different in terms of their secrecy. Having explained the data we use, we now continue to our central questions.

3. Characteristics of Secrecy

In this section we examine the first main question of our paper: what are the characteristics of secretive hedge funds that differentiate them from their more transparent peers? In summary, we find that secretive funds are larger and, as a result, more likely to file form 13F with the SEC and are also more likely to file a request for confidential treatment from such disclosure. Surprisingly, despite their reluctance to disclose information to their own investors, secretive funds are more likely to voluntarily disclose information to a public marketing database (Lipper TASS). Secretive funds are also less liquid and more complex than their more transparent peers. There are no appreciable differences in performance or exposure to tail risk measures.

3.1. Differences in Liquidity, Flows, Portfolio Composition, Leverage, Risk and Raw Returns by Secrecy

In this subsection we examine differences between secretive and transparent funds along several characteristics that may be related to the need for secrecy. We examine 5 broad categories of fund characteristics: 1) Size and liquidity-related; 2) Portfolio composition; 3) Risk; 4) Disclosure; 5) and Full-sample performance. We sort funds by the contemporaneous level of secrecy consistent with the literature on secrecy *vis à vis* the public that examines hedge fund performance during periods of heightened secrecy. This means that if secrecy is measured in March of 2007 (2009), we use data from April 2006 through March of 2007 (April 2008 through March of 2009) for flow-type measures (returns, correlations and flows) and data for March 2007 (2009) for the remaining measures. We consider simple differences, as well as those corrected for strategy and

substrategy fixed effects. These latter two are equivalent to matching funds by (sub)strategy, so that the differences that we find (or not) are not the result of the differences in the characteristics associated with certain (sub)strategies, but rather from the differences between secretive and transparent funds within a (sub)strategy.

In Table 2 we find that compared to transparent funds, secretive funds are larger but less liquid. The 0.77 difference in the log of size translates to a difference of roughly $600 million. These differences survive the inclusion of (sub)strategy-month fixed effects. Transparent funds have much larger in-flows over the sample, but this difference is not statistically significant.

Differences in portfolio composition are minor, including concentration of the portfolio and the fraction of long holdings that are equity, debt, preferred stock, calls and puts.[8] The only notable difference in the composition of the portfolios is that secretive funds follow more complex strategies than transparent funds.

We examine the difference between secretive and transparent funds for several measures of leverage, both qualitative (Leverage) and quantitative (Gross Leverage, Net Leverage, Percent Long, and Percent Short), and do not find any differences. Further, we correlate fund returns from April of 2006 through March of 2008 with measures related to tail risk, the Agarwal and Naik (2004) and Agarwal et al. (2017) tail risk measure, as well as measures of returns to out-of-the-money call and put returns. We use only the period prior to the down market because many asset returns increase in correlation in down markets. Again, we find no economically or statistically significant difference.

Secretive funds are more likely than transparent funds to report holdings through 13F filings with the SEC, consistent with the fact that transparent funds are smaller, because only funds that have investment discretion over more than $100 million in assets are required to file. Notably, the vast majority of secretive funds, never request confidential treatment of their SEC holdings filings, which permits them to delay the disclosure of specific holdings. This is somewhat surprising if secrecy is important to maintaining performance, but it is consistent with the frequency of confidential treatment requests in Aragon et al. (2013), which has a sample of 250 hedge funds in which confidential treatment requests were filed for 169 of 5,051 13F filings.

Besides 13F filings, we also examine whether our funds decided to voluntarily report their information to one of several commercially available hedge fund data sets, Lipper TASS. Secretive funds are somewhat more likely to report information publicly to Lipper TASS, but the

[8]The percentage of holdings attributed to calls and puts is overstated, because the SEC requires that funds report the value of the underlying of the option, not the value of the option.

differences are insignificant.

Finally, as a prelude to further analysis of fund performance we examine the average full-sample return to secretive and transparent and find that, while there are no differences in the returns to the long equity positions reported in 13F filings, looking at actual reported returns, secretive funds over this sample performed worse than transparent funds on average. However, once we control for (sub)strategy-month fixed effects these differences go away, emphasizing the importance of including these controls in later results.

4. Does Secrecy Signal Skill

In this section we examine the second main question of our paper: does secrecy signal skill? More precisely, do secretive hedge funds outperform their more transparent peers? We know from prior research discussed earlier, Aragon et al. (2013) and Agarwal et al. (2013b), that hedge fund managers, who are secretive *vis à vis* the public appear to be skilfull because they are able to generate abnormal returns on the stocks they hold during periods when the fund is withholding information from public disclosure, consistent with secrecy from the public signalling managerial skill. Our paper is the first that is able to examine the question of whether secretive hedge fund managers, those who are reluctant to disclose information to their *own* investors, use this secrecy to generate superior performance and whether this type of secrecy signals greater skill than their more transparent peers. The distinction between secrecy *vis à vis* the public verses own investors is important because secrecy *vis à vis* the public can be motivated by managers' fear of outside competition capturing their profits from costly information acquisition. If similar reasons motivate managers to be secretive *vis à vis* their own investors, we would expect such managers to outperform. In this section we examine whether the returns these secretive hedge fund managers earn suggest superior knowledge or skill and the evidence shows that they do not.

We can think of this question of whether secrecy influences performance as having at least two aspects. First, do secretive funds provide a better or worse risk-return trade off than their transparent peers and, second, is secrecy necessary for the funds to generate superior returns? A particular concern may be whether hedge fund managers are using secrecy to load on risks, instead of generating alpha. In the following subsections we address each of these questions.

We find that more secretive funds perform insignificantly better in the up market and sig-

nificantly worse in the down market in our sample. This result provides answers to each of our two questions. First, secretive funds provide a worse risk-return trade off compared to their (sub)strategy-matched peers. Second, we also find that transparent funds perform at least as well as or better than their secretive strategy-matched peers, suggesting that secrecy is not necessary for generating higher returns (although, we cannot preclude the possibility that the secretive funds would have performed even worse without higher levels of secrecy *vis à vis* their own investors). Furthermore, past hedge fund secrecy does not predict differences in performance, further solidifying this conclusion. Our finding is also consistent with secretive funds loading on unmeasured risks.[9]

We also show that secrecy from the funds' investors is distinct from secrecy *vis à vis* the public in the form of 13F disclosure. Consistent with Aragon et al. (2013) and Agarwal et al. (2013b), we find some evidence that funds requesting confidential treatment outperform their otherwise secretive peers during the down market.

Finally, we examine how investors view secrecy in flow-to-performance regressions we provide evidence that investors in more secretive funds are less sensitive to past performance until the 2008 crisis hits, which is consistent with investors receiving a less clear signal from the returns of secretive funds than from their more transparent peers in good times, similar to a theoretical model by Huang, Wei, and Yan (2012), in which flow-to-performance sensitivity is lower when it is more difficult to make inferences from past returns.

4.1. Do Secretive Funds Outperform Transparent?

4.1.1. Do Secretive Funds Earn Higher Profits?

We begin addressing this question, by examining the time-series performance of secretive and transparent funds visually. Though the return data in these graphs are not adjusted for factor-related returns, they can still suggest whether differences in performance are due to skill or risk. This is because our sample includes an up-market period and a down-market period, so, as long as we can assume that the factor loadings of high and low secrecy funds are stable across periods then differences in the relative performance of funds across periods can suggest whether the differences are due to skill or risk (see a similar argument for stocks in Schmalz

[9]One might suspect that this poor performance is the result of hedge funds, which engage in fraud, "taking a bath" during the down-market period. In unreported tests, we use three indicators of potential fraudulent behavior proposed by Bollen and Pool (2012) (specifically, *Indexrsq*, *kink*, and *Maxrsq*, as Bollen and Pool (2012) find these measures are the strongest predictors of potential fraud) to examine whether these three indicators are more often triggered for secretive funds. Excepted for the *kink* measure, they are not.

and Zhuk, 2019 and Kuzmina, 2020). To see this consider if the returns to secretive funds are higher in the up-market period than returns to transparent funds. The high returns could be either due to the asset-picking skill of the secretive hedge fund manager or it could be due to the secretive hedge fund manager loading on additional risks that earn compensation in the form of positive returns, akin to high-beta strategies. However, if returns to secretive funds are lower than returns to transparent funds in the down-market, i.e. the crash period, this could happen for one of two reasons: either secretive hedge fund managers pick portfolios that load on risks that materialize in the crash period, or secretive hedge fund managers have perverse timing ability to shift their portfolios to negative-alpha or positive beta assets just before the market crashes. On the other hand, if secretive funds perform better than transparent funds in both the up and down market, while it does not preclude different risk exposures, it does suggest that the managers of secretive funds have skill, either better ability to pick positive alpha assets or better market timing skills. Our evidence suggests that secretive fund managers do not have superior asset selection or timing skills.

Figure 1 plots the equally weighted hedge fund returns in excess of the risk-free rate grouped by the secrecy score the fund received at the end of each April-to-March year. We refer to this as contemporaneous secrecy, because the secrecy score is based on interactions during the year the returns are earned. The dark grey (blue) solid line presents the equally weighted average excess returns to transparent funds. The light grey (red) dashed line is the equally weighted average excess returns to secretive funds. We see that excess returns to secretive funds are slightly higher than the excess returns to more transparent funds during the rising market of April 2006 through March of 2007 and nearly identical in the following year. By contrast around the 2008 crash, transparent funds perform noticeably better than secretive funds. Transparent funds yield excess returns in September and October of 2008 of -5.5% and -2.2% respectively; secretive funds over the same two months did much worse, -6.5% and -6.7%. As noted above, this finding is consistent with the more secretive hedge funds loading on risk more so than transparent funds and is one of the main messages of this paper.

To quantify the magnitude of these differences in performance and examine their statistical significance, we use a regression framework and present the results in Table 3. We run the regressions separately for the year ending in March 2007 from the regressions for the year ending in March 2009 because, as noted above, by comparing the difference between secretive and transparent funds in an up market (April 2006 to March 2007) to the same difference in a

down market (April 2008 to March 2009), we may be able to uncover evidence as to whether the difference in returns is due to skill or risk taking. For brevity we exclude the year from April 2007 to March 2008, but the results are available from the authors on request. Separating the up-market analyses from the down-market analyses also conveys a conceptual advantage. Recall that when one runs a regression, an implicit assumption is that that all observations are equally likely. In this sample, this would be akin to assuming the major market crashes occur one-third of the time, something not born out by history. By separating these time periods, the estimates are conditional on whether it is an up market or a down market.

We estimate the following empirical specification separately for the up-market sample, 2006-2007, and the down-market sample, 2008-2009:

$$Return_{i,t} = c + a^H Secrecy_{i,FY} + d_{s,t} + \delta X'_{i,t} + \varepsilon_{i,t} \tag{1}$$

where $Return_{i,t}$ is the excess return of fund i in month t. $Secrecy_{i,FY}$ is the dummy for secretive funds in the April to March fiscal year FY. Specifications 2-3 and 5-6 in Table 3 include strategy-month or substrategy-month fixed effects, $d_{s,t}$, where s denotes the strategy or substrategy pursued by fund i. These strategy-month and substrategy-month fixed effects are the econometric equivalent of strategy or substrategy matching hedge funds before running the regressions. In doing so, we effectively control for macroeconomic conditions that may affect all hedge funds, as well as for risk factors common to funds following a given strategy or substrategy. In specifications 2, 4, and 6 we also include a vector of controls, $X'_{i,t}$, which includes dummy variables for illiquidity, complexity, concentration, and leverage (defined similarly to the secrecy indicator), the natural logarithm of fund's assets under management, net percentage flows to the fund over the last month – to account for potential differences in performance of funds that have different size or have recently experienced abnormal flows. It is worth noting that the coefficient on secrecy is equivalent to examining the impact of abnormal secrecy assuming that the included controls, $X'_{i,t}$, and fixed effects predict the normal level of secrecy. $\varepsilon_{i,t}$ denotes the error term in the above-specified regression model.

Column 1 in Panels A and B of Table 3 reports the results of the simplest specification that regresses hedge fund performance in excess of the risk-free rate on the indicator variable corresponding to high levels of secrecy and quantifies the monthly average magnitudes we see in Figure 1. The coefficient a^H, in the row labeled "Secrecy in 2007" in Panel A and "Secrecy

in 2009" in Panel B, identifies the mean difference in performance between secretive funds and transparent funds, which are used as the base category in this estimation. In this first specification we do not include any other qualitative characteristics or controls, and as such, this test is exactly analogous to a difference in means for secretive versus transparent funds with standard errors clustered at the hedge fund level. Panel A, column 1, shows that secretive funds do have slightly higher returns during the year from April 2006 through March 2007, but the difference averages a statistically insignificant 19 basis points per month. Between April 2008 and March 2009, column 1 of Panel B shows that secretive funds earn on average approximately 1.0% less per month than more transparent funds. If we had found that a^H was positive in both the up and down markets, this would have suggested that secretive hedge funds either have superior asset picking ability or superior market-timing skills. Instead these results suggest that the returns of secretive funds are driven by risks that materialize during the down market.

In Column 2 we add the illiquidity, complexity, concentration, and leverage measures to the specification in Column 1, because these may be related to performance. We also add the natural log of the prior month's AUM (ln(AUM)), and finally, because flows can affect how much cash the fund must keep on hand, we also include contemporaneous flows (Flows). Including these measures along with secrecy allows us to disentangle the impact of secrecy on returns from these other measures.

The results in Column 2 of Panels A and B in Table 3 are largely sensible. In Panel A we see that more illiquid funds earn insignificantly higher returns through the up market, but perform significantly worse by 2.181% through the crash in the down market. While this -2.181% translates to a magnitude large than -26% per year, given that this is the period of the Global Financial Crisis, such a high figure does not seem implausible.[10] There is also some evidence of more complex funds under performing less complex funds, at least in the up market in Panel A, which may be related to higher transactions costs when executing more complicated trading strategies. Funds running more complex strategies underperform by 0.243% per month during the up market, however a high standard error of this estimate prevents us from drawing strong conclusions with respect to this variable. More concentrated funds yield higher returns in the up market and insignificantly lower returns in the down market. Although this finding may be

[10]In unreported results we extend our sample through to December 2009 and find that the extreme returns associated with illiquidity are partially reversed, but secrecy does not reverse, suggesting that the poor performance due to secrecy is not entirely driven by (undermeasured) illiquidity. Specifically, with substrategy-month fixed effects, we find that returns to secretive fund are of similar magnitude to Panel B of Table 3 and still significant at the 5% level in *all* specifications, while the coefficient on the illiquidity dummy becomes statistically insignificantly different from zero, as we saturate the model further.

surprising in light of standard finance theory, in which concentrated portfolios should not bear a premium, this result is in line with a recent empirical studies by Ivković, Sialm, and Weisbenner (2008) and Choi et al. (2017) which find that individuals and institutions with more concentrated portfolios outperform those with more diversified portfolios. In Panel A we see that more levered funds earn 0.424% higher returns per month in the up market, presumably as compensation for the extra risk they bear, because we see in Panel B that they earn insignificantly lower returns of -0.282% in the down market. In Column 2 we also add the logarithm of total assets under management and percentage net flows during current month to control for potential differences in size that may exist across different types of funds, and that could also be responsible for the performance difference. Outflows are a drag on performance in both up and down markets, as one would expect.

4.1.2. Do Secretive Funds Earn Higher Risk-Adjusted Returns?

One may be reasonably concerned that the analyses presented in columns 1 and 2 of Table 3 do not control for the known risk exposure(s) of the funds. In columns 3-4 and 5-6 we use strategy-month or substrategy-month fixed effects as a model-free approach to control for the risk of the funds' strategies, which is econometrically equivalent to strategy or substrategy matching, respectively. The advantage of this method is that it automatically subsumes any group-specific loadings on all factors, including *unknown* factors. In this sense, it is model-free – we do not need to know all the factors that are relevant for a particular hedge fund style, if we can assume that funds that follow a particular strategy or substrategy load similarly on the underlying risks. Columns 3 and 4 in Panels A and B of Table 3 present these results, which yield similar patterns to the results without controls for risk. Secretive funds have statically insignificantly higher returns in the up market, and significantly lower returns in the down market. This pattern further reinforces our main finding so far, that secretive funds appear to load on some unmeasured risk compared to their more transparent peers. [11]

Concerned that the five strategy classifications (see Table 1, Panel C) might be too broad, we also examine regressions using substrategy-month fixed effects for 37 substrategies. Substrategy-

[11] While, one could control for risk using standard asset- or hedge-fund-pricing models. We believe this is tantamount to assuming that the model we measure ex-post is identical to the model investors assume ex-ante. We find it much more credible that investors believe that funds with similar strategies are similarly risky. In addition, any model-based conclusion about skill has to be ultimately based on the assumption that the factor model is correct. Given the dynamic nature of many of hedge fund strategies and the resulting difficulty of modeling factor structure for hedge funds, we opt for using a model-free framework. Furthermore, from a purely econometric point of view, even the more successful attempts of modeling hedge fund factors, such as the Fung and Hsieh (2001) seven-factor model, would quickly use up degrees of freedom leading to over fit.

month fixed effects are superior to the strategy-month fixed effects because we are much more likely to have as a comparison group exactly comparable funds; but, this comes at a cost: there are many fewer funds in each substrategy, which dramatically reduces the power of our tests. For each regression when strategy-month fixed effects are included there are 60 (=5 strategies $\times$ 12 months) fixed effects. With substrategies, in 2006-07 there are 408 (=34 substrategies $\times$ 12 months) fixed effects and in 2008-09 there are 432 (=36 substrategies $\times$ 12 months) fixed effects.[12] In columns 5 and 6 in Panels A and B of Table 3 once again we see similar patterns: insignificantly higher returns in the up-market and worse performance in the down-market. As we add substrategy-month fixed effects, which arguably reduce statistical power substantially, the statistical significance has become slightly weaker (9.6% and 10.9% in the specification without and with controls, respectively); but, the magnitude of the effect remains comparable.

In summary, in Table 3 we document that secretive funds earn insignificantly more positive returns than transparent funds during the up market, but significantly worse returns during the down market. This is consistent with the funds loading on risk(s) which carry an small premium during the up market, but which result in severe losses when that risk is realized.[13]

4.1.3. Survivorship and Selection

Fundamentally, whether or not managers are secretive is a decision that hedge fund managers make, and as such, we cannot and would not want to eliminate the effect of managerial decisions. However, we do want to consider how performance might influence hedge fund managers' decisions, which may help us understand better what drives the choice to be secretive and how this might influence our findings. Obvious motivations include the desire of the hedge fund managers to obscure poor performance and the desire of the fund of fund to drop funds that the fund managers' expect will perform poorly.

For any bias to influence the prior findings in Figure 1 and Table 3, it must be one that biases the *difference* in performance, since we are focused on the difference between secretive and transparent funds. One possibility is that the worst performing transparent funds, switch to secretive by April of 2008, which biases down the performance of secretive funds (i.e. using the March, 2009 secrecy score). However, there are only 7 such funds that are added to the 110 other secretive funds in 2008-09. While this does influence our findings that secretive funds

[12]The number of strategies varies a bit because 56 funds are dropped from the sample after March of 2007 and 32 funds are added prior to April of 2008.

[13]There are other interpretations as well. For example, this evidence is also consistent with secretive hedge fund managers manipulating their returns, and that this behavior is harder to hide during downturns.

yield lower retuerns during the down market in Table 3 and Figure 1, it is not the main driver. In unreported results we drop the 7 funds that switch from transparent to secretive and find that the differences between secretive and transparent funds persist once the control variables are taken into account and are qualitatively and quantitatively similar to the findings in Table 3.

Another explanation consistent with our findings in the bad period is that the secretive funds could be performing similarly or better than transparent funds in the bad period, had the fund of funds not dropped the particularly good secretive hedge funds from its portfolio. However, this only means that even this very savvy investor, the fund of funds, was not able to realize potential benefits of investing in secretive funds, if there were any, which might have happened if, for example, the signals from secretive funds are too obscure. This is what we explore in Section 4.2, which examines flow to performance. At a minimum, we can say that it appears that hedge fund secrecy does not suggest stronger performance, and, if anything, weaker.

4.1.4. Do more secretive funds perform better in the future?

While existing literature focuses on fund and asset performance during periods when hedge fund managers are secretive, it would be particularly useful to know whether secrecy can also signal future (over/under)performance. In Table 4 we examine whether past secrecy predicts future performance. Table 4 presents regressions identical to Equation 1, but using secrecy (and controls) from March of 2007 only. In all specifications with and without controls and with and without (sub)strategy fixed effects the coefficient, a^H, on "Secrecy in 2007" is statistically insignificantly different zero in all specifications. Current hedge fund secrecy does not suggest differences in future returns, neither in absolute terms nor on a risk-adjusted basis.

4.1.5. Distinguishing Own-Investor Secrecy from Secrecy vis à vis the Public

So far we document that secretive hedge funds, at best, perform similarly to their more transparent peers and, at worst, significantly underperform them. As noted earlier, Aragon et al. (2013) and Agarwal et al. (2013b) document that the assets for which confidential treatment is requested earn alpha and Aragon et al. (2013) document that funds that make more heavy use of confidential treatment requests outperform those that do not, suggesting that users of confidential treatment requests may have unique information or skill. In a similar vein, in this subsection we examine the interaction between secrecy from a fund's own investors and secrecy

vis á vis the public as in the aforementioned research, i.e. using confidential treatment requests. To summarize, we find that while secrecy *vis á vis* one's own investors does not suggest skill, and may even suggest additional risk taking, there is some evidence that secrecy from the public does suggest superior performance at least with respect to funds that do not file SEC Form 13F.

As noted in the introduction, hedge fund managers who are required to file disclosure of their holdings to the U.S. SEC on form 13F may request a delay, if disclosure would inhibit their trading strategy. Those that request such delays show evidence of skill. In this spirit, we calculate the fraction of months in which a manager has a confidential treatment request outstanding. We then rank funds into those with high confidential treatment usage and low. Because few funds that are required to file form 13F with the SEC make use of confidential treatment requests, this ranking effectively means that any fund that makes at least one confidential treatment request is classified as a high confidential-treatment user. In the remainder of this section we provide evidence about the differences between own-investor secrecy and secrecy *vis à vis* the public both graphically in Figure 2 and in regressions in Table 5.

Figure 2 depicts a chart with 6 sets of returns. Those in dark grey (blue) solid lines are transparent funds and those in the light grey (red) dashed lines are secretive funds. The thin lines represent funds that are not required to file form 13F with the SEC. Notably, their returns ("Trans no13F" and "Sec no13F") are unambiguously better through the crisis, though there is no clear distinction during the up market of 2006-07 and during 2007-08. The thick lines represent funds that file 13F. Filled lines indicate they are a high user of confidential treatment requests and hollow (or double) lines indicate a low user. There are only three transparent funds that use confidential treatment("Trans CT user"). These funds are no longer in sample after March of 2008, and as such there is no secrecy score going forward, but these three funds are the worst performers on an unconditional, unmatched basis. Among the 13F filers, the secretive funds that also filed a confidential treatment request at some point during our sample, ("Sec CT user"), performed noticeably better although in more rigorous tests in Table 5 these results, while economically large, are not statistically significant.

In Table 5 we run a similar regression to Equation 1, however, the regression includes two new dummy variables. The first is "$13F\ Filer$" a zero-one indicator, which indicates whether the fund manager ever filed form 13F with the SEC during our sample period, and "CT" which indicates whether, during our sample period, the fund filed a confidential treatment request with the SEC to delay disclosure of some holdings from the mandated 13F-holdings report. "$Secrecy$"

is the dummy variable for the level of secrecy for the period over which returns are measured in Panels A and B. Panel C uses "Secrecy in 2007" for predictive returns similar to Table 4.[14] All panels use the same controls as in prior tables, but these controls are suppressed to conserve space.

Panel A of Table 5 regresses monthly excess returns from April of 2006 through March of 2007 on the dummy variables and controls. The 13F-Filer dummy captures the difference in returns between transparent funds that filed form 13F, and those that did not. We see that through the up market transparent 13F filers outperformed transparent non-filers in column (1) by 0.49% on average, with this difference being very similar among secretive funds (as indicated by the near zero interaction term "$13F\ Filer \times Secrecy$"). Once we include strategy-month fixed effects in column (2) and substrategy-month fixed effects in column (3) the results get a bit weaker statistically, yet the magnitudes stay similar. This is most likely an issue with power, because, in unreported tests, if the insignificant interactions with secrecy and confidential treatment are dropped, this coefficient is significant at the 10% level (results available upon request), and there is no difference in 13F-filing premium across transparent and secretive funds.

Each panel includes difference tests, which, in conjunction with the coefficient on "$CT \times Secrecy$", allow us to compare funds that also filed for confidential treatment during the sample to the other groupings. During the up market funds with confidential treatment only outperform funds that were not large enough to become 13F filers. They do not outperform their non-confidential-treatment-filing-secretive peers.

Panel B of Table 5 examines returns through the down-market period in our sample. The evidence suggests that transparent 13F filers perform worse through this down market, than their non-13F-filing peers, and this 13F-filing effect is again similar for secretive funds (as indicated by the near zero interaction term "$13F\ Filer \times Secrecy$"). Consistent with what we can visually infer from Figure 2, the secrecy dummy suggests that the non-13F-filing, secretive funds perform worse through the down market than their non-13F-filing, transparent peers. However, these findings are weaker with more precise the controls for substrategy-month fixed effects. In column (2) of Panel B, we can see the coefficient is -1.042 with strategy-month fixed effects and -0.582 in column (3) with substrategy-month fixed effects.

[14] Though ideally, we should include the confidential treatment dummy without an interaction term too, the dummy without the interaction with secrecy is capturing the difference in return between transparent funds that file for confidential treatment and transparent funds that do not. There are only three of these funds in 2006-07 and no such funds in 2008-09, so this dummy would be automatically dropped from all specifications to avoid perfect multicollinearity. As such, we report $CT \times Secrecy$ to reflect that this measured difference is among secretive funds only.

Most interestingly, among 13F filers, the returns to secretive funds that filed requests for confidential treatment are much better than those that did not with coefficients of 0.997, 0.968 and 1.391 on the interaction term with no fixed effects, with strategy-month fixed effects, and with substrategy-month fixed effects, respectively ("$CT \times Secrecy$").[15] The results are only marginally significant, but they get stronger the tighter the controls are; the most economically and statistically significant result occurs when we use substrategy-month fixed effects in column (3) of Panel B. These findings are more pronounced when, in Panel C, we run predictive regressions similar to Table 4.

Overall, the evidence suggests that funds that use confidential treatment requests outperform funds that were not 13F filers during the up market (although not other 13F-filing funds). There is some evidence that during the down market confidential-treatment filers do outperform their secretive peers, although it is not statistically significant.

4.2. Do investors perceive differences between secretive and transparent funds? Evidence from flow-to-performance sensitivity

In Table 6 we examine flow to performance, regressing flow as a percentage of net assets on the return over the past quarter plus controls for illiquidity, size, and volatility. We also implicitly control for average flows to (sub)strategies because any effects of these differences will be subsumed by (sub)strategy-month fixed effects. We run these tests because they can help us understand whether investors view secretive and transparent funds as different, either because they view secretive funds as potentially "problem funds", which Brown et al. (2008) argue results in lower net inflows following stronger performance than "non-problem funds" or because investors view the returns as a particularly noisy signal of managerial skill as in Huang et al. (2012). In this table we use a low-illiquidity dummy so that the coefficients on "$LowSecrecy \times Return$" and "$HighSecrecy \times Return$" can be interpreted within high-illiquidity funds, which are the most prevalent in our sample. Panel A presents the flow-to-performance sensitivity with strategy-month fixed effects, and Panel B presents the same specifications with substrategy-month fixed effects. The results are qualitatively similar, so we only discuss the results from Panel A with strategy-month fixed effects. The specification is similar to other flow-to-performance regressions in the literature (Bollen and Pool, 2012; Sialm, Starks, and Zhang, 2015; Sirri and Tufano,

[15] In 2009, there are no transparent funds in sample that file confidential treatment requests. As such, we do not include the confidential treatment dummy separately, meaning that what the "$CT \times Secrecy$" interaction tells us is how much better (or worse) returns are for fund that file confidential treatment requests. Please also see the discussion in footnote 14.

1998) except that instead of rank-based performance measures, we use the past quarter's return directly.

$$\begin{aligned} NetFlow_{i,t+3} = c &+ a^L LowSecrecy_{i,FY} \\ &+ \gamma^L LowSecrecy_{i,FY} \times Return_{i,t} \\ &+ \gamma^H HighSecrecy_{i,FY} \times Return_{i,t} \\ &+ \delta X'_{i,t} + d_{s,t} + \varepsilon_{i,t} \end{aligned} \tag{2}$$

Given that $LowSecrecy_{i,FY}$ and $HighSecrecy_{i,FY}$ are mutually exclusive dummy variables for transparent and secretive funds, respectively, the coefficients of primary interest are γ^L and γ^H that measure the average flow-to-performance sensitivity for transparent and secretive funds.

We start by estimating a simpler specification that does not disaggregate flow-to-performance sensitivity by whether the fund is secretive or not: column 1 of Panels A and B in Table 6 shows that flows chase past quarterly returns with strategy-month and substrategy-month fixed effects, respectively. Similar to our main performance specifications, including these sets of fixed effects makes our results interpretable as within strategy- (substrategy-) matched peer groups. We see in Panel A that one additional percentage point of past return associates with 1.021 percentage point higher flows in the next quarter during the up-market period and, in column 3, we see a 0.561 percentage point higher flows during the down-market period with strategy-month fixed effects. Magnitudes are very similar with substrategy-month fixed effects. Next we turn to estimating the above specification in Equation 2.[16]

During the up market in column 2 both secretive and transparent funds are responsive to past returns in the manner one would expect, higher returns lead to more inflows controlling for illiquidity, strategy-month fixed effects and various other controls. Particularly notable is that the sensitivity of transparent funds is about 69% larger than for secretive funds, 1.405 versus 0.829 percentage points. The difference between the flow-to-performance sensitivity of secretive and transparent funds is statistically significant at the 5% level as shown at the bottom of Panels A and B in the rows labeled "$HighSecrecy \times Return - LowSecrecy \times Return$". This is consistent with the hypothesis that investors are able to distinguish secretive and transparent funds and that they deem past returns of secretive funds to be a less clear signal of managerial quality.

During the down market flows to transparent funds become much less sensitive to past

[16] In unreported results we exclude the illiquidity dummy and interaction with excess returns and find that the results in both the up- and down-markets in columns (2) and (4) are qualitatively and quantitatively similar, suggesting that the findings are not driven by liquidity.

performance, while secretive fund flows are similarly sensitive to past returns as in the up market. This implies that the differences in average sensitivity across periods is mostly due to the transparent funds, while the signals from secretive funds are similarly obscure in both periods. Importantly, these findings hold even when we control for the interplay between illiquidity, returns, and flows (in both Panels) and when we use even tighter specifications controlling for substrategy-month fixed effects (Panel B). This is important because it is evidence that secrecy is neither merely a proxy for illiquidity, nor does it pick up the inherent differences in flows of funds that follow different substrategies.

One may be concerned that these differences in flow to performance sensitivity are driven by differences in lockup, holding and redemption periods. However, for the sub-sample with Lipper TASS data, the average redemption notice periods are 53 days for secretive funds and 54 days for transparent funds. The mean pay out period is longer for transparent funds than secretive funds, 24 days vs. 16 days. The mean lock-up period is 6 months for both secretive and transparent funds. Admittedly this is only a sub-sample, however the fact that secretive fund performed at least as badly as transparent funds through the 2008-09 crisis is not consistent with the existence of longer lock-up periods for secretive funds as Aragon, Martin, and Shi (2019) find that funds with longer lockup periods earned higher returns through the crisis.

Overall, our evidence on the flow-to-performance sensitivity of the funds shows that during the up-market secretive funds are much less sensitive to past performance than transparent funds. Also, flow-to-performance sensitivity for transparent funds falls during the down-market, but remains the same for secretive funds. These findings are consistent with investors viewing secretive funds as problematic (Brown et al., 2008) or investors having a more difficult time making inferences when signals are obscured and, as such, the findings are consistent with the theoretical model of Huang, Wei, and Yan (2012) in which flow-to-performance sensitivity is lower when it is more difficult for investors to learn from past performance, as it may be when funds are behaving secretively.

5. Concluding Remarks

In this paper we set out to examine how funds that are secretive with respect to their own investors differ from those that are not and whether the fact that funds are secretive is a signal of the fund manager's skill. Prior work has been unable to address this question because of the

lack of data. Using a proprietary data set obtained from a fund of funds, we show that funds that are reluctant to disclose information about the fund to their own investors – secretive funds – are larger, less liquid, and more complex than their more transparent peers. Notably, secretive and transparent funds are no different in their concentration or leverage, nor are there difference in the asset classes that the secretive and transparent funds invest in.

One might expect that secrecy is important for maintaining or improving performance; however, our main findings regarding performance do not support this notion. At best, secretive funds perform no better than transparent funds when sorting on measures of past hedge fund secrecy. At worst, secretive funds perform significantly worse on a strategy-matched basis when sorting on contemporaneous measures of secrecy. This finding holds controlling for a wide range of fund-level characteristics, as well as any risk factors that would be common to all funds within the same strategy or substrategy. Notably, some of the strongest performers are funds that are secretive with respect to public disclosure, in the form of requesting a delay in reporting holdings on Form 13F to the SEC, consistent with Aragon et al. (2013), Agarwal et al. (2013b), and Shi (2017). So, that while secrecy *vis à vis* the public may signal managerial skills, secrecy *vis à vis* a fund's own investors does not.

While we cannot provide direct evidence, our findings are also largely consistent with various sorts of misbehavior on the side of secretive funds. The examples could include pocketing the bulk of fund returns during up markets and shifting losses to their investors during down markets. Even though we have interpreted our findings as more secretive funds loading on risks that materialize during the down market, our findings could result from the funds' inability to hide their misbehavior in the face of large losses. Nevertheless, an additional risk loading could also be interpreted as bad behavior on the side of secretive funds, particularly extra risk loading that does not generate superior returns. In this respect, no matter the exact interpretation, our results suggest that secrecy is not used for the benefit of their investors, and as such, is consistent with the view of our fund of funds, in particular, and practitioners, in general (see e.g. Anson (2002), Hedges (2005), Goltz and Schröder (2010)), who regard secrecy as a "problematic" fund characteristic.

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Table 1: Summary Statistics

Panel A: Sample Description				
	Mean	**Median**	**STD**	**Counts**
Ex. Fund Ret. (%)	-0.43	0.22	4.51	5713
ln(AUM)	20.56	20.58	1.46	5558
Secrecy	0.82	1	0.38	5232
Illiquidity	0.82	1	0.39	5232
Leverage	0.54	1	0.50	5232
Complexity	0.39	0	0.49	5232
Concentration	0.62	1	0.49	5232
Flows (%)	1.42	0.23	31.81	5363

Panel B: Correlations				
	Secrecy	**Illiquidity**	**Leverage**	**Complexity**
Illiquidity	0.24***			
Leverage	-0.03	0.09*		
Complexity	0.10**	-0.01	0.44***	
Concentration	0.03	0.15***	0.10**	0.02

Panel C: Fund-Month Counts				
	Missing	**Transparent**	**Secrective**	**Total**
Credit	100	132	283	515
Event Driven	71	101	644	816
Equity	458	402	2162	3022
Relative Value	168	72	739	979
Tactical Trading	98	112	171	381
Total	895	819	3999	5713

(continued)

Table 1: Summary Statistics (*continued*)

Data in this table are from hedge funds in which a large anonymous fund of funds invested. The fund of fund continued to track performance of dropped funds for several months following a fund being dropped. To be included funds must have returns reported to the fund of funds, but we supplement missing hedge fund returns with data from Lipper TASS where available. Because Lipper TASS does not provide fund names, we match each hedge fund to all funds in the Lipper TASS database and only consider a fund a match if it is the fund with the highest correlation over 0.99. Funds also must have a proprietary secrecy score, which was developed by the fund of funds in its due diligence efforts to grade funds from most transparent to the most secretive. Panel A provides summary statistics for the sample of variables used in subsequent tables and figures. ex. Fund Rt. is the monthly fund return in excess of the risk-free rate. The risk-free rate is from Kenneth French's data website. ln(AUM) is the natural log of assets under management. Secrecy, Illiquidity, Leverage, Complexity, and Concentration scores are assessed and assigned by the fund of funds in March of 2007, 2008 and 2009 based on the fund-of-fund manager's assessment of the characteristic in the prior year, from April of the prior year through March of the current. The original scores are from least (1) to most problematic (4), which we collapse to 0 to 1, with the three highest scores receiving 1. Flows are net inflows scaled by assets under management. Panel B presents correlations among the qualitative measures described above from March of each year. Panel C presents counts of the number of hedge-fund months in sample. The columns labeled "Transparent" and "Secretive" list the number of funds classified as low and high secrecy. ***, **, and * indicate significance of the correlations in Panel B at the 1%, 5%, and 10% level.

Table 2: Characteristics of Funds by Secrecy

		Sec.	Transp.	Diff.	(p-value)	Strat. Diff.	Fixed Eff. (p-value)	Substrat. Diff.	Fixed Eff. (p-value)	Funds (Clusters)	Fund-Month Count
Size and Liquidity	ln(AUM)	20.8	20.0	0.77	(0.001)	0.65	(0.002)	0.61	(0.006)	192	4852
	Illiquidity	0.86	0.62	0.24	(0.005)	0.21	(0.009)	0.12	(0.085)	192	5232
	Flows (% AUM)	1.24	5.72	-4.47	(0.175)	-4.34	(0.216)	-3.39	(0.217)	190	4731
Portfolio Composition	Complexity	0.42	0.29	0.12	(0.137)	0.10	(0.043)	0.10	(0.046)	192	5232
	Concentration	0.62	0.59	0.03	(0.700)	0.04	(0.651)	-0.04	(0.506)	192	5232
	% Equity	81.8	85.2	-3.41	(0.434)	3.60	(0.218)	2.28	(0.481)	140	1191
	% Debt	7.66	7.88	-0.22	(0.948)	-4.64	(0.099)	-4.15	(0.163)	140	1191
	% Pref. Stock	1.10	0.20	0.90	(0.007)	0.44	(0.048)	0.33	(0.335)	140	1191
	% Calls	4.21	3.72	0.49	(0.738)	-0.08	(0.961)	1.11	(0.600)	140	1191
	% Puts	5.06	2.88	2.18	(0.115)	0.68	(0.609)	0.46	(0.788)	140	1191
Risk	Leverage	0.53	0.58	-0.04	(0.625)	-0.01	(0.852)	0.02	(0.832)	192	5232
	Gross Leverage	201.7	191.8	9.87	(0.681)	19.90	(0.298)	24.62	(0.178)	173	3697
	Net Leverage	54.83	63.62	-8.79	(0.349)	-0.93	(0.907)	-6.53	(0.407)	173	3697
	Pct Long	128.3	127.7	0.60	(0.967)	9.50	(0.398)	9.08	(0.354)	173	3698
	Pct Short	73.4	64.1	9.33	(0.399)	10.42	(0.266)	15.57	(0.123)	173	3697
	Corr. OTM Call	0.34	0.31	0.03	(0.610)	0.02	(0.664)	0.03	(0.598)	175	4944
	Corr. OTM Put	-0.31	-0.29	-0.02	(0.707)	-0.02	(0.765)	-0.02	(0.781)	175	4944
	Corr. Tail Risk	0.46	0.35	0.10	(0.127)	0.07	(0.282)	0.05	(0.479)	175	4944
Disclosure and Returns	Filed 13F	0.74	0.51	0.23	(0.006)	0.17	(0.043)	0.16	(0.010)	192	5232
	Conf. Treat.	0.06	0.00	0.05	(0.000)	0.05	(0.003)	0.05	(0.021)	192	5232
	Lipper TASS	0.32	0.26	0.06	(0.399)	0.06	(0.481)	0.01	(0.872)	192	5232
	Ex. HF Rt.	-0.36	0.04	-0.40	(0.016)	-0.14	(0.354)	-0.07	(0.660)	192	4818
	Long Rt. Only	-1.09	-0.84	-0.24	(0.532)	0.44	(0.097)	0.27	(0.355)	139	3480

This table presents average characteristics for secretive and transparent funds and their differences with controls for strategy-month, substrategy-month, and no fixed effects. Standard errors used to calculate p-values for the difference are clustered at the fund level. Variables are as in Table 1, plus Gross Leverage (%), Net Leverage (%), Percent Long, and Percent Short, which are from the fund of hedge funds. % Equity, % Debt, % Prefered Stock, % Calls and % Puts are the fraction of long holdings reported on the SEC's Form 13F. % Calls and % Puts represent the value of the underlying, not the value of the options. Corr. OTM Call, OTM Put, and Tail Risk are the correlations over April 2006-March 2008 between ex. Fund Rt. and returns to CBOE calls, puts or the Agarwal et al. (2017) Tail Risk measure courtesy of Vikas Agarwal. Filed 13F indicates if a fund matched to a 13F filer that filed in the current quarter. Conf. Treat. indicates whether the fund delayed disclosure of holdings on form 13F. Lipper TASS is a 0-1 dummy for funds which disclose information to Lipper TASS. Long Ret. Only are the CRSP returns to 13F holdings in the 3 months following a quarter end.

Table 3: Differences in Excess Hedge Fund Return and Secrecy

Panel A: 2006-07 Return$_{i,t}$						
	(1)	(2)	(3)	(4)	(5)	(6)
Secrecy in 2007	0.190	0.216	0.189	0.184	0.161	0.166
(p-value)	(0.135)	(0.120)	(0.155)	(0.150)	(0.283)	(0.262)
Illiquidity		0.174		0.0887		0.00919
		(0.168)		(0.491)		(0.951)
Complexity		-0.243*		-0.285*		-0.294*
		(0.099)		(0.052)		(0.072)
Concentration		0.370***		0.359**		0.173
		(0.007)		(0.020)		(0.295)
Leverage		0.424**		0.516**		0.700***
		(0.024)		(0.038)		(0.004)
ln(AUM)		-0.0580		-0.0684		-0.101
		(0.254)		(0.163)		(0.145)
Flows		-0.0426***		-0.0355***		-0.0317***
		(0.000)		(0.000)		(0.000)
Strategy×month fixed effects			Y	Y		
Substrategy×month fixed effects					Y	Y
Observations	1,677	1,642	1,677	1,642	1,677	1,642
Adj. R^2	0.001	0.051	0.246	0.293	0.473	0.498

(continued)

Panel B: 2008-09 Return$_{i,t}$						
	(1)	(2)	(3)	(4)	(5)	(6)
Secrecy in 2009	-0.998***	-0.923***	-0.811**	-0.875**	-0.530*	-0.576
(p-value)	(0.004)	(0.007)	(0.029)	(0.015)	(0.096)	(0.109)
Illiquidity		-2.181***		-2.064***		-1.245**
		(0.000)		(0.000)		(0.010)
Complexity		0.502		0.0139		-0.791
		(0.186)		(0.973)		(0.161)
Concentration		-0.521		-0.275		0.290
		(0.115)		(0.465)		(0.519)
Leverage		-0.282		-0.637		-0.311
		(0.451)		(0.154)		(0.506)
ln(AUM)		0.0828		0.162		0.135
		(0.627)		(0.338)		(0.436)
Flows		-0.153***		-0.132***		-0.100***
		(0.000)		(0.000)		(0.000)
Strategy×month fixed effects			Y	Y		
Substrategy×month fixed effects					Y	Y
Observations	1,602	1,560	1,602	1,560	1,602	1,560
Adj. R^2	0.004	0.153	0.278	0.369	0.566	0.614

This table presents the results of regressions in the form of Equation (1), which regresses hedge fund returns in excess of the risk-free rate ($Return_{i,t}$) on the contemporaneous secrecy dummy both with and without controls. Columns (3) and (4) include strategy-month fixed effects. Columns (5) and (6) include substrategy-month fixed effects. The standard errors used to calculate p-values in all regressions are clustered by hedge fund. Panel A presents results for the up-market period, April, 2006 to March, 2007. Panel B presents results for the down-market period, April, 2008 to March, 2009. The Secrecy scores are from March of 2007 and 2009 respectively. Similarly, the secrecy dummies correspond to $Secrecy_{i,2007}$ in Panel A and $Secrecy_{i,2009}$ in Panel B. All data are described in Table 1. p-values, based on standard errors clustered at the fund level, are reported below the coefficients. ***, **, and * indicate significance at the 1%, 5%, and 10% levels respectively.

Table 4: Can we learn about future performance from prior secrecy?

	2008-09 Return$_{i,t}$					
	(1)	(2)	(3)	(4)	(5)	(6)
Secrecy in 2007	-0.098	0.299	0.124	0.526	0.730	0.654
(p-value)	(0.843)	(0.559)	(0.804)	(0.297)	(0.184)	(0.263)
Illiquidity		-2.048***		-1.886***		-0.711
		(0.000)		(0.000)		(0.183)
Complexity		0.318		-0.166		-0.288
		(0.500)		(0.759)		(0.609)
Concentration		-0.816**		-0.704		-0.00736
		(0.047)		(0.123)		(0.988)
Leverage		0.0641		-0.339		-0.385
		(0.890)		(0.545)		(0.563)
ln(AUM)		0.230		0.265*		0.250
		(0.127)		(0.074)		(0.145)
Flows		-0.167***		-0.133***		-0.106***
		(0.000)		(0.000)		(0.000)
Strategy×month fixed effects			Y	Y		
Substrategy×month fixed effects					Y	Y
Observations	1,607	1,542	1,607	1,542	1,607	1,542
Adj. R^2	0.000	0.151	0.324	0.406	0.594	0.635

This table examines the association between prior secrecy and future performance. As in Table 3 this table presents the results of regressions in the form of Equation (1). The difference is that the regression for this table uses Secrecy, Illiquidity, Complexity, Concentration, and Leverage as classified in March of 2007 and the monthly data are for the period April 2008 through March 2009. For example, the secrecy dummy in this table corresponds to $Secrecy_{i,2007}$ Columns (3) and (4) include strategy-month fixed effects. Columns (5) and (6) include substrategy-month fixed effects. The standard errors used to calculate p-values in all regressions are clustered by hedge fund. All data are described in Table 1. p-values, based on standard errors clustered at the fund level, are reported below the coefficients. ***, **, and * indicate significance at the 1%, 5%, and 10% levels respectively.

Table 5: Skill and Secrecy

	Panel A: 2006-07 Return$_{i,t}$ Secrecy in 2006-07			**Panel B: 2008-09 Return$_{i,t}$ Secrecy in 2008-09**			**Panel C: 2008-09 Return$_{i,t}$ Secrecy in 2006-07**		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
13F Filer	0.485**	0.335*	0.389	-0.687	-1.056*	-1.307*	-2.044*	-1.965	-2.094**
(p-value)	(0.014)	(0.055)	(0.165)	(0.188)	(0.079)	(0.067)	(0.082)	(0.106)	(0.045)
Secrecy	0.184	0.085	0.175	-0.913*	-1.042*	-0.582	-0.643	-0.482	0.589
	(0.399)	(0.668)	(0.496)	(0.089)	(0.073)	(0.309)	(0.598)	(0.695)	(0.634)
13F Filer * Secrecy	0.037	0.148	-0.018	-0.025	0.268	0.09	1.355	1.370	0.238
	(0.892)	(0.568)	(0.954)	(0.969)	(0.704)	(0.901)	(0.276)	(0.257)	(0.852)
CT * Secrecy	0.008	-0.012	0.016	0.997	0.968	1.391*	1.050*	1.000*	1.140*
	(0.965)	(0.943)	(0.913)	(0.111)	(0.120)	(0.081)	(0.076)	(0.078)	(0.084)
Difference Tests									
Sec. CT – Sec. non-13F Filer	0.530*	0.472*	0.387	0.284	0.180	0.175	0.361	0.406	-0.716
Sec. CT – Trans. 13F Filer	0.229	0.221	0.173	0.059	0.194	0.899	1.762**	1.888***	1.967**
Sec. CT – Trans. Non-13F Filer	0.714***	0.556***	0.563**	-0.629	-0.862	-0.408	-0.282	-0.077	-0.127
Strategy×month FEs		Y			Y			Y	
Substrategy×month FEs			Y			Y			Y
Controls	Y	Y	Y	Y	Y	Y	Y	Y	Y
Observations	1,642	1,642	1,642	1,560	1,560	1,560	1,542	1,542	1,542
Adj. R^2	0.058	0.298	0.499	0.158	0.374	0.620	0.158	0.412	0.641

This table presents the results of regressions in the form of Equation (1), but they include the dummy variables 13F Filer and CT. 13F Filer and CT are set to one if at least once during the sample the fund filed a 13F Form or, separately, the fund requested Confidential Treatment of its holdings or filed an "add holdings" amendment, a de facto confidential treatment request which adds previously undisclosed holdings to the 13F filing. All specifications include controls for liquidity, complexity, concentration, leverage, size and flows (all columns) and strategy-month fixed effects (columns 2, 5, and 8) and substrategy-month fixed effects (columns 3, 6, and 9); the coefficients are suppressed to conserve space. All other items are defined as in prior tables. Panels A and B present results for 2006-07 and 2008-09 respectively, with Secrecy from March of the final year. Panel C presents predictive regression as in Table 4 for 2008-09, using March 2007 Secrecy. Difference tests are for the differences between respective sums of coefficients. p-values based on standard errors clustered by fund are reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels respectively.

Table 6: Flow to Performance Sensitivity

Panel A: With Strategy-Month Fixed Effects						
	Up Market: 2006-07		Down Market: 2008-09		Down - Up Market	
	(1)	(2)	(3)	(4)	(3) - (1)	(4) - (2)
Return	1.021***		0.561***		-0.460***	
(p-value)	(0.000)		(0.000)		(0.002)	
Low Secrecy×Return		1.405***		0.801***		-0.604*
		(0.000)		(0.004)		(0.094)
High Secrecy×Return		0.829***		0.553***		-0.276
		(0.000)		(0.000)		(0.142)
Low Illiquidity×Return		-0.317		0.192		
		(0.451)		(0.365)		
lnAUM	-2.191**	-2.387**	-0.959	-0.598		
	(0.022)	(0.024)	(0.131)	(0.292)		
Annual volatility	-0.678	-0.852	0.433	0.694		
	(0.401)	(0.345)	(0.495)	(0.280)		
Low Secrecy		-2.777		4.462**		7.239**
		(0.295)		(0.038)		(0.043)
Low Illiquidity		-1.279		2.050		3.329
		(0.747)		(0.442)		(0.479)
Observations	1,229	1,229	1,319	1,319		
Num. of Funds	120	120	119	119		
Adj. R^2	0.134	0.139	0.426	0.429		
High Secrecy×Return –		-0.576**		-0.248		
Low Secrecy×Return		(0.044)		(0.344)		

Panel B: With Substrategy-Month Fixed Effects						
	Up Market: 2006-07		Down Market: 2008-09		Down - Up Market	
	(1)	(2)	(3)	(4)	(3) - (1)	(4) - (2)
Return	1.072***		0.707***		-0.365*	
(p-value)	(0.000)		(0.000)		(0.059)	
Low Secrecy×Return		1.475***		0.715**		-0.760*
		(0.000)		(0.024)		(0.086)
High Secrecy×Return		0.894***		0.689***		-0.205
		(0.000)		(0.000)		(0.349)
Low Illiquidity×Return		-0.381		0.361		
		(0.500)		(0.212)		
lnAUM	-1.470	-1.596	-1.609**	-1.373*		
	(0.231)	(0.227)	(0.034)	(0.050)		
Annual volatility	-0.143	0.0122	1.009	1.083		
	(0.915)	(0.993)	(0.273)	(0.248)		
Low Secrecy		-3.973		1.743		5.715
		(0.177)		(0.585)		(0.203)
Low Illiquidity		2.539		4.067		1.528
		(0.670)		(0.168)		(0.816)
Observations	1,229	1,229	1,319	1,319		
Number of Funds	120	120	119	119		
Adj. R^2	0.192	0.198	0.499	0.500		
High Secrecy×Return –		-0.582*		-0.0267		
Low Secrecy×Return		(0.077)		(0.922)		

This table reports the results of estimating the following specification with strategy-month fixed effects in Panel A and substrategy-month fixed effects in Panel B for the periods from April 2006 to March 2007 in columns 1 and 2 and from April 2008 to March 2009 in columns 3 and 4 of Panels A and B: $NetFlow_{i,t+3} = c + a^L LowSecrecy_{i,FY} + \gamma^L LowSecrecy_{i,FY} \times Return_{i,t} + \gamma^H HighSecrecy_{i,FY} \times Return_{i,t} + \delta X'_{i,t} + d_{s,t} + \varepsilon_{i,t}$, where $NetFlow_{i,t+3}$ is the net quarterly flow to the fund from month t to t+3, $Return_{i,t}$ is the quarterly excess return of fund i from month *t-3* to t; $LowSecrecy_{i,FY}(HighSecrecy_{i,FY})$ is an indicator variables that equals 1 if a fund is rated as low-(high-) secretive, and 0 otherwise; $X_{i,t}$ are fund-level controls (log of assets under management, measured at *t-3*, annual volatility, measured from *t-15* to *t-3*, indicator variable for low-illiquidity funds, *LowIlliquidity*, and its interaction with excess fund return, and d_{st} are strategy-month (Panel A) or substrategy-month (Panel B) fixed effects. The columns labeled (3) – (1) and (4) – (2) test for the difference in coefficients in the corresponding columns. The rows labeled "High Secrecy×*Return* – Low Secrecy×*Return*" report the difference between the coefficients on High Secrecy×*Return* and Low Secrecy×*Return*. p-values, based on standard errors clustered at the fund level, are reported below the coefficients. Controls are defined as in prior tables. ***, **, and * indicate significance at the 1%, 5%, and 10% levels respectively.

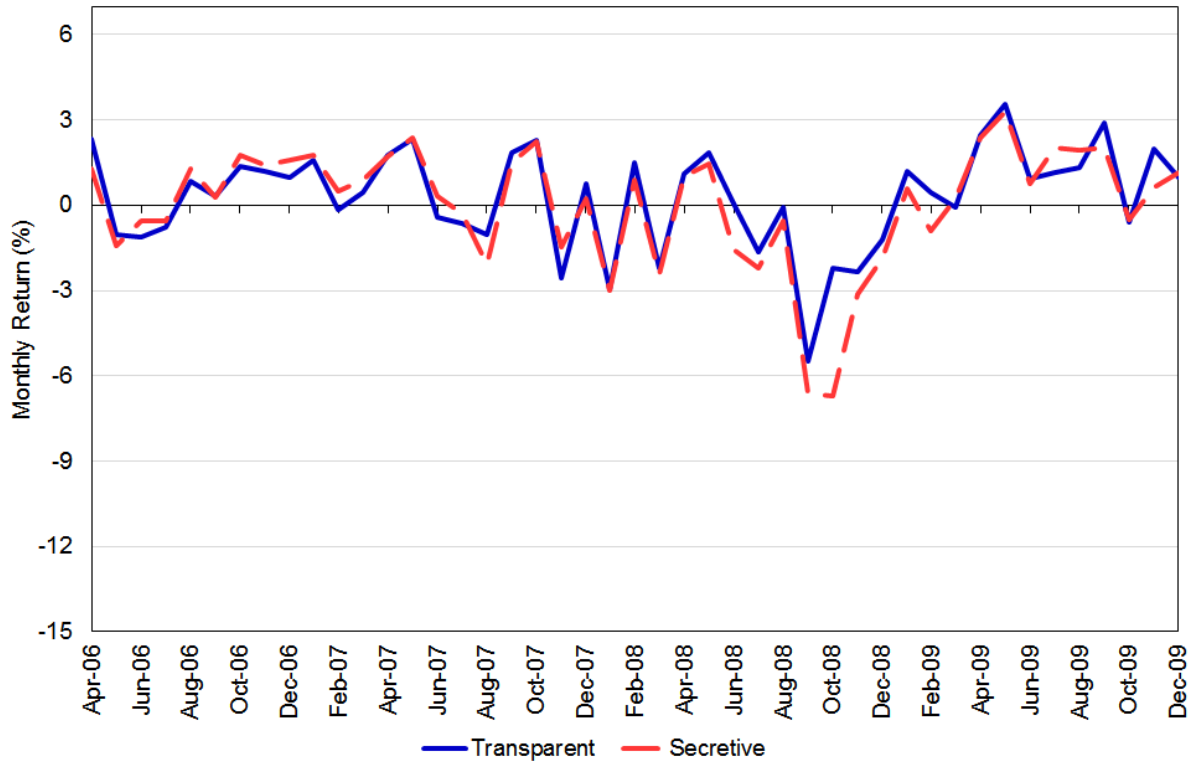

Fig. 1: Excess Hedge Fund Returns by Contemporaneous Secrecy

This figure presents equally weighted excess returns to hedge funds classified as secretive or transparent by the fund of hedge funds at the end of an April-to-March year in March of 2007, 2008, and 2009. For return data from April through December 2009, we use March 2009 Secrecy for sorting. Excess returns are as defined in Table 1. The light grey (red) dashed line depicts the returns to secretive funds and the dark grey (blue) solid line depicts the returns to transparent funds.

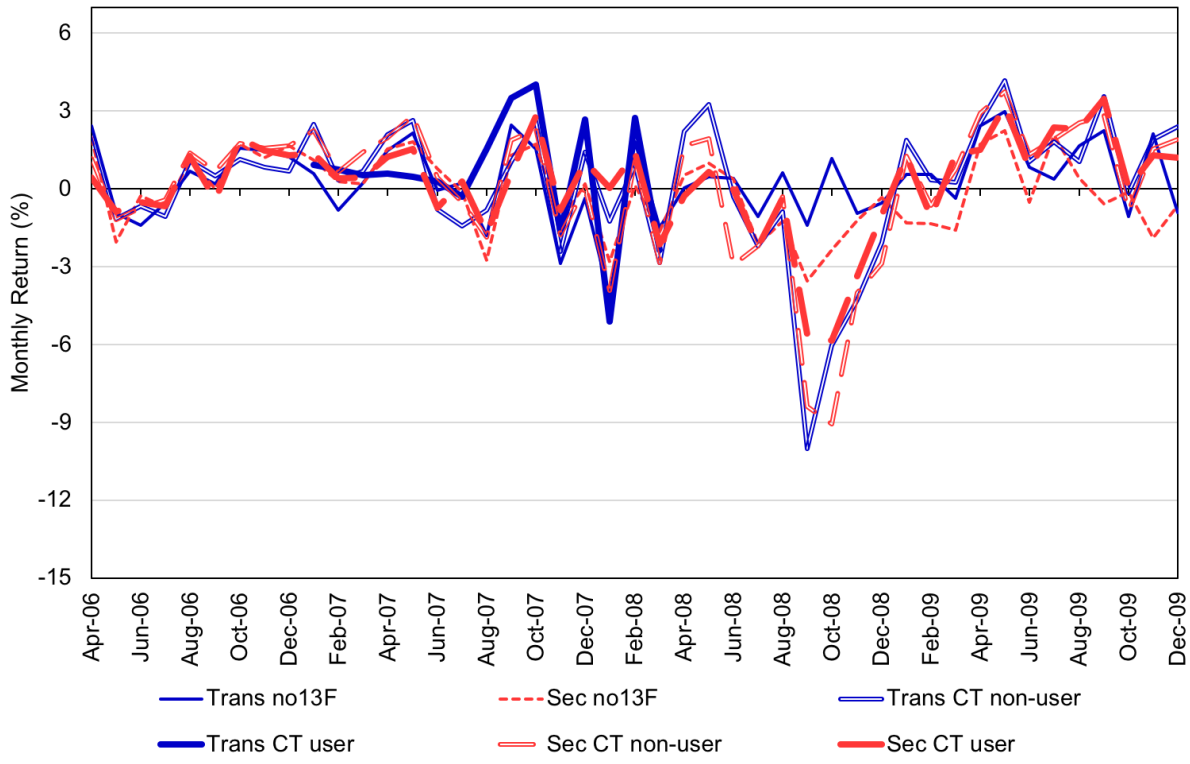

Fig. 2: Is Secrecy Better in the Hands of Skillful Managers?

This figure presents equally weighted returns to hedge funds classified as secretive or transparent with further sorts on whether or not the hedge fund's holdings were included in 13F filings and whether or not the hedge fund manager at any point during the sample made a request for confidential treatment as in Table 5. The light grey (red) thin dashed line depicts the returns to secretive funds which did not file Form 13F during our sample and the dark grey (blue) thin solid line depicts the returns to similar transparent funds. The light grey (red) thick dashed line depicts the returns to secretive funds that filed Form 13F and at some point in sample made a request for confidential treatment. The dark grey (blue) thick solid line depicts the returns to similar transparent funds. There were three transparent funds that made confidential treatment requests, but they are no longer in sample by April of 2008. The light grey (red) thick dashed double line depicts the returns to secretive funds that filed Form 13F but did not make a request for confidential treatment at any point during the sample. The dark grey (blue) thick double line depicts the returns to transparent funds that filed Form 13F but did not make a request for confidential treatment at any point during the sample. The data are as described in Figure 1 and Table 1.

Internet Appendix for "Does Secrecy Signal Skill? Characteristics and Performance of Secretive Hedge Funds"

March 29, 2020

Appendix A. Internet Appendix

Table 1: Characteristics of Funds by Secrecy

		Panel A: Medium Secrecy – Transparent									
		M. Sec.	**Trans.**	**Diff.**	**(p-value)**	**Strat. Diff.**	**Fixed Eff. (p-value)**	**Substrat. Diff.**	**Fixed Eff. (p-value)**	**Funds (Clusters)**	**Fund-Month Count**
Size and Liquidity	ln(AUM)	20.6	20.0	0.57	(0.012)	0.50	(0.016)	0.58	(0.014)	166	4128
	Illiquidity	1.12	0.78	0.33	(0.005)	0.26	(0.015)	0.10	(0.266)	166	4428
	Flows (% AUM)	1.28	5.72	-4.44	(0.180)	-4.55	(0.225)	-3.55	(0.243)	164	4018
Portfolio Composition	Complexity	0.46	0.42	0.04	(0.760)	0.19	(0.012)	0.13	(0.034)	166	4428
	Concentration	0.88	0.77	0.11	(0.374)	0.08	(0.538)	-0.10	(0.368)	166	4428
	% Equity	82.9	85.2	-2.24	(0.617)	2.84	(0.318)	2.21	(0.491)	119	975
	% Debt	7.11	7.88	-0.77	(0.823)	-4.06	(0.127)	-3.42	(0.275)	119	975
	% Pref. Stock	0.78	0.20	0.58	(0.010)	0.36	(0.056)	0.11	(0.534)	119	975
	% Calls	4.03	3.72	0.31	(0.840)	-0.13	(0.938)	0.41	(0.860)	119	975
	% Puts	4.89	2.88	2.01	(0.164)	0.95	(0.484)	0.70	(0.686)	119	975
Risk	Leverage	0.67	0.81	-0.14	(0.305)	-0.02	(0.853)	0.03	(0.832)	166	4428
	Gross Leverage	187.2	191.8	-4.64	(0.842)	24.25	(0.258)	12.34	(0.477)	151	3266
	Net Leverage	54.05	63.62	-9.57	(0.314)	1.20	(0.880)	-4.92	(0.515)	151	3266
	Pct Long	120.6	127.7	-7.05	(0.621)	12.74	(0.311)	3.75	(0.705)	151	3267
	Pct Short	66.6	64.1	2.47	(0.816)	11.53	(0.257)	8.63	(0.336)	151	3266
	Corr. OTM Call	0.35	0.31	0.04	(0.459)	0.02	(0.744)	0.03	(0.644)	151	4176
	Corr. OTM Put	-0.33	-0.29	-0.04	(0.517)	-0.01	(0.869)	-0.01	(0.906)	151	4176
	Corr. Tail Risk	0.47	0.35	0.11	(0.105)	0.07	(0.336)	0.04	(0.645)	151	4176
Disclosure and Returns	Filed 13F	0.72	0.51	0.21	(0.013)	0.13	(0.113)	0.15	(0.009)	166	4428
	Conf. Treat.	0.05	0.00	0.05	(0.004)	0.04	(0.009)	0.04	(0.085)	166	4428
	Lipper TASS	0.35	0.26	0.10	(0.220)	0.08	(0.314)	0.06	(0.522)	166	4428
	Ex. HF Rt.	-0.38	0.04	-0.42	(0.015)	-0.16	(0.312)	-0.04	(0.789)	166	4087
	Long Rt. Only	-1.07	-0.84	-0.23	(0.562)	0.32	(0.223)	0.02	(0.948)	118	2850

		Panel B: High Secrecy – Transparent									
		H. Sec.	**Trans.**	**Diff.**	**(p-value)**	**Strat. Diff.**	**Fixed Eff. (p-value)**	**Substrat. Diff.**	**Fixed Eff. (p-value)**	**Funds (Clusters)**	**Fund-Month Count**
Size and Liquidity	ln(AUM)	21.7	20.0	1.67	(0.000)	0.61	(0.002)	0.44	(0.056)	74	1583
	Illiquidity	1.18	0.78	0.40	(0.021)	0.13	(0.105)	0.07	(0.338)	74	1740
	Flows (% AUM)	1.08	5.72	-4.64	(0.165)	-0.83	(0.403)	-0.06	(0.903)	73	1526
Portfolio Composition	Complexity	1.18	0.42	0.76	(0.000)	0.12	(0.159)	0.17	(0.027)	74	1740
	Concentration	0.66	0.77	-0.11	(0.519)	0.03	(0.733)	-0.07	(0.452)	74	1740
	% Equity	77.3	85.2	-7.86	(0.158)	6.64	(0.018)	3.44	(0.416)	51	373
	% Debt	9.73	7.88	1.85	(0.694)	-5.66	(0.073)	-4.47	(0.180)	51	373
	% Pref. Stock	2.33	0.20	2.13	(0.103)	0.60	(0.256)	1.70	(0.220)	51	373
	% Calls	4.88	3.72	1.16	(0.518)	-0.69	(0.578)	0.74	(0.597)	51	373
	% Puts	5.70	2.88	2.82	(0.144)	-0.79	(0.551)	-1.38	(0.444)	51	373
Risk	Leverage	1.19	0.81	0.39	(0.043)	0.08	(0.293)	0.10	(0.348)	74	1740
	Gross Leverage	290.2	191.8	98.36	(0.076)	1.49	(0.938)	41.43	(0.170)	64	1067
	Net Leverage	59.61	63.62	-4.02	(0.789)	-2.64	(0.722)	-4.85	(0.666)	64	1067
	Pct Long	174.9	127.7	47.23	(0.112)	-0.58	(0.955)	18.29	(0.178)	64	1068
	Pct Short	115.3	64.1	51.19	(0.064)	2.07	(0.844)	23.14	(0.207)	64	1067
	Corr. OTM Call	0.28	0.31	-0.03	(0.671)	0.03	(0.376)	0.05	(0.419)	67	1620
	Corr. OTM Put	-0.24	-0.29	0.05	(0.521)	-0.04	(0.333)	-0.08	(0.266)	67	1620
	Corr. Tail Risk	0.42	0.35	0.07	(0.403)	0.03	(0.309)	0.04	(0.538)	67	1620
Disclosure and Returns	Filed 13F	0.81	0.51	0.30	(0.003)	0.13	(0.028)	0.10	(0.300)	74	1740
	Conf. Treat.	0.09	0.00	0.09	(0.009)	0.04	(0.035)	0.05	(0.060)	74	1740
	Lipper TASS	0.18	0.26	-0.08	(0.439)	-0.04	(0.483)	-0.01	(0.922)	74	1740
	Ex. HF Rt.	-0.24	0.04	-0.28	(0.185)	0.03	(0.751)	0.01	(0.933)	74	1550
	Long Rt. Only	-1.14	-0.84	-0.30	(0.533)	0.60	(0.025)	1.03	(0.055)	50	1074

Panel C: High Secrecy – Medium Secrecy

		H. Sec.	M. Sec.	Diff.	(p-value)	Strat. Diff.	Fixed Eff. (p-value)	Substrat. Diff.	Fixed Eff. (p-value)	Funds (Clusters)	Fund-Month Count
Size and Liquidity	ln(AUM)	21.7	20.6	1.11	(0.000)	0.80	(0.009)	0.75	(0.041)	160	3993
	Illiquidity	1.18	1.12	0.06	(0.644)	-0.01	(0.919)	0.14	(0.289)	160	4296
	Flows (% AUM)	1.08	1.28	-0.20	(0.698)	-0.46	(0.381)	-0.67	(0.366)	157	3918
Portfolio Composition	Complexity	1.18	0.46	0.72	(0.000)	0.20	(0.151)	0.15	(0.219)	160	4296
	Concentration	0.66	0.88	-0.23	(0.126)	-0.18	(0.258)	0.01	(0.938)	160	4296
	% Equity	77.3	82.9	-5.62	(0.198)	10.31	(0.023)	8.91	(0.172)	122	1034
	% Debt	9.73	7.11	2.62	(0.458)	-9.08	(0.020)	-9.52	(0.039)	122	1034
	% Pref. Stock	2.33	0.78	1.56	(0.229)	1.31	(0.416)	3.16	(0.287)	122	1034
	% Calls	4.88	4.03	0.85	(0.576)	-0.33	(0.850)	0.30	(0.920)	122	1034
	% Puts	5.70	4.89	0.81	(0.637)	-1.86	(0.318)	-1.99	(0.354)	122	1034
Risk	Leverage	1.19	0.67	0.53	(0.001)	0.00	(0.993)	0.10	(0.539)	160	4296
	Gross Leverage	290.2	187.2	103.00	(0.046)	-16.77	(0.690)	22.16	(0.705)	145	3061
	Net Leverage	59.61	54.05	5.56	(0.671)	-10.49	(0.484)	7.99	(0.643)	145	3061
	Pct Long	174.9	120.6	54.28	(0.046)	-13.63	(0.563)	15.07	(0.626)	145	3061
	Pct Short	115.3	66.6	48.72	(0.061)	-3.14	(0.881)	7.08	(0.814)	145	3061
	Corr. OTM Call	0.28	0.35	-0.07	(0.215)	0.04	(0.540)	0.01	(0.827)	147	4092
	Corr. OTM Put	-0.24	-0.33	0.09	(0.151)	-0.04	(0.528)	-0.07	(0.351)	147	4092
	Corr. Tail Risk	0.42	0.47	-0.05	(0.389)	0.03	(0.648)	0.02	(0.765)	147	4092
Disclosure and Returns	Filed 13F	0.81	0.72	0.09	(0.219)	0.13	(0.124)	0.09	(0.461)	160	4296
	Conf. Treat.	0.09	0.05	0.04	(0.256)	0.02	(0.597)	0.01	(0.740)	160	4296
	Lipper TASS	0.18	0.35	-0.17	(0.038)	-0.15	(0.117)	-0.16	(0.180)	160	4296
	Ex. HF Rt.	-0.24	-0.38	0.14	(0.480)	0.10	(0.615)	0.18	(0.463)	158	3999
	Long Rt. Only	-1.14	-1.07	-0.07	(0.843)	0.49	(0.206)	0.99	(0.092)	122	3036

This table repeats Table 2 from the main body of the paper, but with 3 secrecy levels instead of 2. Funds were scored by the fund of hedge funds from 1 to 4 based on the degree of secrecy (see Section 2 of the paper). We group levels 3 and 4 together because of the few that scored 4. Panels A, B, C present the differences in average characteristics between funds categorized and medium secretive and transparent, highly secretive and transparent, and highly secretive and medium secretive respectively. This table presents average characteristics for secretive and transparent funds and their differences with controls for strategy-month, substrategy-month, and no fixed effects. Standard errors used to calculate p-values for the difference are clustered at the fund level. Variables are described in Table 1 and 3 in the main body of the paper.

Table 2: Differences in Excess Hedge Fund Return with Three Secrecy Categories

Panel A: 2006-07 ex. Fund Rt.						
	(1)	(2)	(3)	(4)	(5)	(6)
Med. Secrecy	0.152	0.188	0.138	0.141	0.130	0.168
(p-value)	(0.256)	(0.195)	(0.319)	(0.286)	(0.405)	(0.245)
High Secrecy	0.389**	0.416**	0.381**	0.388**	0.305	0.205
	(0.012)	(0.019)	(0.036)	(0.029)	(0.107)	(0.324)
Med. Illiquidity		0.054		0.035		-0.042
		(0.673)		(0.791)		(0.776)
High Illiquidity		0.493***		0.371**		0.620**
		(0.002)		(0.031)		(0.031)
Med. Complexity		-0.147		-0.244		-0.196
		(0.255)		(0.127)		(0.223)
High Complexity		-0.419**		-0.345**		-0.530**
		(0.019)		(0.024)		(0.021)
Med. Concentration		0.267**		0.278**		0.152
		(0.023)		(0.030)		(0.313)
High Concentration		0.498		0.489		0.145
		(0.136)		(0.184)		(0.678)
Med. Leverage		0.376*		0.474**		0.628***
		(0.063)		(0.035)		(0.008)
High Leverage		0.261		0.310		0.604*
		(0.264)		(0.403)		(0.092)
ln(AUM)		-0.066		-0.073		-0.084
		(0.176)		(0.120)		(0.184)
Flows		-0.043***		-0.036***		-0.032***
		(0.000)		(0.000)		(0.000)
Strategy×month fixed effects			Y	Y		
Substrategy×month fixed effects					Y	Y
Observations	1,677	1,642	1,677	1,642	1,677	1,642
Adj. R^2	0.002	0.059	0.246	0.298	0.474	0.505
p-value: equal secrecy coef.	(0.0940)	(0.127)	(0.136)	(0.0912)	(0.273)	(0.842)

(continued)

Panel B: 2008-09 ex. Fund Rt.						
	(1)	(2)	(3)	(4)	(5)	(6)
Med. Secrecy	-1.048***	-1.118***	-0.810**	-0.953***	-0.523	-0.695*
(p-value)	(0.005)	(0.001)	(0.038)	(0.009)	(0.114)	(0.071)
High Secrecy	-0.801*	-0.593	-0.812*	-0.559	-0.557	0.159
	(0.063)	(0.144)	(0.066)	(0.157)	(0.255)	(0.753)
Med. Illiquidity		-1.340***		-1.665***		-0.936**
		(0.003)		(0.000)		(0.022)
High Illiquidity		-3.133***		-3.715***		-3.526***
		(0.000)		(0.000)		(0.000)
Med. Complexity		0.567		-0.071		-1.011*
		(0.205)		(0.859)		(0.072)
High Complexity		1.113**		-0.060		-0.747
		(0.021)		(0.917)		(0.355)
Med. Concentration		-0.348		-0.199		0.058
		(0.341)		(0.594)		(0.898)
High Concentration		-0.246		-0.027		0.692
		(0.664)		(0.963)		(0.276)
Med. Leverage		-0.052		-0.409		-0.332
		(0.903)		(0.373)		(0.413)
High Leverage		-0.398		-1.181*		-1.173
		(0.500)		(0.072)		(0.109)
ln(AUM)		0.0219		0.098		0.0306
		(0.899)		(0.547)		(0.847)
Flows		-0.155***		-0.136***		-0.107***
		(0.000)		(0.000)		(0.000)
Strategy×month fixed effects			Y	Y		
Substrategy×month fixed effects					Y	Y
Observations	1,602	1,560	1,602	1,560	1,602	1,560
Adj. R^2	0.004	0.171	0.278	0.390	0.566	0.631
p-value: equal secrecy coef.	(0.554)	(0.147)	(0.997)	(0.239)	(0.942)	(0.0892)

This table repeats Table 3 from the main body of the paper, but with 3 secrecy levels instead of 2. Funds were scored by the fund of hedge funds from 1 to 4 based on the degree of secrecy or other qualitative characteristic (see Section 2 of the paper). We group levels 3 and 4 together because of the small number that scored 4. This table presents the results of regressions in the form of Equation (1), which regresses hedge fund returns in excess of the risk-free rate on contemporaneous secrecy dummies for medium and high secrecy both with and without controls. Columns (3) and (4) include strategy-month fixed effects. Columns (5) and (6) include substrategy-month fixed effects. The standard errors used to calculate p-values in all regressions are clustered by hedge fund. Panel A presents results for the up-market period, April, 2006 to March, 2007. Panel B presents results for the down-market period, April, 2008 to March, 2009. The Secrecy scores are from March of 2007 and 2009 respectively. All data are described in Table 1 in the main body of the paper. ***, **, and * indicate significance at the 1%, 5%, and 10% levels respectively.