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Are Un-Registered Hedge Funds More Likely to Misreport Returns?

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Abstract

This paper seeks to introduce an empirical finance analysis of the relationship between misreporting behavior in hedge funds at the return level and registration as an investment adviser with the SEC, a law that has been enacted, overturned and re-enacted in the last decade. We hypothesize that hedge funds that are not registered with the SEC will be more likely to misreport returns so that a fund will seem as if it is generating positive returns more often than not. We test our hypothesis on the return level by conducting several statistical tests and regression models on hedge fund monthly returns that fall within a certain monthly reported return bin width. We do not find compelling evidence to support our hypothesis that funds not registered with the SEC will be more likely to misreport returns, although we do find links between certain hedge fund characteristics and misreporting behavior that is supported by the existing literature. We check the robustness of our study according to a number of parameters, including, bin widths of misreporting returns, as well as specifications controlling for fund size, hedge fund style, incentives, backfill bias, survivorship bias and other robustness checks.

Keywords: hedge fund, regulation, misreported returns, SEC, registered adviser, law and finance

Introduction

In this paper, we seek to analyze the link between the instance of hedge fund return misreporting and its relation to hedge fund regulation in the United States by asking, "Are Un-Registered Hedge Funds More Likely to Misreport Returns?"

The hedge fund industry is one of the most elite, as well as controversial industries in finance, and total assets under management of hedge funds have grown to enormous proportions. Hedge funds are thought to have played a crucial part in the most recent financial crisis. They are increasingly at the forefront of financial markets, and certain hedge fund managers have the pull to move markets. As hedge funds have become integrated into the American financial system, and engrained in the minds of the American public as one of the main players in Wall Street, they have also enjoyed a period of relatively low regulation when compared to other investment vehicles, which has drawn the criticism of many regulators and politicians, alike.

Currently, hedge funds, as private entities, are not required to disclose nearly the same amount of information as other similar investment vehicles, such as mutual funds and pension funds, although they still have to meet certain requirements pertaining to record-keeping and anti-fraud measures. In 2004, the SEC enacted a law that required hedge fund advisers managing more than $25 million and having more than 15 investors to register as an investment adviser, which entailed disclosing aspects of the fund to the SEC. However, in June 2006, the rule was overturned (Williams, 2009). In 2008, the US economy took one of the worst downturns in history and many were questioning if more regulation was needed on Wall Street. As a result, regulators analyzed all aspects of the US economy, and in July 2010, the Dodd-Frank Wall Street Reform Act was passed. The Dodd-Frank act was passed to reduce risks to the financial system

so that a crisis of that magnitude could be prevented, and many provisions in the law subject financial institutions other than banks, such as hedge funds, to greater regulatory oversight. One aspect of the law essentially reenacted the 2004 SEC registration law by requiring hedge fund advisers controlling more than $150 million in assets and having more than 15 clients to register with the SEC, as well as provide information about the fund. Information such as assets under management and trading positions of the registered hedge fund were deemed necessary so that the SEC could examine the impact that the funds had on the systemic risk of the financial system, as well as to prevent hedge fund fraud (PriceWaterhouseCoopers, various years). As the industry faces increasing regulation in the aftermath of the financial crisis, hedge funds will most likely have to adapt and find ways to meet the increased cost of meeting compliance standards. This has set the stage for an intense argument about whether these regulations will ultimately harm the state of the hedge fund industry.

It has been shown extensively in the literature that many hedge funds engage in return smoothing and return misreporting to improve the overall performance of the fund for various reasons, including attracting potential investors and preventing investor outflow. A method of measuring hedge fund monthly return misreporting was developed from the research conducted by Bollen and Pool (2008 & 2009). In their paper they outlined a theory as to what factors might contribute to the instance of hedge fund misreporting and the range of returns that should be considered for a study on misreporting. The bin width of returns they deemed significant to screen from misreporting are in the range, -0.58% to 0.58%. One can consider values in this range to be either marginally negative or marginally positive; therefore, hedge funds will be more inclined to report marginally positive returns ($0 <$ monthly return $\leq 0.58\%$) as opposed to negative returns in order to make their overall returns more attractive to investors and to prevent

fund outflow. By analyzing the amount of marginally positive returns relative to marginally negative returns, a proxy for misreporting can be inferred if there are significantly more marginally positive returns in the bin width of -0.58% to 0.58%. This is the basis for our study and how we will measure misreporting at the return level. Due to lack of regulation, we hypothesize that funds that are not registered with the SEC will have a tendency to report slightly positive returns in order to improve their performance.

This study is relevant is many ways, because it looks at the effects of one aspect of under- and over- regulation. Is regulation of hedge funds worthwhile and valuable? Also, how much regulation is needed before it becomes a hindrance to the industry? After the wake of the financial crisis, many regulators, politicians and citizens have been pushing for heavy regulation of the most important financial institutions. Proponents for increased regulation believe hedge funds should be examined carefully under the eye of the SEC and other financial regulators because of how integrated they have become in our financial system. On the other hand, opponents to increased hedge fund regulation believe that hedge funds should not be regulated because they drive economic and financial market growth. They believe that new regulations might have a negative effect on hedge fund returns, as they would need to commit more capital in meeting reporting requirements. This study seeks to find out if registration with the SEC is worthwhile in preventing the instance of misreporting, and adds to the growing literature of hedge fund regulation, as well as hedge fund fraud.

In this study, we find that hedge funds that are not registered as investment advisers are not more likely to misreport returns than hedge funds that are registered as investment advisers, using various statistical techniques outlined later in the paper. Thus, we fail to accept the

alternative hypothesis. In other words, we do not find significant evidence that the registration with the SEC effectively prevents hedge funds from misreporting their returns.

In the remaining part of this thesis, we summarize the relevant literature, and how our study takes from and advances the existing literature. Afterward, we discuss the development of our hypothesis, which is derived from the literature. The following section concerns the data set and derivation of the sample, as well as summary statistics and return histograms showing the return distribution. In the empirical analysis section, we discuss how the hypothesis was tested, including tables of statistical t-tests run on hedge funds that are either registered or not registered with the SEC. We also include a regression analysis to control for several characteristics of hedge funds, such as asset under management and fee structures. Finally, we conclude the thesis with a discussion about our findings, as well future direction for other studies in this field.

Literature Review

Our hypothesis stems from much of the existing literature concerning hedge fund regulation, especially in the United States. The first paper that sets the stage for our topic looks at the issue of the agency problem, first researched by Jensen and Meckler (1976), which sought to explain the issue of why and how there is an occurrence of selfish actions on the part of the entrepreneur who is investing the savers' capital. In our case, the entrepreneur would be the hedge fund manager who misreports returns while the savers are the investors. This paper first highlighted the compensation and incentive problems that can cause these kinds of agency problems that may lead to misreporting of hedge fund returns. The paper also helped to outline why there is a need for disclosure in the capital markets and summarized much of the previous

literature on the matter. It sets the theoretical framework for disclosure and agency problems, the basis of our hypothesis.

Another important paper is a study conducted by Liang (2003), which started to question the accuracy of hedge fund returns. The paper delves into many aspects of hedge fund returns; however, the most important finding in his paper to our hypothesis is the link between audited funds and return discrepancies. They find that audited funds have smaller return discrepancies than unaudited funds, and that auditing makes a difference in data quality. The study sheds light on hedge funds manipulating returns in the industry and provided a basis for further research into the matter.

More literature relevant to our study is the work done by Bollen and Pool (2008) on a way to screen for fraud in hedge funds. Their first goal was to assess whether the returns reported by a hedge fund was enough to develop an accurate test for fraud, however, they found that their test was only accurate around 35% most of the time. Another goal of theirs was to develop a way to detect if a hedge fund was engaging in conditional return smoothing, meaning that they are more likely to report positive returns in order to balance out the negative returns. Their research helped lay the groundwork for the type of statistical tests and inferences that our study will be utilizing. Their subsequent paper (Bollen and Pool, 2009) delved further into detail about the "Misreported Returns" variable that is at the crux of our hypothesis. Building from their previous paper, the researchers found a significant discontinuity around the pooled distribution of monthly hedge fund returns. One would expect a continuous curve distributed around zero in a bin range of marginally negative and marginally positive results, however, Bollen and Pool found that there are significantly more reported small gains than small losses. This indicates that fraud could be occurring in the hedge funds that report slightly positive returns because the managers

want to show that even though the returns are not robust, they are at least positive. This is the same way we will be able to tell if hedge funds are misreporting returns, by making a statistical inference that a hedge fund that reports a slightly positive monthly return is more likely to be misreporting returns. They also found that these results were the same across live and dead funds, as well as among different types of funds. An important part of their study that bolsters their hypothesis is that this discontinuity is not observed using bimonthly returns, indicating that the single-month discontinuity in returns is partly caused by some misreporting. They also established a range in monthly returns that will prove essential to our study; the range they found to be essential in conducting their study on misreported returns is between -0.58% and 0.58%. They also checked for robustness in their study by analyzing misreporting in the ranges between -0.48% and -0.48% and -0.68% and 0.68%.

The work of Dai and Cummings (2010) is important to this area of research because it finds important links between hedge fund misreporting, hedge fund characteristics and different hedge fund regulations in varying countries. The focus of their paper is on the instance of misreporting across different types of hedge funds and different regions of the world. Their paper analyzes the way hedge fund regulations and hedge fund characteristics across different countries have a significant effect on the instance of misreporting. Things such as minimal capital requirements, restrictions on location, distribution on service providers and wrappers have a significant effect on hedge fund misreporting. Their variable for hedge fund misreporting, a marginally positive return dummy assigned a value of 0 if the return was greater than or equal to -0.58% and equal to 0 and 1 if the return was greater than 0 but less than or equal 0.58%, was based on the discontinuity in monthly return distributions that Bollen and Pool outlined in the aforementioned studies. They also showed that misreporting affects capital inflows and that

there is an added economic benefit to misreporting returns. This is probably the most closely related study to our hypothesis testing and provided a great framework to construct our study.

In 2009, Brown, Liang, Goetzmann and Schwarz outlined the different ways that registration with the SEC could be beneficial to investors and how costly it was to hedge funds. In 2004, the SEC increased the different ways they could regulate hedge funds and required some managers to register with the SEC as investment advisers. In 2006, the rule was overturned. They tested whether this type of reporting was redundant and found that it was if the investors were well informed rational capital market participants. For the most part, the type of information that the SEC was requiring hedge funds to disclose or register could be obtained by other means and it did not help investors in identifying problem funds. This is important to our hypothesis because it provides a backdrop about regulation and registration with the SEC. Furthermore, it provides a theoretical reason as to why we could not accept the alternative hypothesis that un-registered hedge funds will be more likely to misreport returns.

PWC has a special website that goes into detail about the different details associated with hedge fund regulation and taxation, although we were mostly concerned with the former. It outlines the progression of several different bills that have come up in order to regulate hedge funds. There is a large movement within congress, especially after the financial crisis, to try to get more information from hedge funds and regulate them further to try to identify any sources of systemic risk within the markets. The information that the SEC is particularly interested in obtaining is the amount of assets under management, borrowings, off-balance sheet exposures, counterparty credit risk exposures, trading and investment positions.

These papers are the major studies in the field that we deemed important enough to summarize. They not only provided a backdrop to our study, but also helped us identify key variables and how to control for different hedge fund characteristics within the study. Most of the studies also have regression models that provided guidance when we tested our hypothesis.

Hypotheses Development

Null Hypothesis H_0 = There will be no difference in misreported returns between hedge funds that are not registered with the SEC and hedge funds that are registered with the SEC as investment advisers.

Alternative Hypothesis H_0 = Hedge funds that are not registered with the SEC as investment advisers are more likely to misreport returns, by way of having an increased number of marginally positive returns.

The development of the hypothesis stems from the idea that if a hedge fund is not required to disclose as much information, or is not subject to SEC oversight, than those hedge funds will be more likely to misreport returns. We hypothesize a correlation between hedge funds not registered with the SEC and the tendency to misreport monthly returns.

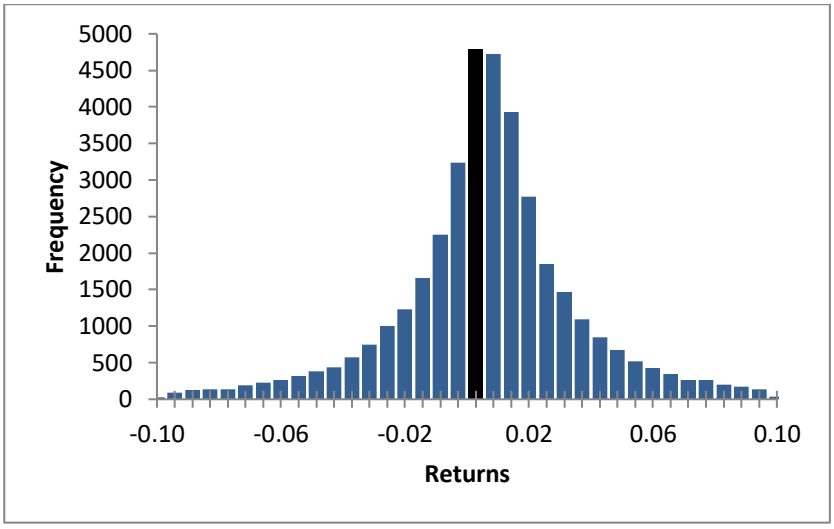
Data and Sample

The main database used in our empirical analysis was supplied by Lipper/TASS, a major hedge funds data vendor. In the database, there are 13 different styles of hedge funds. Of these styles, the five most common in terms of months of reported returns were: fund of funds (24.76%), long/short equity hedge (21.54%), event driven (17.03%), managed futures (9.57%) and equity market neutral (7.54%). Other useful information contained in the data is the

inception date of the fund, the report date, the time period that the fund reported returns, the lockup period, the estimated assets under management, as well as other variables regarding fee structure and investment strategy. To avoid survivorship bias, our sample period covered January 1994 through July 2013 for both live and dead funds. We restricted our sample to hedge funds domiciled in the U.S. The data also did not include hedge funds whose estimated assets were not in US dollars. We also excluded monthly returns for which the hedge fund did not report estimated assets. Furthermore, we excluded the first 18 months of reported returns by each hedge fund, to account for backfill bias. This left us with 31,207 hedge fund return observations and 2,154 hedge funds in the months between January 1, 1994 and July 31, 2013. We considered only the hedge fund monthly returns within the [-0.58%, 0.58%] range for our sample. To check for robustness, we also created a sample of monthly returns in the [-0.68%, 0.68%] range, as well as the narrower [-0.48%, 0.48%] range. To account for inflation, the consumer price index was used to set the estimated total assets of each fund on the reported return date to 2012 dollars. Dummy variables were used in order to perform the regression analysis. A lockup period dummy variable was created and a hedge fund return observation was either assigned a 1 if the fund had a lockup period and 0 if the fund did not have a lockup period. Similarly, if the fund had a yearly redemption, the return observation was assigned a value of 1 and 0 if the fund did not. For example, if the fund was a fund of funds, it was assigned a variable of 1 and 0 if it was not a fund of funds. Finally, the most important variable used in our study, the marginally positive return dummy, was created. If the return observation for the fund had a return greater than 0 but less than or equal to 0.58%, the fund return observation record was assigned a value of 1. If the return observation for the fund had a return greater than or equal to -0.58% or less than or equal to 0, the fund return observation record was assigned a value of 0. The 1 values for this variable are

referred to as the marginally positive return dummy throughout our paper and is our proxy for misreporting. Registration with the SEC is a variable equal to 1 if the fund is registered as an investment adviser with the SEC and 0 if the fund is not registered.

Panel A Registered hedge fund monthly return distribution



Panel B Un-registered hedge fund monthly return distribution

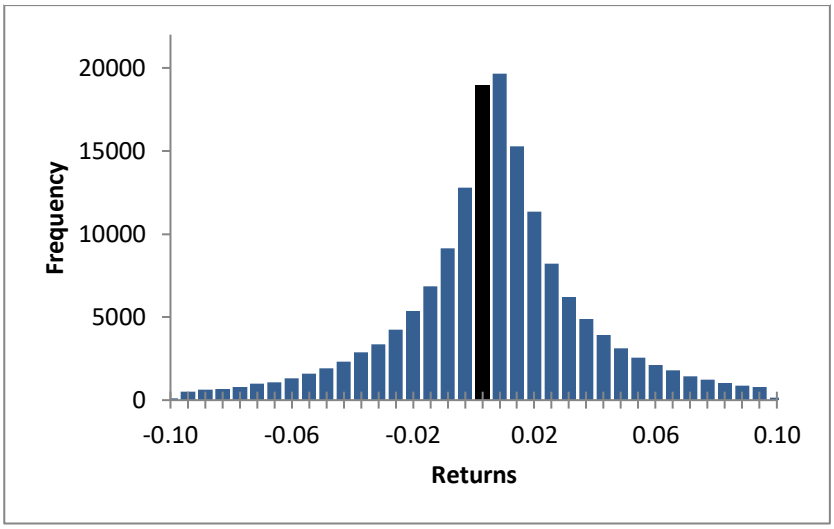


Figure 1 Discontinuity in monthly hedge fund returns around zero at a bin width of 0.0058

Figure 1 displays two histograms of raw monthly returns for sample funds from the database for registered and un-registered funds. Registered funds' monthly returns are displayed in Panel A, while un-registered funds' monthly returns are displayed in Panel B. Tails are omitted past 0.1 in order to highlight differences in marginally positive and marginally negative returns around zero. Marginally positive returns greater than 0 but less than or equal to 0.58% are highlighted by a dark-shaded bar in both graphs, showing the large jump from marginally negative to marginally positive returns.

Table 1 Summary statistics and comparison of means tests

	Registered		Not Registered		Difference
Variables	Mean	Median	Mean	Median	T-test
Fund Characteristics					
Adjusted AUM (millions)	$169.95	$62.24	$155.35	$43.79	0.0006
Management Fee	0.0129	0.0215	0.0133	0.01	0.0000
Performance Fee	0.1402	0.2	0.1669	2	0.0000
High Water Mark	0.7985	1	0.6802	1	0.0000
Leveraged	0.4996	0	0.5654	1	0.0000
Yearly Redemption	0.1230	0	0.122	0	0.4148
Lockup Period	0.4619	0	0.4113	0	0.0000
Fund of Funds	0.3426	0	0.2142	0	0.0000
No. Of Observations	6421		24786		

Table 1 provides the mean and median for the important variables used in the study and the difference in means (t-test) for each variable, showing p-values for each. The data comprise of 31,207 return observations and 2,154 hedge funds from the period of January 1994 to July 2013. In this table, fund returns outside the range of (-0.58%, 0.58%) are excluded.

Figure 1 displays two histograms of raw monthly returns for sample funds from the database for registered and un-registered funds. Registered funds' monthly returns are displayed in Panel A, while un-registered funds' monthly returns are displayed in Panel B. Marginally positive returns greater than 0 but less than or equal to 0.58% are highlighted by a dark-shaded bar in both graphs, showing the large jump from marginally negative, which are to the left of the dark bar, to marginally positive returns. Both panels show a sharp discontinuity in the distribution at zero. The frequency of returns just below zero is significant lower than expected, whereas the frequency of returns just above zero is significantly higher than expected. These

histograms help depict how our study measured misreported returns by showing the difference in the marginally positive and marginally negative dummy.

Table 1 shows the mean and median for several of our key variables from the subsample of return observations that fall between -0.58% and 0.58% for both registered and un-registered hedge funds. A difference of means test is also depicted to the far right in the table, showing if the difference in means of registered and un-registered hedge funds is significant. The data set has 31,207 return observations and 2,154 hedge funds from the period of January 1994 to July 2013. From the table, it is clear that there is a stark difference in the mean and median for adjusted assets under management (AUM) in both registered and un-registered hedge funds. For example, the mean value for adjusted AUM for registered hedge funds is $169.95 million and the median value is $62.24 million, resulting in a difference of over $100 million. It is also clear that there is a significant difference in the means of all the variables of registered and un-registered funds except for the yearly redemption dummy variable because the p-values are around 0.0000. Another note regarding the table is the much larger number of observations for funds that are not registered (24786) in contrast to registered hedge funds (6421). These variables were used for the regression analysis.

Empirical Analysis

Our main model is as follows:

$$Marginally\ Positive\ Return\ Dummy\ Variable = \alpha + \beta_1 \times Not\ Registered\ with\ the\ SEC + \beta_2 \times Control\ Variables$$

Since registration of a hedge fund with the SEC means greater transparency of the fund for investors and more regulation, we seek to infer an interaction SEC registration variable and the marginally positive return dummy variable. We conducted this test by first running t-tests on the marginally positive return dummy variables on the return level for both registered and un-registered hedge funds. This was done to find an initial significance in misreporting between registered and un-registered hedge funds. The results are listed below in Table 2 and discussed later in the section. To test for robustness, we also repeated this testing at the 0.48% and 0.68% bin widths.

In our regression analysis, we tested our hypothesis and further cemented our findings by controlling for other fund specific factors, listed in the summary statistics table above, that are important in hedge fund misreporting according to the literature, including fund AUM, performance and incentive fees, yearly redemption lockup period and several different investment strategies. A regression analysis was performed in Microsoft Excel by setting the marginally positive return dummy as the dependent variable and the SEC registration variable as the independent variable. The log and log-squared of the AUM, management fee, incentive fee, high watermark variable, leverage variable, lockup period variables and several hedge fund strategy dummy variables were also set to the independent variables in the regression analysis. To test for robustness, we also repeated this testing at the 0.48% and 0.68% bin widths.

Table 2 Univariate tests of the marginally positive return dummy

t-Test: Two-Sample Assuming Unequal Variances		
Statistic	*Registered*	*Not Registered*
Mean	0.5819* *0.5899*** 0.5963***	0.5822* *0.5910*** 0.5985***
P(T<=t) one-tail	0.4816* *0.4377*** 0.3681***	
P(T<=t) two-tail	0.9631* *0.8754*** 0.7361***	

Table 2 shows the univariate testing that was performed on the marginally positive return dummy variables of the registered return observations versus the marginally positive return dummy variables of the un-registered return observations. It should be noted that one asterisk signifies the t-test performed at the 0.0048 bin width, two asterisks signify the t-test performed at the 0.0058 bin width and three asterisks signify the t-test performed at the 0.0068 bin width. The p-values at the one and two tail levels are also listed, showing no significance at either level.

We performed a t-test on the sample means of the marginally positive return dummy variables for both registered and un-registered hedge funds using Microsoft Excel. Table 2 shows the t-test means and significance for two-samples with unequal variances. It should be noted that one asterisk signifies the t-test performed at the 0.0048 bin width, two asterisks signify the t-test performed at the 0.0058 bin width and three asterisks signify the t-test performed at the 0.0068 bin width. At the 0.0058 bin width, the mean of the marginally positive return dummy variable for registered hedge funds is 0.5899 and the mean of the marginally positive return dummy variable for un-registered hedge funds is 0.5910. One can see that the mean of the variable that is the proxy for misreporting is higher in funds that are not registered with the SEC, in line with our hypothesis; however, the difference in the means is not significant, showing a p-value of 0.4377

at the 0.0058 bin width. These results do not support our alternative hypothesis and a regression analysis was performed to investigate the t-test results further.

Table 3 Regression analysis of hedge fund return misreporting at different bin widths

	0.0048 bin width	0.0058 bin width	0.0068 bin width
Intercept	0.5107 (0.0009)	0.5119 (0.0006)	0.4969 (0.0002)
SEC Registered	-0.0047 (0.5423)	-0.0063 (0.3702)	-0.0080 (0.2251)
Log AUM	0.0156 (0.7013)	0.0163 (0.6812)	0.0222 (0.5311)
Log^2 AUM	0.0000 (0.9873)	0.0000 (0.9853)	-0.0004 (0.8668)
Management Fee	-0.0115 (0.0259)	-0.0125 (0.0085)	-0.0122 (0.0054)
Incentive Fee	0.0013 (0.0209)	0.0012 (0.0217)	0.0009 (0.0592)
High Water Mark	-0.0038 (0.6110)	-0.0002 (0.9758)	0.0009 (0.8908)
Leverage	-0.0049 (0.4458)	-0.0067 (0.2538)	-0.0077 (0.1595)
Lockup Period	-0.0071 (0.2820)	-0.0008 (0.8976)	-0.0011 (0.8375)
No. of Observations	26,075	31,207	36,217
Adjusted R-Squared	0.97%	1.17%	1.23%

Table 3 shows the values obtained from the regression analysis that was performed on the sample. The dependent variable is the marginally positive return dummy in the 0.58% bin width during the period from January 1994 – July 2013. The independent variables include the SEC registration variable, log and log-squared of the adjusted AUM of the fund, management fee, incentive fee, the high water mark variable, the leverage variable, and the lockup period dummy variable. Please refer to the Appendix for detailed definitions of these variables. P-values are reported in parentheses and the number of observations and adjusted R-squared values are reported at the bottom of the table.

We performed a regression analysis on the sample at a bin width of 0.0058, as well as 0.0048 and 0.0068 to make our findings more robust. The dependent variable is the marginally positive return dummy. The independent variables include the SEC registration variable, log and log-squared of the adjusted AUM of the fund, management fee, incentive fee, the high water mark variable, the leverage variable, and the lockup period dummy variable. P-values are reported in parentheses and the number of observations and adjusted R-squared values are reported at the bottom of the table. From this table, we can see that the SEC registration variable is negatively associated with the marginally positive return dummy, in line with our hypothesis that un-registered funds are more likely to misreport returns; however the findings are definitely not significant at either confidence level. The p-value at the 0.0058 bin width is 0.3702, similar to what we found for the t-tests. From the table, we can also see that management fee is negatively associated with the marginally positive return dummy and that incentive fee is positively associated with the marginally positive return dummy. Both are significant at the 95% confidence level, with p values less than 0.05. It is also clear that high water mark, leverage and the lockup period dummy variable are negatively associated with the marginally positive return dummy as well, with both being significant at the 99% confidence level. The adjusted R-squared values for the regression analysis is very small, indicating a loose correlation.

Conclusion

This paper outlines a finance analysis that was performed on the link between SEC registration as an investment adviser and fund return level misreporting. Consistent with previous literature (Bollen and Pool, 2009; Cumming and Dai 2010), we show in Figure 1 a discontinuity around returns just below and above zero. In this way, hedge fund managers are incentivized to misreport monthly returns that are marginally positive in order to smooth their performance and attract investors.

After conducting several statistical tests, we failed to accept the alternative hypothesis that un-registered hedge funds are more likely to misreport returns because of inconclusive evidence in both the univariate and multivariate analyses. This means, by the design of our study, that hedge fund registration is not an accurate predictor of whether the hedge fund monthly returns are marginally positive, a proxy for misreporting. To make the study more robust, we performed the same analysis on two other ranges of monthly returns, bin widths of 0.48% and 0.68%. The tests showed slight variation between the different ranges of monthly returns, there was still no significant evidence to accept the alternative hypothesis. The data could signify a couple different things. First, it does not seem that registration with the SEC has any significant effect on the misreporting of monthly returns of hedge funds. As one hedge fund trader said, "Hedge fund registration with the SEC is easy. It only takes an hour and you only have to do it once a year." This could mean that registration with the SEC is not a big deal or time-consuming for hedge funds and hedge funds will find a way to misreport returns somehow. Although this doesn't mean that the information collected from the registration process it not valuable to the SEC. They might use the data to screen for fund externalities and systemic risk. Another idea of why alternative hypothesis was not accepted was because the hedge funds that we looked at in

the study were only domiciled in the US, and perhaps the increased regulation does not have an effect on reporting because we have very efficient markets here comprised of sophisticated investors. Other studies looked at hedge funds around the world and saw that differences in regulation had an impact on return manipulation. In countries with less developed markets, regulations might have a significantly greater impact on preventing misreporting and other fraudulent activities.

Some of the statistical results in this paper are consistent across past literature, showing links between misreporting and certain hedge fund characteristics like AUM, fee structures and investment style. The methodology used is most consistent with the studies conducted by Cumming and Dai (2010). The evidence from this study is inconclusive to support the alternative hypothesis that hedge funds not registered with the SEC are more likely to misreport returns. Further investigation is needed into the link between regulation and misreporting in the United States. Future directions for the study include performing the study at the fund level or identifying different kinds of misreporting flags.

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Appendix

Table 4 Variable definition table

Variables	Definition
Fund Misreporting	
Marginally Positive Return Dummy	A dummy variable equal to one for monthly returns between 0 and 0.0058, and equal to zero for returns between −0.0058 and 0. This cutoff is selected based on Bollen and Pool (2009). (The sensitivity of this dummy variable to specifications at the 0.0048 and 0.0068 cutoff points is assessed in the regressions.)
Rate of Return	The monthly rate of return of the hedge fund on the reporting date in decimal format

Fund Regulation	
Registered Investment Adviser	A dummy variable equal to 1 if the fund is registered as an investment adviser with the SEC
Fund Characteristics	
Adjusted AUM	The fund's assets adjusted in 2012 US dollars
Management Fee	The fixed fee in percentage for management compensation
Performance Fee	The carried interest performance fee in percentages for management compensation
High Water Mark	A dummy variable equal to 1 if the fund utilizes a high water mark as an incentive to perform well
Leveraged	A dummy variable equal to 1 if the fund utilizes leverage techniques
Yearly Redemption	A dummy variable equal to 1 if capital redemptions are possible only on an annual basis
Lockup Period	A dummy variable equal to one if the fund has a lock-up provision
Fund of Funds	A dummy variable equal to one if the fund is a fund-of-funds
Long/Short Equity Hedge	A dummy variable equal to one if the fund is categorized under long/short equity hedge
Event Driven	A dummy variable equal to one if the fund is categorized under event driven
Equity Market Neutral	A dummy variable equal to one if the fund is categorized under equity market neutral
Managed Futures	A dummy variable equal to one if the fund is categorized under managed futures
Convertible Arbitrage	A dummy variable equal to one if the fund is categorized under convertible arbitrage
Multi-Strategy	A dummy variable equal to one if the fund is categorized under multi-strategy