

Hedge Fund Returns: Auditing and Accuracy

Bing Liang
Weatherhead School of Management
Case Western Reserve University
Cleveland, OH 44106-7235
Phone: (216) 368-5003
Fax: (216) 368-6249
E-mail: BXL4@po.cwru.edu

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Abstract

In this paper, we investigate why the same hedge fund may report different performance measures in different places. We find that auditing plays an important role in explaining this difference. Although majority hedge funds state they have auditors, a significant proportion of hedge funds are not effectively audited. Especially, dead funds are less effectively audited than live funds. We find that audited funds have a much lower return discrepancy than non-audited funds. There is a significantly positive correlation between the auditing variable and fund size. Large funds tend to be audited while small funds tend not to be. Funds listed on exchanges, fund of funds, funds with broad investors, funds open to the public, funds invested in a single industrial sector, and unleveled funds have less return discrepancy than the other funds. These findings suggest a need for hedge fund auditing.

The recent collapse of Enron Corp. has raised the question of auditing effectiveness on public companies. As the outside auditor, Arthur Andersen LLP is under harsh scrutiny for its conduct and relations with Enron.

A related question is how effective private companies such as hedge funds are audited. Public companies are required for auditing and disclosing while private companies are not. Given the optional feature for auditing, how well are hedge funds audited? What is the impact of auditing on the accuracy of hedge fund information?

Calculating hedge fund returns may not be an easy task because several aspects can complicate it. Hedge funds invest in a wide range of financial assets, ranging from equity and bonds, emerging market securities, swaps, sophisticated derivative securities, and currencies, to mortgage backed securities, convertible debt, and regulation D securities. Pricing may not be easy for these diversified positions in different securities across different markets. Different currencies can be involved in pricing these transactions. Some of the assets may be illiquid, hence prices may be stale and hard to determine. Using leverage, directly from borrowing and indirectly from holding derivative securities and short positions, can further complicate return calculations. Finally, management fee and incentive fee deduction above a certain hurdle rate, together with the high watermark provision, can make calculations of net asset value and returns even more problematic.

By nature, hedge funds are basically not regulated and are not required to report their fund information to the SEC. Hedge funds are not even required for auditing because of the private partnership structure. Many hedge funds choose to have their funds audited simply because of professionalism and signaling fund quality to investors. However, academic studies have questioned the quality and the accuracy of hedge fund data. Liang

(2000) compares two major hedge fund databases and finds some inconsistency between the two datasets. Fung and Hsieh (2000), Ackermann, McEnally, and Ravenscraft (1999), Brown, Goetzmann, and Ibboston (1999) all document different survivorship biases for hedge funds.

In this paper, we study some very fundamental issues for hedge funds: How much can we trust the reported return information by data vendors? What affects the quality of hedge fund data? Can we make recommendations to improve the data quality for future research and for the investment community?

Our basic hypothesis is that auditing plays a critical role in the quality of hedge fund data. Our conjecture is that audited funds have better data quality and more accurate return information than the non-audited funds. The purpose of auditing is to insure data consistency and to correct errors when they are found. A very interesting phenomenon in auditing hedge funds is the following: Although a vast majority of hedge funds have auditors, a significant proportion of audit dates are missing (Figure 1). This implies that a large amount of hedge funds is not effectively audited. Our goal is to find out what is the impact of missing auditing on hedge fund returns. This is an important issue because the previous study of hedge funds focuses on performance and risk, which all depend on the quality of return information. The accuracy of hedge fund returns directly affects measurement on risk and returns. Therefore, our paper has important implications to both academia and practitioners. By studying the return measurement issue, we can further shed light on future studies in hedge funds in the direction of how to use quality data.

The paper is organized as follows. Section I describes data and methodology. Section II combines TASS data with the US Offshore Fund Directory for comparison. Section III

compares a recent TASS data with a previous one to examine data consistency. Section IV matches onshore funds with their offshore equivalent in TASS for data accuracy. Section V concludes the paper.

I. Data and Research Design

A. Data

In this paper, we use two major hedge fund databases: one from TASS Management Limited (hereafter TASS) and another from US Offshore Fund Directory (hereafter Offshore). The two databases are major hedge fund databases for academic researches. For example, Fung and Hsieh (1997a, 1997b, 2000), Liang (2000), and Brown, Goetzmann, and Park (2001) use TASS data while Brown, Goetzmann, and Ibbotson (1999) use the Offshore data. Offshore publishes data on an annual basis. From the 1990 version to the 2000 version, Offshore data contains 1,358 offshore funds.

There are three versions of TASS data available for our study: July 31, 1999 (2,016 funds in total including 1,407 live funds and 609 dead funds), December 31, 2000 (2,562 funds in total including 1,668 live funds and 894 dead funds), and March 31, 2001 (2,545 funds in total including 1,543 live funds and 1,002 dead funds). We use these different versions for a comparison purpose.

B. Research Design

B.1 How to measure data accuracy

We measure the quality of hedge fund returns in three different ways. First, we compare two major databases for consistency: TASS and Offshore data. The same funds should offer identical returns regardless of which database they are in. We consider a data problem exists if return discrepancy between the two databases is found. Second, we compare two versions of the TASS data from two different snap shots. Historical returns should be the same for the same funds across two different versions. Third, we compare onshore funds with their offshore twins. Funds with the same manager and identical fund characteristics should offer similar returns. Again, we define inaccuracy whenever we find return discrepancies.

B.2 How to measure auditing effectiveness

There are two major auditing variables in the TASS data: auditor name and the last auditing date. As of December 31, 2000, there are 1,668 live funds in the TASS data, out of which 1,552 have non-missing auditors while 116 (6.95%) have auditors missing. For the 1,552 funds with non-missing auditors, 998 have non-missing audit dates and 554 (35.7%) have missing auditing dates. In contrast, for the 116 funds with missing auditors, 95 have missing auditing dates and only 21 have non-missing auditing dates. Therefore, non-missing auditor may not be sufficient for measuring auditing effectiveness since audit dates can still be missing. Considering the above factors, we use the missing auditing date as the measure of ineffective auditing.

In contrast, for the 895 dead funds, 806 have non-missing auditors while 89 (9.94%) have missing auditors. For the 806 funds with non-missing auditors, 464 have non-missing dates and 342 (42.4%) have missing audit dates. Therefore, dead funds are even less effectively audited than live funds.

Table 1 exhibits the relationship between auditing and fund assets.¹ Interestingly, funds with missing auditing dates are smaller than those without missing auditing dates. Further, funds with the Big Five firms as their auditors have larger fund assets than those with non-Big Five firms.

B.3 Other factors that affect data quality

Except for effective auditing, other factors may also relate to the data quality. We classify these factors into three categories:

Transparency: we expect that transparent funds will have better data quality than other funds. Transparency can be measured by variables such as listed on exchanges and open to the public.

Manager efforts: Managers of fund of funds do not engage in daily trading activities so they may have more time to verify return accuracy than hedge fund managers. Also, funds with managers' personal investments may have better data quality because these managers may try harder to make sure the returns are correct for their own sake.

Easiness of calculating returns: Returns of unlevered funds will be easier to calculate than those of levered funds since leverage may complicate portfolio positions and daily

¹ We report live funds only since dead funds may disappear at different time and assets are at different times.

settlement. Funds investing in a single industrial sector will have simpler returns than those who invest in multiple sectors, especially if these sectors contain less liquid assets.

II. TASS versus the US Offshore Fund Directory

In this section we compare the same funds that exist in two different databases: TASS and the Offshore data. Since we have combined Offshore data from the 1990 version through the 2000 version, we match it with the December 31, 2000 version of TASS data. There are 1,358 funds in the Offshore data and 2,565 funds (including 1,668 live funds and 897 dead funds) in TASS. However, there are only 251 common funds (with exactly the same names) across both databases. It turns out that all of these 251 funds are live funds. They represent 891 annual fund return observations. Annual return numbers are calculated from compounding monthly returns in TASS while annual returns are directly provided by the Offshore data.

In Table 2, the average return difference between the TASS data and the Offshore data is -0.71% per year for these 251 common funds. The difference is significant at the 5% level. The absolute return difference is as high as 5.49% per year and significant at the 1% level. Therefore, two data vendors provide different average return information for the same 251 funds. This implies that returns for a particular fund on a particular date could be different based on different data sources. To further examine which data is more accurate, we crosscheck whether the reported returns in each database match the corresponding percentage change in net asset values (NAV). In the Offshore Fund data, the average discrepancy between the reported return and the percentage change of NAV

is 0.29% per year (based on 631 observations) while the average discrepancy from TASS is zero. The accuracy of the TASS data is consistent with the findings in Liang (2000) where he finds that TASS provides better data quality than Hedge Fund Research, Inc. (HFR). The 0.29% discrepancy can explain 41% of the 0.71% return difference between TASS and the Offshore data.

From Table 2 we can also see that funds that are effectively audited have lower return discrepancy than those that are not. The absolute return difference between the audited and non-audited funds is 3.91% (8.82%-4.91%) on an annual basis, which is significant at the 1% level although the raw return difference is not significant.

Table 3 displays the raw return discrepancy and the absolute return discrepancy between the two databases, together with fund characteristics as classifying categories. In terms of raw return discrepancy, the only significant fund category (at 10% level) is fund of funds/hedge funds, where fund of funds has an average zero return discrepancy while hedge funds have a return discrepancy of -0.97% per year. Therefore, funds of funds report returns more accurately than hedge funds since managers of fund of funds do not have to engage in daily trading activities and therefore, can spend more time concentrating on bookkeeping, verifying return accuracy, and providing investors with accurate performance information on a timely basis.

Regarding the absolute return discrepancy between the two databases, significant fund categories are frequency of paying incentive fees, audit date, funds listed on exchanges, fund of funds/hedge funds, investor type, funds open to the public, single/multi industrial sectors, and fund leverage. Generally, audited funds, funds listed on exchanges, fund of funds, funds open to both US and non-US investors, funds open to

the public, funds invested in a single sector, and unlevered funds have lower return discrepancy than the other funds. In the above fund categories, return differences are significant at either a 99% or 95% confidence level. In addition, for the category called frequency of paying incentive fees, the return difference is significant at the 10% level between different fee payment intervals. This means that funds paying incentive fees on an annual basis have a larger return discrepancy than those paying more frequently than an annual basis. When funds pay incentive fees more frequently than an annual basis, they have a better opportunity to verify return accuracy.

Table 4 reports the regression results of absolute return difference on fund assets and other fund characteristics. Consistent with the univariate test in Table 3, significant variables are fund assets, audit date, personal investment, single/multi sectors, and leverage. In general, large funds, funds with non-missing audit dates, fund of funds, funds with managers' personal investment, funds open to the public, funds investing in a single industrial sector, unlevered funds, and funds paying incentive fees not on an annual basis have low return discrepancy. Note that the variable audit date has the highest *t*-statistic among all explanatory variables.

III. Two different versions of TASS data

After we compare two different databases, we turn to the same dataset from a single data vendor. TASS updates its data on a monthly basis, with recent information overwriting the previous data. In this section, we use two different versions of TASS data: one from July 31, 1999 and the other from March 31, 2001. The purpose of using

two different versions is to examine whether there is any inconsistencies for the same fund returns over the same time horizons across two versions. Fund managers may change fund returns later for correcting errors, inflating performance, or for some other unknown reasons. Our hypothesis is that data inconsistencies may occur especially when funds are not audited.

As a matter of fact, across the two databases, there are 3,638 monthly return observations that are different for the same funds over the same time horizons. These 3,638 observations are from 461 hedge funds. If data were perfectly accurate, there would be no inconsistencies at all.

In Table 5, we report the distribution for return discrepancy between the two data versions. Although the majority (98%) have a return discrepancy between -1.0% to 1.0% , these differences can be as high as -23% and 27% per month for the exact same funds appearing in two different data versions.

In Table 6, the raw (absolute) return difference between the 2001 and 1999 data is -0.037% (0.53%) per month. We can also see that the raw return (absolute) difference between the 2001 and 1999 data is only 0.01% (0.46%) per month if funds are audited, compared to -0.15% (0.69%) per month if funds are not audited. The 0.15% monthly difference is equivalent to an annual return difference of 1.81% . The difference is significant at the 5% level; the absolute return difference between the audited and non-audited funds is 0.22% ($0.6866\%-0.4623\%$) a year, which is significant at the 1% level. These all indicate that non-audited funds indeed have large errors and low data quality. In addition, the absolute return difference is 0.36% ($0.7574\%-0.4006\%$) between Big Five auditors and non Big Five auditors. The difference is significant at the 5% level. This

may suggest that Big Five firms provide better auditing service than the non Big Five firms. Although Arthur Andersen funds has larger errors than the other Big Five funds when raw return difference is used, the absolute return difference for the other funds are higher than that for Arthur Andersen funds.

Table 7 displays the average return differences across the two versions and fund characteristics as classifying categories. We report not only raw return differences but also absolute return differences since we do not know exactly which data version is more accurate and which direction the error goes.² By using absolute returns, we can avoid having the positive and negative errors cancel each other out.

In Table 7, audit date is the only significant variable in determining the raw return difference and other variables are not significant in explaining the return difference across the two data versions.

Absolute return differences are significantly related to variables such as auditing, fund of funds or hedge funds, manager's personal investment, or single/multi industrial sectors. Generally, audited funds, fund of funds, funds with manager's personal investment have less absolute return errors. For example, audited funds have an absolute return difference of 0.46% per month while non-audited funds have an error of 0.69%. The difference between 0.46% and 0.69% is significant at the 1% level. Note that 411 observations from 362 funds with missing information on single/multi fund managers, manager's personal investment, single/multi industrial sectors, and leverage ratio result in the largest error regardless of raw return or absolute return measures.

² It is possible that errors are found either in the later version and then corrected or data is inflated /smoothed in the later version in order to impress investors. In either case, a data error will occur.

In Table 8, we report the audit date distribution according to the 2001 data. To consider the common time horizon, we focus our attention on July 1999. Out of 461 funds having inconsistent returns in our sample, 201 (43.6%) are not effectively audited and 206 (44.69%) are audited. Auditing dates are clustered in a few Decembers, with December 1998 capturing the largest amount of audited funds in any given month. However, we do not observe an increasing trend for fund auditing: In December 1999 we have only 44 audited funds while in December 2000 there are only two.

IV. Onshore funds versus offshore equivalents

To further test the auditing hypothesis, we examine onshore funds with their offshore equivalents. We expect that these pairs offer similar returns if they belong to the same fund family, have the same fund manager, use the same investment strategy and same leverage, and charge the same fees. The only difference between the two vehicles is the fund location, which should not be critical for determining fund returns.

In the 1999 version of TASS data, there are 1,407 live funds. We find 37 pairs of onshore funds with their equivalent offshore vehicles. Deleting one pair that has abnormally high return differences in two out of the 12-month history, we have 36 pairs left in our final sample.

In Table 9 there are 16 audited pairs and 20 non-audited pairs.³ The average monthly return difference between the onshore funds and offshore funds is 0.12% per month for the audited pairs and 0.24% for the non-audited pairs. Although the latter doubles the

³ 16 audited pairs are defined as both onshore and offshore funds are audited while 20 non-audited pairs are defined otherwise.

former, the difference is not statistically significant. The average absolute return difference is 0.17% for the audited pairs and 0.33% for the non-audited pairs. The difference between 0.17% and 0.33% is significant at the 5% level. Therefore, audited pairs have less return discrepancy than the non-audited pairs. Remember that error may occur either way, so we use not only the raw return difference but also absolute return difference.

In Table 10, we list the average assets and ages for these 36 pairs. The average onshore fund has an asset of \$58 million, compared with \$33 million for the offshore funds. The average fund age for the onshore funds is 58 months while it is only 39 months for the offshore vehicles. The 19-month difference is significant at the 5% level. Therefore, onshore funds are larger and older than their offshore equivalents. It seems that fund managers establish onshore funds first, and then start an offshore equivalent at a later stage when they gain some expertise in fund management and want to attract investors from different countries. The average time lag is about one and a half years.

Interestingly, there is a positive correlation between the audit dummy variable (defined as 1 if one or both of the audit dates is non-missing and zero if both audit dates are missing for the pair) and the fund assets. The correlation coefficient between the logarithm of onshore assets and the audit dummy is 0.55 with a p -value of 0.0006, while the correlation coefficient between the logarithm of offshore assets and the audit dummy is 0.31 with a p -value of 0.0627. Therefore, large funds tend to be audited while small funds tend not to be audited. Large funds are more likely have auditors than their smaller counterparts as their large assets and more complicated positions may also require more scrutiny than smaller funds.

V. Conclusion

In this paper, we investigate data accuracy for hedge funds and explore reasons why discrepancy in fund returns exists across different data sources. We compare the same funds that appear in two different databases for return discrepancy. We analyze fund returns in the same database but from two different versions: a previous version and an updated version. We also compare onshore funds with their equivalent offshore products to see whether return discrepancy between the two occurs. The following is our main findings:

First, audited funds have a much lower return discrepancy than non-audited funds. Auditing makes a clear difference on data quality. Unfortunately, over 40% of hedge funds in our sample are not effectively audited, i.e., they don't have a clear auditing date. In addition, we do not observe an increasing trend for fund auditing based on auditing dates. Given the strong correlation between auditing and data accuracy, we strongly recommend that hedge funds should be audited and investors should look for audited funds instead of non-audited ones.

Second, dead funds are less effectively audited than live funds. This may be caused by bad data quality of these funds with missing information or poor administration of the funds.

Third, there is a significantly positive correlation between the auditing dummy variable and fund size. Large funds tend to be audited while small funds tend not to be. This is probably because large funds can afford to have an auditor and there are more

needs for auditing their large money pools or complicated portfolio positions. Since large funds are more likely to be audited, they provide better data quality than their smaller counterparts.

Forth, funds listed on exchanges, fund of funds (compared with hedge funds), funds with both US and non-US investors, funds open to the public, funds invested in a single sector (compared with multiple sectors), and unlevered funds have better data quality than the other funds. It is understandable that these fund managers have done due diligence to better keep their books and to report return information more accurately since these funds are funds of funds, listed on exchanges, and open to the public. Their returns also may be easily calculated since they do not use leverage and invest only in a single industrial sector.

Finally, we find that, on average, onshore funds are about 80% larger and one and a half years older than their equivalent offshore products. We compare matched pairs between onshore and offshore funds with the same fund family, manager, leverage, style, and fee structures. It seems that hedge fund managers normally establish an onshore vehicle in the US. When managers gain experiences and funds get large, they start an offshore equivalent to take tax advantages and attract foreign investors.

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Table 1. Auditing and Fund Assets

As of December 31, 2000, TASS Management Limited (TASS) has 2,562 funds, including 1,668 live funds and 894 dead funds in the database. We report live funds only since dead funds may disappear at different times, which can cause difficulty to compare fund assets at different times.

Variables	# of Funds	Mean	Standard dev	Median
Missing auditor	67	\$68,078,598	\$162,637,426	\$21,658,187
Non big five	346	82,243,912	180,155,948	18,910,000
Big five	929	182,855,697	1,340,087,155	35,500,000
Missing date	502	64,710,656	228,439,363	17,000,000
Non Missing	840	202,864,110	1,402,523,705	41,489,000
Total	1,342 ^a	151,185,247	1,120,121,625	28,510,673

^a326 funds have missing asset information.

Table 2. Annual Return Difference between TASS and The US Offshore Fund Directory

As of December 31, 2000, TASS Management Limited (TASS) has 2,562 funds, including 1,668 live funds and 894 dead funds in the database. The US Offshore Fund Directory (Offshore) has 1,358 funds. There are only 251 funds common to both databases; these 251 funds result in 891 annual observations. The return difference is calculated as the annual return difference between TASS and Offshore. Annual returns are calculated from compounding monthly returns in TASS while annual returns are directly provided by the US Offshore Fund Directory. The 251 funds are all live funds.

All 251 funds							
Variable	N	Mean	Std Dev	t-value	Median	Min	Max
Difference	891	-0.71%	9.69%	-2.19 **	-0.11%	-75.89%	64.45%
Abs (diff)	891	5.49	8.01	20.46 ***	2.94	0.01	75.89
Audit date not missing							
Difference	760	-0.45	7.87	-1.58	-0.09	-55.30	44.75
Abs (diff)	760	4.91	6.16	21.97 ***	2.92	0.01	55.30
Audit date missing							
Difference	131	-2.24	16.68	-1.54	-0.30	-75.89	64.45
Abs (diff)	131	8.82	14.31	7.05 ***	3.50	0.02	75.89
Big Five							
Difference	809	-0.64	9.33	-1.95 *	-0.10	-75.89	64.45
Abs (diff)	809	5.32	7.69	19.68 ***	2.96	0.01	75.89
Non Big Five							
Difference	72 ^a	-2.26	12.01	-1.60	-0.42	-48.68	36.30
Abs (diff)	72	6.84	10.10	5.75 ***	2.73	0.03	48.68
Andersen							
Difference	48	-0.63	7.57	-0.58	-0.38	-35.81	16.12
Abs (diff)	48	4.61	6.00	5.32 ***	2.49	0.14	35.81
Big Four							
Difference	761	-0.64	9.63	-1.83 *	-0.10	-75.89	64.45
Abs (diff)	761	5.37	8.02	18.47 ***	3.01	0.01	75.89

^aThere are 10 observations with missing auditors.

***significant at the 1% level

**significant at the 5% level

*significant at the 10% level

t (Raw diff: audit date missing-non missing)=-1.21. t (Abs diff: audit date missing-non missing)=3.08.

t (Raw diff: Big Five-non Big Five)=-1.12. t (Abs diff: Big Five-non Big Five)=-1.25.

t (Raw diff: Andersen-Big Four)=-0.01. t (Abs diff: Andersen-Big Four)=-0.83.

Table 3. Annual Return Difference (between TASS and Offshore) and Fund Characteristics

As of December 31, 2000, TASS Management Limited (TASS) has 1,668 funds in the database while The US Offshore Fund Directory (Offshore) has 1,358 funds. There are only 251 funds common to both databases; these 251 funds result in 891 annual observations. The return difference is calculated as the annual return difference between TASS and Offshore. Annual returns are calculated from compounding monthly returns in TASS while annual returns are directly provided by the US Offshore Fund Directory. The 251 funds are all live funds. Audit='No' if audit date=missing.

Variable	Raw diff			Abs diff			
<i>Ifee Interval^a</i>							
	Missing	Annual	Non-annual	Missing	Annual	Non-annual	
N	219	478	194	219	478	194	
Mean	0.34	-0.98	-1.25	4.46	6.19	4.92	
Std Dev	6.33	11.12	8.94	4.49	9.29	7.55	
<i>t</i> -value ^b				0.33			1.84*
<i>Audit date</i>							
		Yes	No		Yes	No	
N		760	131		760	131	
Mean		-0.45	-2.24		4.91	8.82	
Std Dev		7.87	16.68		6.16	14.31	
<i>t</i> -value				1.21			-3.08***
<i>List on exch</i>							
	Missing	Yes	No	Missing	Yes	No	
N	37	237	617	37	237	617	
Mean	0.81	-0.38	-0.93	6.36	3.91	6.04	
Std Dev	10.70	6.33	10.64	8.58	4.98	8.81	
<i>t</i> -value				0.93			-4.44***
<i>Fund advisor</i>							
		Single	Multi		Single	Multi	
N		647	244		647	244	
Mean		-0.96	-0.06		5.89	4.42	
Std Dev		10.68	6.29		8.96	4.47	
<i>t</i> -value				-1.55			3.24***
<i>FOF/HF^a</i>							
		FOF	HF		FOF	HF	
N		239	652		239	652	
Mean		0.00	-0.97		4.45	5.87	
Std Dev		6.34	10.64		4.51	8.93	
<i>t</i> -value				1.66*			3.12***
<i>Open to public</i>							
	Missing	Yes	No	Missing	Yes	No	
N	12	174	705	12	174	705	
Mean	2.92	-0.38	-0.86	8.73	3.81	5.84	
Std Dev	15.27	6.13	10.27	12.62	4.80	8.49	
<i>t</i> -value				0.79			-4.19***
<i>Personal investment</i>							
	Missing	Yes	No	Missing	Yes	No	
N	34	555	302	34	555	302	
Mean	0.71	-0.71	-0.88	6.68	5.40	5.51	
Std Dev	11.14	8.86	10.90	8.87	7.06	9.45	
<i>t</i> -value				0.23			-0.18
<i>Industry sector</i>							
	Missing	Multi	Single	Missing	Multi	Single	
N	37	492	362	37	492	362	

Mean	0.81	-0.79	-0.76	6.36	5.90	4.84	
Std Dev	10.71	10.42	8.48	8.58	8.62	7.01	
<i>t</i> -value				-0.05			1.98**
<i>Leverage</i>							
	Yes	No		Yes	No		
N	631	260		631	260		
Mean	-0.83	-0.43		5.89	4.50		
Std Dev	10.59	7.03		8.84	5.41		
<i>t</i> -value				-0.66			2.86***

***significant at the 1% level

**significant at the 5% level

*significant at the 10% level

^aFOF is classified using the Offshore Fund data. So do the other two variables.

^b*t*-value for the difference between annual and non annual fee intervals.

Table 4. Regression results of absolute difference on fund variables

The dependent variable is the absolute annual return difference between TASS and US Offshore fund directory. All independent variables are dummy variables except for Log(asset). Audit date=1 if date is not missing and 0 if missing. Single/multi advisor=1 if single manager and 0 if multiple managers. Personal invest=1 if yes and 0 if no. List on exchange=1 if yes and 0 if no. Open to public=1 if yes and 0 if no. Single/multi sector=1 if single and 0 if multiple. Leverage=1 if yes and 0 if no. Fee intervals=1 if annual interval and 0 otherwise. Investor=1 if funds are open to US investors and 0 otherwise.

Variable	Estimate	Standard error	<i>t</i> -value
Intercept	0.1611	0.0359	4.48***
Log(asset)	-0.0052	0.0020	-2.63***
Audit date	-0.0324	0.0096	-3.37***
Single/multi advisor	0.0222	0.0100	2.23**
Personal invest	-0.0147	0.0072	-2.03**
List on exchange	-0.0041	0.0101	-0.41
Open to public	-0.0221	0.0113	-1.96**
Single/multi sector	-0.0173	0.0068	-2.53***
Leverage	0.0131	0.0077	1.71*
Fee interval	0.0153	0.0073	2.09***
Observation	661		
R ²	8.30		
Adj. R ²	7.04		

**Table 5. Monthly Return discrepancy between
1999 and 2001 TASS databases**

Data is from TASS Management Limited (TASS). There are two versions: July 31, 1999 and March 31, 2001. There are 3,638 monthly return observations that are different for the same 461 funds across the two databases. The return difference is defined as 2001-1999. To save space, the table does not report all differences.

Difference (%)	Frequency	Percentage (%)	Cumulative freq.	Cumulative %
-22.85	2	0.05	2	0.05
-17.75	1	0.03	3	0.08
-5	1	0.03	39	1.07
-1	1	0.03	234	6.43
-0.5	3	0.08	390	10.72
0	3	0.08	1,928	53
0.5	5	0.14	3,294	90.54
1	3	0.08	3,437	94.47
5	1	0.03	3,605	99.09
23.1	2	0.05	3,637	99.97
26.90	1	0.03	3,638	100

Note: There are 16,699 monthly return observations (563 funds) that are missing in 1999 data but exist in 2001 data (up to 1999.07). Out of these 563 funds, only 80 (14.2%) have non-missing audit dates. There are 15,700 monthly return observations (429 funds) that are missing in 1999 data but exist in 2001 data (up to 1999.05), allowing two months window. Out of these 429 funds, only 40 (9.32%) have non-missing audit dates. There are 92,374 return observations (from 1,830 funds) that are identical on the same date for the same funds. Out these 1,830 funds, there are 639 (34.9%) audited funds and 1,191 (65.1%) non-audited funds.

Table 6. Monthly Return Difference (between 2001 and 1999) and Fund Characteristics

Data is from TASS Management Limited (TASS). There are two versions: July 31, 1999 and March 31, 2001. In the 2001 data, there are 2,545 funds (1,543 live funds and 1,002 dead funds). In the 1999 data, there are 2,016 funds (1,407 live funds and 609 dead funds). There are 3,638 monthly return observations that are different for the same 461 funds across the two versions. The return difference is defined as 2001-1999. Audit= "No" if audit date=missing.

Variable	Raw diff		Abs diff
<i>461 funds</i>			
N	3638		3638
Mean	-0.0370		0.5289
Std Dev	1.6557		1.5694
<i>t</i> -value		-1.35	20.33***
<i>Non missing date</i>			
N	2558		2558
Mean	0.0120		0.4623
Std Dev	1.4533		1.3779
<i>t</i> -value		0.42	16.97***
<i>Missing date</i>			
N	1080		1080
Mean	-0.1532		0.6866
Std Dev	2.0533		1.9410
<i>t</i> -value		-2.45**	11.62***
<i>Big Five</i>			
N	2611		2611
Mean	-0.0206		0.4006
Std Dev	1.0899		1.0138
<i>t</i> -value		-0.97	20.19***
<i>Non Big Five</i>			
N	612 ^a		612
Mean	-0.0169		0.7574
Std Dev	2.4231		2.3016
<i>t</i> -value		-0.17	8.14***
<i>Andersen</i>			
N	174		174
Mean	0.0971		0.2587
Std Dev	0.7276		0.6867
<i>t</i> -value		1.76*	4.97***
<i>Big Four</i>			
N	3049		3049
Mean	-0.0265		0.4803
Std Dev	1.4708		1.3904
<i>t</i> -value		-0.99	19.07***

t-(Raw diff: audited-non audited)=2.41. *t*-(Abs diff: audited-non audited)=-3.45.

t-(Raw diff: big five-non big five)=-0.04. *t*-(Abs diff: big five-non big five)=-3.75.

t-(Raw diff: Andersen-Big Four)=2.02. *t*-(Abs diff: Andersen-Big Four)=-3.84.

^aThere are 415 cases where auditors are missing.

Table 7. Monthly Return Difference (between 2001 and 1999) and Fund Characteristics

Data is from TASS Management Limited (TASS). There are two versions: July 31, 1999 and March 31, 2001. In the 2001 data, there are 2,545 funds (1,543 live funds and 1,002 dead funds). In the 1999 data, there are 2,016 funds (1,407 live funds and 609 dead funds). There are 3,638 monthly return observations that are different for the same 461 funds across the two versions. The return difference is defined as 2001-1999. Audit= “No” if audit date=missing.

	Raw difference				Abs difference			
<i>Audit date</i>								
	Yes	No		<i>t</i> -value	Yes	No	<i>t</i> -value	
N	2,558	1,080			2,558	1,080		
Mean	0.012	-0.1532		2.40**	0.4623	0.6866	-3.45***	
Std Dev	1.4533	2.0533			1.3779	1.941		
<i>Fund advisor</i>								
	Missing	Single	Multi		Missing	Single	Multi	
N	411	2,469	758		411 ^a	2,469	758	
Mean	-0.1723	-0.0201	-0.0189	-0.03	1.0076	0.5199	0.2985	5.64***
Std Dev	2.8257	1.5931	0.7488		2.6452	1.5060	0.6869	
<i>FOF/HF</i>								
	Missing	FOF	HF		Missing	FOF	HF	
N	24	835	2,779		24	835	2,779	
Mean	-0.2138	-0.0212	-0.0403	0.42	0.6946	0.3145	0.5918	-6.48***
Std Dev	1.2362	0.8490	1.8329		1.0355	0.7888	1.7352	
<i>Personal investment</i>								
	Missing	Yes	No		Missing	Yes	No	
N	411	2,556	671		411	2,556	671	
Mean	-0.1723	-0.0114	-0.0520	0.71	1.0076	0.4462	0.5505	-2.00**
Std Dev	2.8257	1.4827	1.2641		2.6452	1.4139	1.1389	
<i>Industry sector</i>								
	Missing	Multi	Single		Missing	Multi	Single	
N	411	2,006	1,221		411	2,006	1,221	
Mean	-0.1723	-0.0153	-0.0273	0.21	1.0076	0.3391	0.6796	-6.39***
Std Dev	2.8257	1.1966	1.7688		2.6452	1.1476	1.6332	
<i>Leverage</i>								
	Missing	Yes	No		Missing	Yes	No	
N	411	2,449	778		411	2,449	778	
Mean	-0.1723	-0.0182	-0.0250	0.11	1.0076	0.4814	0.4254	0.96
Std Dev	2.8257	1.4172	1.5098		2.6452	1.3330	1.4488	

***significant at the 1% level

**significant at the 5% level

*significant at the 10% level

^a411 observations are from 362 funds.

Table 8. Audit date distribution

Data is from TASS Management Limited (TASS). There are two versions: July 31, 1999 and March 31, 2001. There are 3,638 monthly return observations that are different for the same 461 funds across the two databases. Audit dates are from the 2001 data.

Audit date	Freq.	Cum. freq.	%	Cum. %	Freq.	Cum. Freq.	%	Cum. %
	461	funds			All	funds		
9312	6	6	1.30	1.30	18	18	1.08	1.08
9402	1	7	0.22	1.52	1	19	0.06	1.14
9403					2	21	0.12	1.26
9404	1	8	0.22	1.74	1	22	0.06	1.32
9405					1	23	0.06	1.38
9406	1	9	0.22	1.95	4	27	0.24	1.62
9409					3	30	0.18	1.80
9410	1	10	0.22	2.17	1	31	0.06	1.86
9412	1	11	0.22	2.39	7	38	0.42	2.28
9512	2	13	0.43	2.82	10	48	0.60	2.88
9606	1	14	0.22	3.04	9	57	0.54	3.42
9612	2	16	0.43	3.47	23	80	1.38	4.80
9703	7	23	1.52	4.99	12	92	0.72	5.52
9704					1	93	0.06	5.58
9706	1	24	0.22	5.21	5	98	0.30	5.88
9709					1	99	0.06	5.94
9711					2	101	0.12	6.06
9712	51	75	11.06	16.27	131	232	7.85	13.91
9801	1	76	0.22	16.49	9	241	0.54	14.45
9802	1	77	0.22	16.70	1	242	0.06	14.51
9803	4	81	0.87	17.57	7	249	0.42	14.93
9804	2	83	0.43	18.00	7	256	0.42	15.35
9805					1	257	0.06	15.41
9806	3	86	0.65	18.66	17	274	1.02	16.43
9807					3	277	0.18	16.61
9808	1	87	0.22	18.87	3	280	0.18	16.79
9809	1	88	0.22	19.09	21	301	1.26	18.05
9810	2	90	0.43	19.52	4	305	0.24	18.29
9811					2	307	0.12	18.41
9812	106	196	22.99	42.52	356	663	21.34	39.75
9903	4	200	0.87	43.38	10	673	0.60	40.35
9904					2	675	0.12	40.47
9905					1	676	0.06	40.53
9906	5	205	1.08	44.47	20	696	1.20	41.73
9907	1	206	0.22	44.69	1	697	0.06	41.79
9908	1	207	0.22	44.90	4	701	0.24	42.03
9909	4	211	0.87	45.77	9	710	0.54	42.57
9910	1	212	0.22	45.99	4	714	0.24	42.81
9911					1	715	0.06	42.87
9912	44	256	9.54	55.53	288	1003	17.27	60.13
0001					1	1004	0.06	60.19
0003	1	257	0.22	55.75	7	1011	0.42	60.61
0006	1	258	0.22	55.97	4	1015	0.24	60.85
0011					1	1016	0.06	60.91
0012	2	260	0.43	56.40	3	1019	0.18	61.09
Missing	201	461	43.60	100.00	649	1668	38.91	100.00

Table 9. Monthly Return discrepancy between onshore funds and offshore funds

Data is from TASS as of July 31, 1999. Pairs are matched for onshore funds with their offshore equivalents. Using 1,407 live funds only and impose restrictions on the same fund name, same fund manager, same leverage, same strategy, and same fees across the two vehicles, we find that there are 37 matched pairs (among which there is one outlier, order=37, us refer=2122 and offshore refer=2123. There is a huge return difference between offshore and US funds in two out of 12 month history). Delete this outlier we use 36 pairs for analysis.

Category	N	Ret diff	Stdev.	Abs Ret diff	Stdev.
Audited	16	0.1153%	0.1719%	0.1665%	0.1190%
Not audited	20	0.2427%	0.3664%	0.3282%	0.2879%

$t\text{-retdiff}=1.377$

$t\text{-absdiff}=2.279^{**}$

*Significant at the 5% level.

Table 10. Fund characteristics for 36 matched onshore funds with their offshore equivalent

Data is from TASS as of July 31, 1999. Pairs are matched for onshore funds with their offshore equivalents. Using 1,407 live funds only and impose restrictions on the same fund name, same fund manager, same leverage, same strategy, and same fees across the two vehicles, we find that there are 37 matched pairs (among which there is one outlier, order=37, us refer=2122 and offshore refer=2123. There is a huge return difference between offshore and US funds in two out of 12 month history). Delete this outlier we use 36 pairs for analysis.

Variable	Ret US	Ret Off.	Asset US	Asset Off.	Mfee US	Mfee Off	Ifee US	Ifee Off.	Age US	Age Off.
Mean	1.2551	1.0690	57,793,624	32,515,738	1.2153	1.2153	20.3472	20.3472	57.5833	38.9444
Stdev	0.9628	1.0731	73,546,712	41,757,433	0.5041	0.5041	2.5462	2.5462	44.2315	25.5689
N	36	36	35	36	36	36	36	36	36	36

Figure 1. Auditor and audit date (1999 TASS data)

