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Final Report

Bias Analysis of Swiss Registered Fund of Hedge Funds

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Abstract

This paper analysis Swiss registered funds of hedge funds. Thus, a well-defined universe is analysed which is quite unique among fund of hedge funds research. I found similar results like previous research for the survivorship bias which accounts for about 1% of the annual mean performance. Contrary to existing studies for other universes is the negative backfill bias for Swiss registered funds of hedge funds between 0.09% and 0.41%. Possible explanations could be high initial cost or small assets in the start up phase. I also found it to be crucial if a parametric or non-parametric test is used to evaluate the mean returns. Since most of the parametric tests are not significant, but the signs of the difference are mostly identical, the parametric test is in most cases not accurate. I conclude that the construction of the "hedgegate Swiss Funds of Hedge Funds Index" can absorb most of the biases and therefore leads to a quite representative performance for the Swiss fund of hedge funds market.

Keywords: fund of hedge funds, Swiss registration, backfill bias, survivorship bias, fund of hedge funds indices, incubation period, attrition rate

JEL classification: G10, G12, G23

1 Introduction

Investors often use the performance of single stocks or bonds to optimize the weights of a portfolio. Also an index of an asset class can be used to optimize the weights of a target allocation. If the performance of such an index or financial instrument is biased, the optimization leads to an inefficient and thus not optimal allocation. It is well known that hedge fund indices are biased. To ease the problem Fung and Hsieh (2000) suppose to use funds of hedge funds to measure aggregate hedge funds performance. But also fund of hedge fund indices like the “hedgegate Swiss Fund of Hedge Fund Index” (SFoHFI) are affected by biases although to a smaller extent than single manager hedge funds indices. The magnitude of the biases can be limited by a careful construction of the database and the indices, but it is nearly impossible to eliminate them without an obligation to disclose the performance of all available hedge funds. Since every hedge fund manager can decide on his own, if and to which data base(s) he discloses his returns, there are several problems arising as we will see in the next section. In this paper I focus on fund of hedge funds and especially on Swiss registered fund of hedge funds. I will calculate the backfill bias and the survivorship bias of Swiss registered funds. On the way I also calculate the incubation period and the attrition rate for each year. Finally, I try to compare the performance of the HFRI FoF Composite with the hedgegate Swiss FoHF Index by adjusting the construction of the latter.

The paper is structured as follows. I review the relevant literature in section 2 and give an overview about important issues of hedge fund data. Section 3 describes the methodology. Section 4 is about the data used in this paper. Section 5 discusses the results and concluding comments are contained in section 6.

2 Biases in Hedge Fund Data

There are many biases affecting hedge fund data. The most common and for this paper most relevant are the backfill bias and the survivorship bias. The first bias results from a selective disclosure of the returns after the inception date of the fund. If the fund performed well for some months, the manager will more likely add the performance to a database to get attention. If the whole or only part of the history is added to the database a backfill bias arise. The survivorship bias arises when a fund stops reporting his performance. There are many reasons why this could be the case. The performance is overestimated when a funds stops reporting due to poor results or because it was liquidated. A possibility of underestimating the effective performance arises when a fund with superior performance stops reporting because he raised enough money. Figure 1 illustrates the different types of data disclosing.

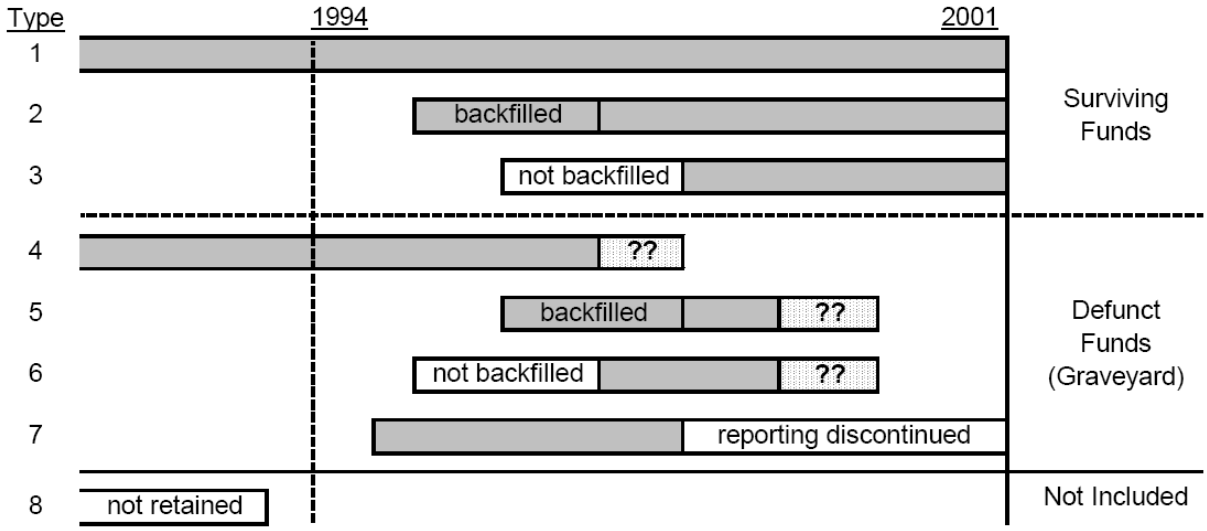

Figure 1: Different types of disclosing data[1]

1994 stands for the launch of a database and 2001 for the actual date. For surviving funds a bias arises if some funds backfill their data and some not. Additionally, for defunct funds a problem results when funds stop reporting but are not liquidated at the same time (type 4-6) or do not need any publication of the performance anymore (type 7) but are still alive.

Another bias is the self reporting bias which is caused by managers who have no incentive to report their performance because of poor result or the fund is already closed. Another problem is that not all manager discloses his performance to all

[1] Ross (2002)

databases because of the effort needed. Figure 2 shows the result of an analysis performed in 2005 for five databases by Fung et al.

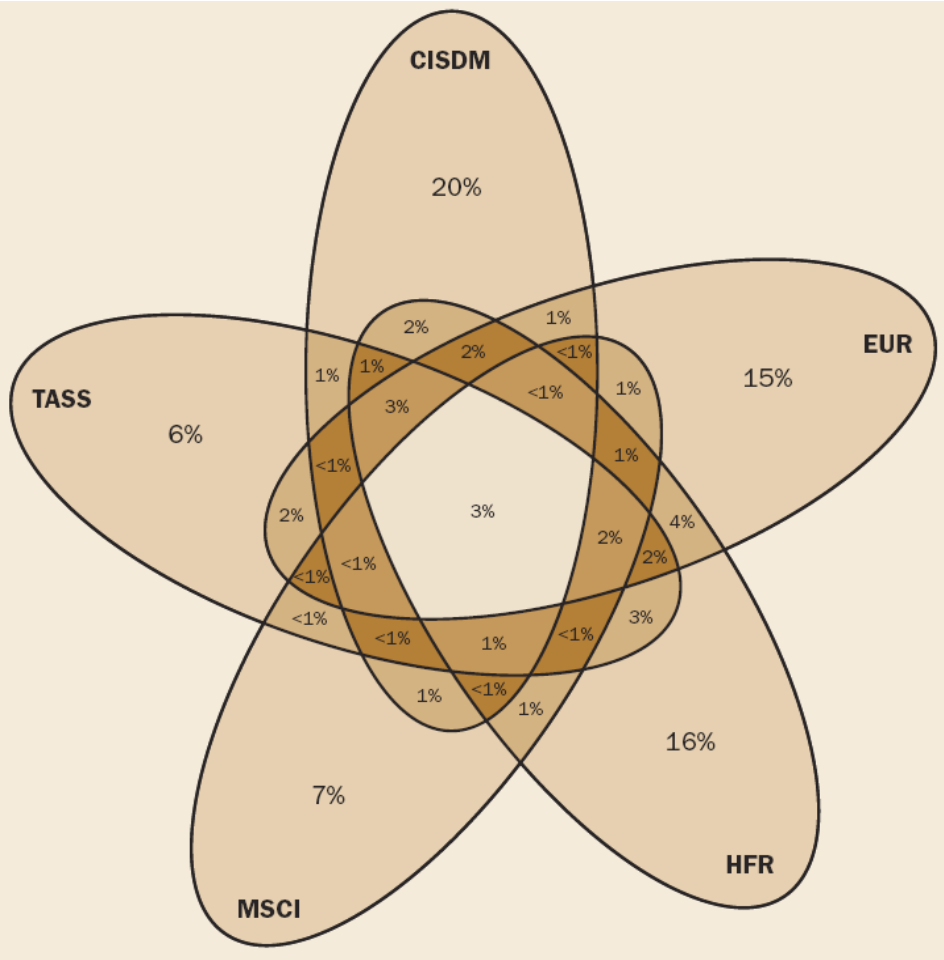

Figure 2: The Hedge Fund Universe in 2005: TASS, HFR, CISDM, Eureka Hedge, and MSCI[2]

Most of the funds is only in one database (64%). Every database comprises a different universe which needs not necessarily be comparable to the other universes. In contrast to the two previously mentioned biases the self reporting bias in comparison to the complete universe can not be estimated due to a lack of data. A fourth bias which I like to mention is the selection bias. This bias arises when data bases establish minimum requirements to add a fund. Frequently used requirements are a minimum assets level or a minimal track record. With such requirements young or small funds are excluded a priori. If these funds perform significantly different from the universe the selection bias is not negligible. Because of the missing data the bias can not be exactly estimated.

Most papers analysing the afore mentioned issues with a focus on single manager hedge funds (smhf). Only very few work considers fund of hedge funds (fohf). A difference between the two investment levels is the magnitude of the biases (Fung

[2] Fung et al. (2006)

and Hsieh, 2000, see Table 1). Since the database analysed in this paper only covers fohf, bias analysis of smhf will be applied to fohf. Most of the work was done around the turn of the millennium. Since then the interest in the topic decreased. On the other hand the quality of databases improved due to a higher awareness of biases but new biases have arised. Single-database oriented performance measures are not able to detect potential data errors arising from hedge funds that migrate from one database vendor to another and merged databases (Fung and Hsieh, 2009). Results of bias estimation are normally not comparable due to different time periods, different databases or not identical methods. Nevertheless, Table 1 gives an overview of different research results. The average survivorship bias is around two

Authors	Year	Survivorship Bias (p.a. %)	Backfill Bias (p.a. %)
Brown, Goethmann, Ibbotson	1999	2.6	
Fung, Hsieh	2000	3	1.3
Fung, Hsieh (FoHF)	2000	1.3	0.7
Liang	2000	2.24	
Fung, Hsieh	2001		1.4
Posthuma, van der Sluis	2003		4.35

Table 1: Overview of research results

percent per year. The average backfill bias accounts for about one percent. However, Posthuma and van der Sluis (2003) estimate a much higher backfill bias which is consistent for most styles and time periods. In section 5 I calculate the two biases for Swiss registered fund of hedge funds.

3 Methodology

As we saw in the previous chapter, different databases contain different universes which can never be complete. In this project the funds of hedge funds of the database hedgegate[3] will be analysed. The result will be of interest because hedgegate and the "hedgegate Swiss FoHF Index"[4] (SFoHFI, a product of a research project supported by KTI and complementa[5]) contains nearly all funds of hedge funds, investment companies and investment foundations which are supervised by Swiss regulators[6]. Thus, this is a well-defined universe limited by regulators. Although, the SFoHFI was designed by considering all state of the art methods to limit biases, it is unsure how severe the biases of the index are. Therefore, I perform an extensive analysis of survivorship and backfill to quantify the biases. Other biases are already limited in the database by adding nearly the entire Swiss fund of hedge funds universe to the database and actively encourage the managers to take part (limit self reporting bias). Additionally, because of regular data publications in a highly recognised newspaper the manager has an immediate benefit by participating in the database. Also, hedgegate has no minimum requirements to add data which could lead to a selection bias.

In this paper the method of Liang (2000) is used to calculate survivorship bias. He calculated two portfolios. The first including all funds and the second including only funds which have survived the time period. The difference of the performance of the two portfolios is the survivorship bias. For the calculation of the backfill bias many suggestions are made in academic literature. [1] Fung and Hsieh (2000) suggest dropping the first 12 monthly return to take into account an average incubation period. [2] Aggarwal and Jorion (2008) choose only the funds whose inception date is very close to the starting date in the database. This leads to a high loss of data. [3] Malkiel and Saha (2005) take the effective entry date into the database. Due to the disadvantage of method 2, I will calculate the backfill bias according to method 1 and 3. During the calculation of the backfill bias I also calculate the instant history, which is the average time period between the inception date of the fund and the inclusion into a database. Since this attribute is not available for all funds on hedgegate

[3] hedgegate: www.hedgegate.com
[4] Dürr et al. (2008)
[5] KTI-Nr. 8955.2 PFES-ES, Title: Rating FoHF, http://www.bbt.admin.ch/kti/index.html?lang=en, http://www.live.complementa.ch/ch_en_cic_home.complementa?ActiveID=1521
[6] Swiss Financial Market Supervisory Authority: www.finma.ch, Federal Social Insurance Office: www.bsv.admin.ch, Six Swiss Exchange: www.six-swiss-exchange.com

because it is only stored since early 2007, I will only consider funds added to the database after that. Posthuma and van der Sluis (2003) calculated an average instant history of just over 3 years. To get a better feeling of the sample I also calculate the attrition rate of the funds on hedgegate. The attrition rate is the proportion of the funds which stopped reporting in a certain year. Malkiel and Saha (2005) calculate this annually by using non backfilled data which result in an annual proportion ranging from 9 to 18 percent for the period between 1994 and 2003.

In a last step I try to answer the question whether the Swiss registered fund of hedge funds performs similar to the offshore ones (represented by the HFRI FoF Composite[7]). Since we have only the time-series of the HFRI Indices I can not evaluate the methodologies used by HFR. Therefore, I need to adjust the

Category	hedgegate SFoHFI	HFRI FoF Composite
Inception	January 2002	January 1990
Weighting	Equal-weighted	Equal-weighted
Reporting Style	Net of all fees	Net of all fees
Performance Time Series Available	Monthly	Monthly
NAV's available	Yes	No
Index calculated	One time per month	Three times per month
Index performance finalized	Trailing two months of performance are subject to revision	Trailing four months of performance are subject to revision
Index rebalanced	Monthly	Monthly
Criteria for fund inclusion	Listing in hedgegate Database; Reports monthly net of all fees monthly NAV in USD	Listing in HFR Database; Reports monthly net of all fees monthly performance and assets in USD
Minimum Asset Size and/or Track Record for fund inclusion	no selection bias	$50 Million minimum or > 12-Month Track Record
Index Denomination	USD, EUR, CHF	USD
Investable Index	No	No
Constituents Details	Free download without subscription	Available to HFR Database subscribers
Number of Constituent Funds	All Swiss registered Fund of Hedge Funds (around 140)	over 800 in HFRI Fund of Funds Composite

Table 2: Methodology Comparison of the Indices[8]

construction of the SFoHFI to get a similar construction quality. By doing this, I add a selection bias by skipping funds which have assets below 50 million USD or a track

[7] Hedge Fund Research Inc., https://www.hedgefundresearch.com/index.php?fuse=indices-faq&1254210966, 29.09.2009

[8] hedgegate, www.hedgegate.com and Hedge Fund Research Inc., https://www.hedgefundresearch.com/index.php?fuse=indices-faq&1254210966, 29.09.2009

record of less than 12 months. The goal is to make the best possible comparison between two completely different universes. Nevertheless, the performances of the two samples can still be differently affected by biases.

Most of the hedge funds indices are equally weighted, which is well accepted in the industry. Fung and Hsieh (2000) describe the typical proxy of a market portfolio as an equally-weighted portfolio of hedge funds in a database. Hence, I use for all analysis and portfolio calculations equal weighting of the funds. All statistical analyses are performed with R[9].

[9] R is a free software environment for statistical computing and graphics: www.r-project.org

4 Data

The database I use for this analysis is “hedgegate”, which is maintained by the “Centre for Alternative investments and Risk Management” (CAI) of the “Zurich University of Applied Sciences”. The database exists since 2002 and covers nearly the entire universe of fund of hedge funds registered by Swiss regulators. On hedgegate fund of hedge funds are listed in USD, EUR, CHF; JPY and GBP. Since nearly all master funds are USD denominated, I focus only on this currency. Table 3

	Attrition	#Start of year	#Liqu	#New
2002	0.0%	42	0	16
2003	0.0%	58	0	22
2004	3.8%	80	3	12
2005	0.0%	92	0	16
2006	1.9%	108	2	17
2007	5.6%	125	7	5
2008	13.8%	130	18	7
2009	21.9%	137	30	2

Table 3: Fund of hedge funds on hedgegate in USD

shows the number of funds of hedge funds on hedgegate for each year. Also the number of liquidated funds and new funds are illustrated. Finally in the second column the attrition rate which is the proportion of funds which died in a certain year in contrast to the entire population. In the first years many new funds were launched and only few were liquidated. This changed heavily during the financial crisis starting in 2007. During this time many fund of hedge funds came into serious liquidity issues. Because the Swiss Financial Market Supervisory Authority (FINMA) did not allow building side pockets for Swiss registered fund of hedge funds many funds were forced to liquidate their position. The peak of this exodus was in the early 2009 with an attrition of 21.9% of all funds. In other words, every fifth Swiss registered fund of hedge funds was forced to close in 2009. There were only very few new fund launches because FINMA renounced to approve new fund of hedge funds for the time being. The new funds which are shown in Table 3 are either funds which have been merged from approved funds or funds which were approved in the previous years but never launched and now started to operate.

The time period which is analysed is critical. Hedgegate exists since 2002. Data about the exact entry date of the funds are available since early 2007. Because of this missing information before 2007, the biases are calculated on an annual basis to distinguish between periods with “livedates” and without.

5 Results

5.1 Backfill Bias

Before the results of the backfill bias are shown, it is reasonable to have a look on the incubation period of the funds. One would estimate that an increase in the incubation period leads to a higher backfill bias. In this paper the incubation period is defined as the time between inception and the listing in the database of a certain fund of hedge funds. As mentioned above the effective entry date is only available since year 2007, thus, only the last three years are shown in Figure 3. The labels on the horizontal

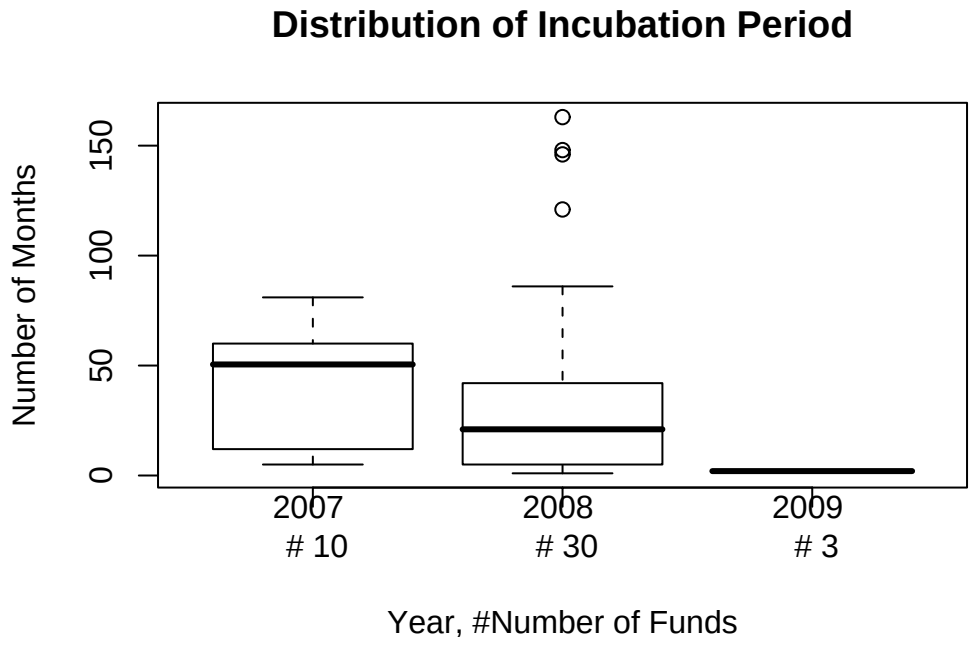

Figure 3: Incubation period of the funds

axis are set as the year of the analysis and the number of funds in the boxplot. Due to a very low number of new funds for the year 2009, the last year is not very representative. The biggest dispersion of the funds is in 2008. If we only consider the median of the boxplots (50.5, 21. 2), the tendency of the incubation period is decreasing. This could be explained by the effort the CAI has done to complete the Swiss registered universe by actively encouraging fund providers to submit their data. In Table 4 the performance of the different samples are shown. The first column includes all data and should be fully affected by the backfill bias. The average annual return is 3.93%. The mean performances of the three corrected samples are slightly higher. 4.34% for the funds without the first 12 months and 4.02% if I use the effective entry date into the database. The average performance of the SFoHFI

(4.13%) lies between. This leads to negative backfill biases between 0.09% and 0.41% depending on the method used for the unbiased sample. These results

	All Data	Drop12	Effective	SFoHFI
2003	9.71	11.08	9.86	9.85
2004	5.42	5.42	5.40	5.44
2005	7.95	8.32	7.94	7.98
2006	9.55	9.73	9.57	9.66
2007	9.86	10.71	10.72	10.79
2008	-20.32	-20.45	-20.74	-20.31
2009	5.37	5.60	5.40	5.49
Mean	3.93	4.34	4.02	4.13
T-value	NA	**-2.06**	**-0.59**	**-1.56**
P-Value T	NA	**0.09**	**0.58**	**0.17**
P-Value Wilc	NA	**0.05**	**0.58**	**0.02**

Table 4: Backfill bias overview

surprise if we remember Table 1 which only shows positive biases. One possible reason could be the different time periods. Most of the papers in the before mentioned overview has been written before our analysis started. Perhaps, if those paper are updated, the results could be different as well. Another reason may be, that funds of hedge funds need a certain size to operate profitable due to their high cost for the screening of potential target funds and the due diligence efforts. Therefore, the start up phase could be affected by high costs which would explain lower returns in this phase and thus a negative backfill bias. The difference between the sample with effective entry date and the SFoHFI can be explained by changes in the history (note: only the last two months of the SFoHFI history are subject to revision) or by funds which came into troubles and were not able to deliver their data in time. These values are completed later in the database until the liquidation date but again the SFoHFI is not recalculated. Since most funds which are in trouble perform worse than the normal operating funds the performance of the sample with the effective entry date (Effective) is lower than the one of the SFoHFI which makes this explanation reasonable. A look at the two-sample t-test against the all data sample shows that all tests are not significant and therefore, none of the differences of the means are unequal zero. These results are somewhat surprising because the sign of the differences is nearly equal in each case. This could be an indication that a parametric test is not adequate for our purposes. Figure 4 shows the normal QQ-Plots for the annual differences of the samples. The plots show that (beside the sample shown in the middle) it is reasonable to assume that the samples are not symmetric and therefore a parametric test not appropriate. To take into account this

property of the differences I also calculated a non parametric test, the Wilcoxon rank-sum test which is also included in Table 4. Using the Wilcoxon test the differences to the SFoHFI and to the Drop 12 samples are significant. Thus, investing in a fund

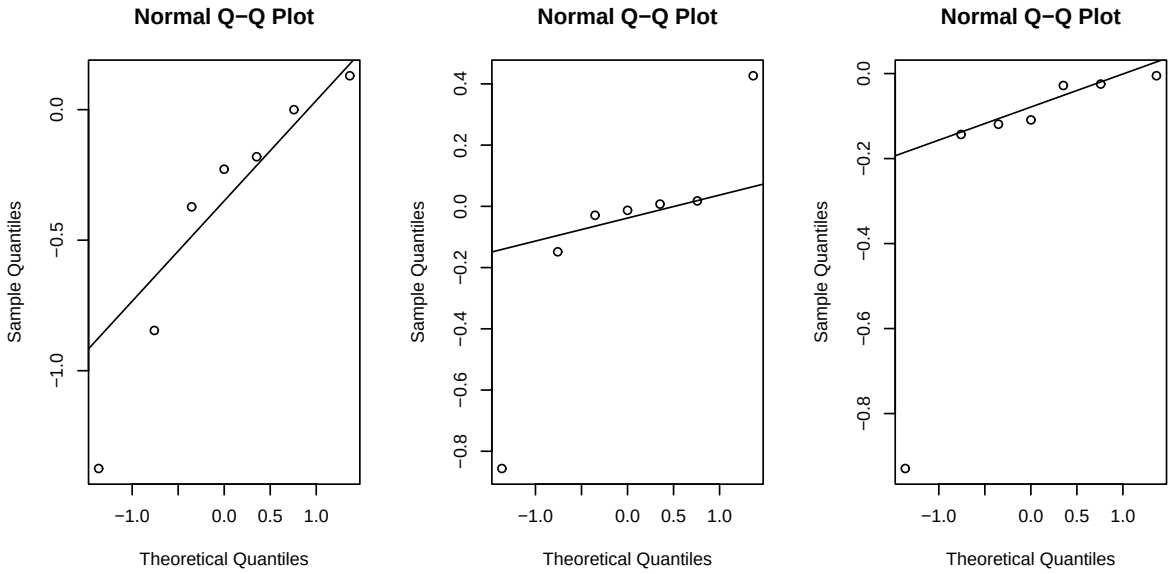

Figure 4: QQ-Normal Plot of the return differences for backfill bias

which is already included in the SFoHFI leads to a significantly higher return in contrast to a recently launched non-listed fund.

5.2 Survivorship Bias

As I mentioned previously the survivorship bias is defined by calculating two samples, one with all funds and one with only the survivors. As for the backfill biases I did it similarly for every year between 2002 and 2009. The biased sample with only

	Survivors	ALL Funds	SFoHFI
2002	0.09	0.21	0.41
2003	12.31	9.86	9.85
2004	6.66	5.40	5.44
2005	8.05	7.94	7.98
2006	10.87	9.57	9.66
2007	12.41	10.72	10.79
2008	-19.69	-20.74	-20.31
2009	5.98	5.40	5.49
Mean	4.58	3.54	3.66
T-value	NA	**3.48**	**2.92**
P-Value T	NA	**0.01**	**0.02**
P-Value Wilc	NA	**0.02**	**0.02**

Table 5: Suvivorship bias overview

surviving funds (see Table 5) returns on average 4.58% whereas the all fund sample only returns 3.54% and the SFoHFI 3.66%. This leads to a survivorship biases for the all fund sample of 1.04% and for the SFoHFI to 0.92%. These results are in line with the findings of Fung and Hsieh (2000) which found a survivorship bias of fohf of 1.3%. Like to the findings of the backfill bias the results for the survivorship bias are significant for both the all fund sample and for the SFoHFI equal with parametric or

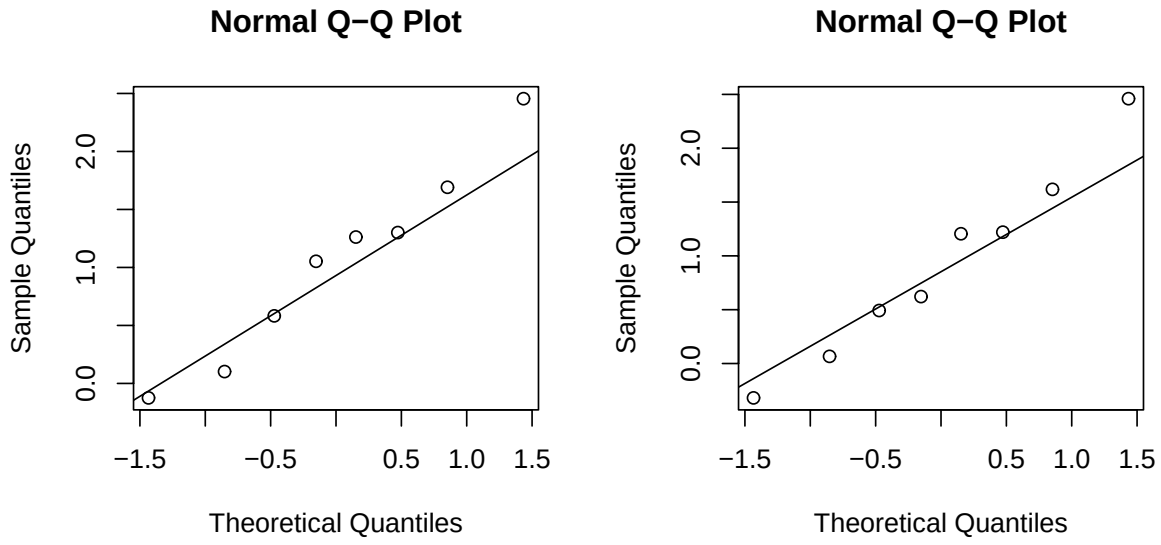

Figure 5: QQ-Normal Plot of the return differences for survivorship bias

non-parametric testing. In contrast to the tests in the previous section, this time the differences are nearly normal distributed and the two tests lead to the same results as indicated by Figure 5. Thus, the construction of the SFoHFI leads to preferable less biased results for survivorship bias and is therefore a better proxy for the industry than only surviving funds.

5.3 Comparison SFoHFI vs. HFRI FoF Composite

As outlined in Section 3, a selection bias is added to calculate an adjusted SFoHFI which includes this bias. The result is an upward shift of the SFoHFI by 0.19%. The differences of the two samples are not significant, nevertheless the mean difference is 0.35% during the evaluated time period. To further explain this deviation it would be necessary to analyse the HFR database in the same way as hedgegate to compare and correct the biases. Only then the effects of the performance could be isolated to get a comparable sample. Based on this results it is not possible to

	HFRI	SFoHFI	SFoHFI adjusted
2002	0.98	0.41	0.98
2003	11.54	9.85	10.84
2004	6.78	5.44	5.32
2005	7.39	7.98	8.20
2006	10.24	9.66	9.83
2007	10.09	10.79	10.61
2008	-21.91	-20.31	-20.39
2009	7.88	5.49	5.59
Mean	4.12	3.66	3.87
T-value	NA	**0.96**	**0.57**
P-Value T	NA	**0.37**	**0.58**
P-Value Wilc	NA	**0.55**	**0.74**

Table 6: Return overview HFRI, SFoHFI and SFoHFI adjusted

conclude which of the two samples perform better.

6 Conclusion

This paper focussed on fund of hedge funds and especially on Swiss registered funds of hedge funds. Therefore, the analyzed universe is well-defined which is normally not the case for hedge funds.

To overview the data sample, the attrition rate of the funds of hedge funds has been calculated. Before the year 2007 the attrition rate was below 4% and increased during the financial crisis to peak at 21.9% in 2009. This means more than every fifth fund of hedge funds was liquidated during 2009. On the other hand there were only very few new fund launches because FINMA renounced to approve new fund of hedge funds for the time being. This leads to a serious question mark about the future of the Swiss registered fund of hedge funds market.

The incubation period of funds which are listed on hedgegate has also been analysed. The median incubation period was sharply decreasing, since the information of the entry date into the database is available, from 50.5 months in 2007 to 2 months in 2009 whereas for the last year only few new funds were available but nevertheless there is a certain tendency.

The calculation of the backfill bias resulted in a negative backfill bias between 0.09% for the sample with the effective entry date and 0.41% for the sample which dropped the first 12 values. These results are in contrast to previous findings in academic literature and maybe explainable through different time periods. Another reason may be, that fund of hedge funds needs a certain size to operate profitable due to their high cost for the screening of potential funds and the due diligences. Therefore, the start up phase could be affected by high costs which could explain lower returns in this phase which leads to a negative backfill bias. Also the significance of the difference of the sample means has been calculated with a two sample t-test. The test was not significant for all samples which surprised because the sign of the differences are mostly identical. The non parametric Wilcoxon rank-sum test however leads to more accurate and significant test results. This issue was maybe underestimated in past papers because most of the researchers relied only on t-tests. The significance of the Wilcoxon test against the SFoHFI sample leads to the conclusion that investing in a fund which is already included in the SFoHFI leads to a significantly higher return in contrast to a recently launched non-listed fund.

Another important issue is the survivorship bias which affects the mean performance by about 1%. Both samples, the all fund sample and the SFoHFI showed significant

deviations in the mean returns against the sample with only surviving funds. Therefore, it is inevitable to take dead funds into account for accurate performance evaluations.

In a last step a selection bias was added to compare the performance of Swiss funds against a global sample represented by the HFRI FoF Composite. A non significant bias of 0.35% could not be explained. To further explain this deviation it would be necessary to analyse the HFR database in the same way as hedgegate to compare and correct the biases and to get a final conclusion. For now it is not possible to allocate the difference of the universes to the different quality of the managers or just the difference in data quality.

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