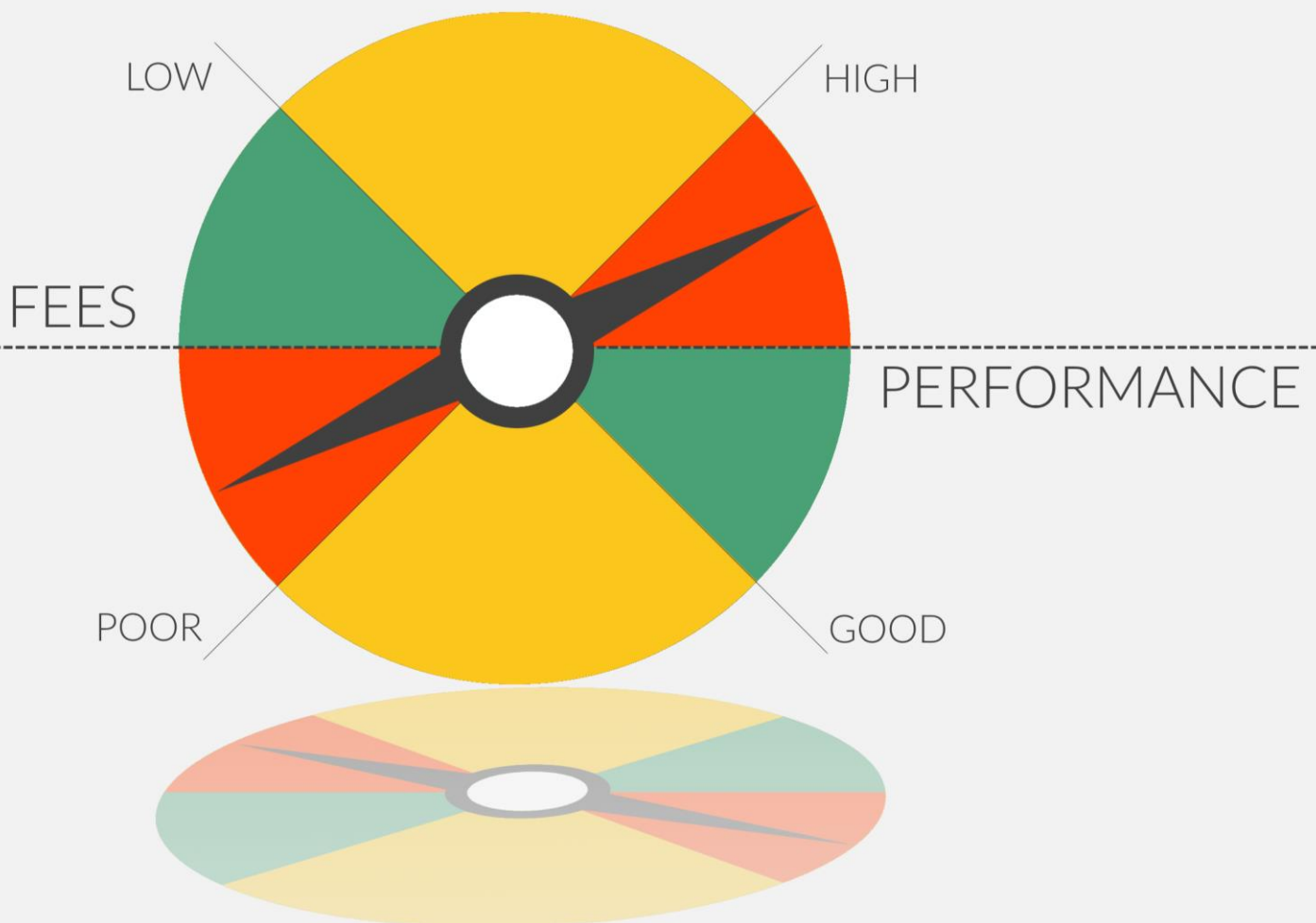


EU EQUITY RETAIL FUNDS:

CORRELATION BETWEEN COST AND PERFORMANCE



BETTER FINANCE
#FUNDRESEARCH

STUDY ON THE CORRELATION BETWEEN COST AND PERFORMANCES IN EU EQUITY RETAIL FUNDS

BETTER FINANCE, the European Federation of Investors and Financial Services Users, is the public interest non-governmental organisation advocating and defending the interests of European citizens as financial services users at the European level to lawmakers and the public in order to promote research, information and training on investments, savings and personal finances. It is the one and only European-level organisation solely dedicated to the representation of individual investors, savers and other financial services users.

BETTER FINANCE acts as an independent financial expertise and advocacy centre to the direct benefit of European financial services users. Since the BETTER FINANCE constituency includes individual and small shareholders, fund and retail investors, savers, pension fund participants, life insurance policy holders, borrowers, and other stakeholders who are independent from the financial industry, it has the best interests of all European citizens at heart. As such its activities are supported by the European Union since 2012.



This research paper is part of **BETTER FINANCE's annual #FundResearch project**, an umbrella research activity aimed at providing qualitative and quantitative assessments of the EU market for retail investment funds, focusing on Undertakings for Collective Investment in Transferable Securities (UCITS) and Alternative Investment Funds (AIFs). This paper compares mutual fund returns with their market index (benchmark) and analyses the relationship between the main factors impacting fund performance and the ability to deliver returns higher than the market.

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Foreword

BETTER FINANCE engages in campaigns to provide relevant information and better protection for end-users, promote market integrity and transparency for retail investors and non-industry stakeholders and establish better governance of financial supervision for all European citizens.

One of our main activities is independent research on the products and market sectors relevant for individual investors, savers and financial services users at large. Since 2013, BETTER FINANCE has been striving to provide EU citizens and policy makers with valuable research on the actual status and developments in the EU Single Market for financial services.

Through our research reports and monographs, we also aim to shed more light and increase transparency on market practices or purely on the retail segment for financial products. As an example, the reports on the *Real Returns of Pension Savings* analyse to the largest extent possible the returns net of charges, tax and inflation of occupational and voluntary pensions in 16 Member States of the EU on a period of 19 years. The Mis-selling Paper presents an overview investor protection rules and analyses the major mis-selling scandals in the CMU in recent years. The Benchmark Disclosure Compliance (2018) report aims to shed light on which funds could have potentially been in breach of EU law requirements for mandatory disclosure.

With this study, we aim to complement our qualitative and quantitative research on investment funds and solve a pressing question for the EU retail saver: what is driving the performances of our investment funds?

There are many factors influencing fund returns. What is important is to observe which ones have a positive or negative impact, and to what extent. The central element of this report is the effect of charges.

We believe our findings hereon should raise awareness with the retail investor that the higher the level of fees, the lower the ability of a fund to overperform its benchmark/index over time.

In the hope that you will find this useful, the BETTER FINANCE team thanks you for taking the time to read this report.

A handwritten signature in black ink, appearing to read 'G. Prache', with a long horizontal stroke extending to the right.

Guillaume PRACHE
Managing Director of BETTER FINANCE

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Executive Summary

Understanding the key factors influencing fund returns helps retail investors make informed decisions on the allocation of their savings into good investment products, either direct (shares, bonds) or packaged (funds).

Endless debates on the ability of fund managers to deliver returns above that of their benchmarks (i.e. to “overperform”) continue, with one side defending fund managers’ ability to achieve returns above-their benchmarks by applying an active management strategy. The other side defends the position that, over the long-term, an investor would be better off by investing in low-fee index funds to obtain at least market returns. These two diverging arguments have given rise to several empirical studies trying to uncover the factors that would make one or another argument more plausible. Our study contributes to this debate by trying to understand the role of fees with regard to returns, while also considering other measurable parameters and shed more light on this highly debated, but still unresolved, area.

We believe that four quite unique features make this paper stand out:

- The scope is very comprehensive: all equity funds domiciled in Luxembourg (biggest European fund domicile), France (second largest domicile) and Belgium;¹ not only UCITS funds but also all AIF² equity funds domiciled in those countries; in all, these domiciles make up for almost half of the European market (48% by number of registered funds and 43% by AuM).
- Long-term timeframe: the research analyses performance data, charges, size and tracking error of the funds in scope over 10 years (31.12.2007-31.12.2017); however, the research team would have been more ambitious, but the time period is limited due to lack of data on the main variables used for the analysis: extending the time-frame before 2008 would have returned very few results;
- Performance analysis: all computations are conducted in comparison with the market index and it analyses rolling periods of 5-years as well; moreover, it takes into account *net returns*, in order to show the perspective of the end investor;
- Correlation and regression analysis: many studies, most recently by ESMA,³ have found that active management underperforms the market or passive management, most probably due to fees. The research team committed to find which factors have

¹ Data on the number of funds (UCITS and AIFs) domiciled in EU Member States is sourced from the EFAMA Quarterly Statistical Release 2018Q4, https://www.efama.org/Publications/Statistics/Quarterly/Quarterly%20Statistical%20Reports/190308_Quarterly%20Statistical%20Release%20Q4%202018.pdf.

² See the Glossary of Terms at the end of the document for information on what UCITS and AIFs are.

³ European Securities and Markets Authority, ‘ESMA Annual Statistical Report: Performance and Costs of Retail Investment Products in the EU’ (10 January 2019) ESMA 50-165-731, https://www.esma.europa.eu/sites/default/files/library/esma50-165-731-asr-performance_and_costs_of_retail_investments_products_in_the_eu.pdf.

the most significant impact on fund returns, with a particular focus on fees and charges, and *to what extent*.

The main objective of this study is to assess whether there is a significant relationship between performance and fees of the actively managed equity funds domiciled in France, Belgium and Luxembourg offered to retail investors. In assessing this relationship, we looked at the following parameters in comparison to the funds' excess return (alpha)⁴:

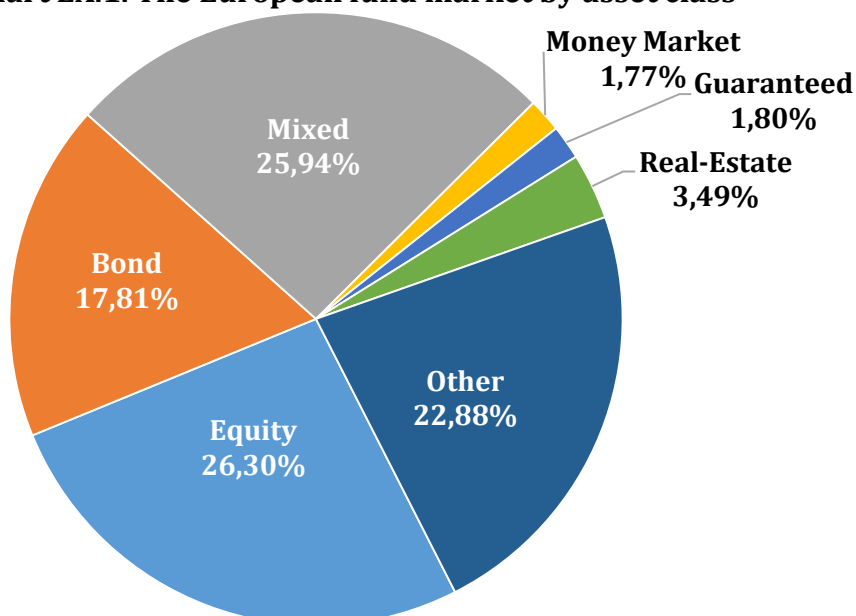
- fees;
- tracking error;
- turnover ratio of the fund's portfolio; and
- fund size (AuM).

The overall objective is to learn, not only what impact (*positive* or *negative*) these different factors have on the alpha an investor could expect from active management, but also the "size" of it.

In particular, the study evaluates the ability of actively managed equity funds to persistently deliver positive alpha (outperform their respective benchmarks) and assesses the relationship between the total fund charges and the rolling 5-year average net past performance based on quarterly returns in excess of the funds' corresponding benchmarks.

The starting point was mapping the investment fund landscape in the EU by asset class. When looking at the fund market in Europe, the equity and balanced funds make up the main part of the market, followed by bond funds and "other" funds (see Chart 1 below).

Chart EX.1. The European fund market by asset class



Source: Own elaboration based on the EFAMA International Statistical Release (2018)

** Remark: Data excluding fund of funds*

⁴ We defined alpha as the positive or negative difference between the fund return over a given period and the benchmark (market index) return over the same period; see *Glossary of Terms* on the last page of the document.

Then, the research team defined a methodology for analysis, focusing on criteria to frame the *fund universe* and *methods of performance analysis*.

Methodology

To begin, the research team defined the fund universe on which to perform the analysis. This sample is determined by a set of selection criteria:

- (a) domicile: funds domiciled in France, Luxembourg and Belgium;
- (b) asset class and legal form: all active⁵ UCITS and AIFs investing predominantly in equities;⁶
- (c) share class: retail and, exceptionally, institutional classes that have a maximum subscription threshold of €200,000 (in order to capture the funds accessible to retail investors, either directly or via unit-linked products).
- (d) inception date and distribution: before 31.12.2007. Funds must have been on the market for 10 consecutive years, this in order to obtain a fund sample with a relatively long track record.

This filtering criteria returned 2,086 funds that were eligible for further research in our sample. Out of the 2,086 selected funds, 1,733 of the funds are UCITS funds and the remaining 353 funds are AIFs.

The following criteria are on indicators that, according to academic literature, could have an impact on and explain fund performance. These indicators concern: fund size (Assets under Management, AuM), benchmark returns,⁷ tracking error (TE), turnover ratio (TR), and fees.⁸ The data was extracted from the Morningstar Direct database (hereinafter “MDd”). The data was compared to those of Thomson Reuters and Money.net in order to verify accuracy.

Time scope

Data was extracted to cover a period of 10 years (31.12.2007 and ending with 31.12.2017) on a quarterly and annual basis. The research team wished to cover a longer period but the database (MDd) did not contain the necessary data prior to 2007 for a significant part of the sample of funds. Therefore, the data sample and the subsequent computations have been made on the 40 quarters and 10 years available.

⁵ Please refer to the Glossary of Term at the end of the document (last page) for the definition of *active management*.

⁶ See Ibid, definition of *equity asset class*.

⁷ For further detail on the availability and allocation of benchmarks to funds, please refer to Chapter 4.

⁸ Due to data availability limitations, we use for fees the concept of expected shortfall, defined as the sum of the ongoing charges and explicit transaction costs, see *infra*, Section 1.9 on page 44; for reasons of comprehensibility, we will refer throughout the report as to fees, costs or charges.

The final list of funds can be summarized in the following tables:

Table EX.1. Number of funds and benchmarks		
Domicile	Fund type Type of Benchmark	Number of funds
Belgium		43
	AIF(AIFMD)	2
	Morningstar Direct benchmark	1
	Primary prospectus benchmark	1
	UCITS	41
	Morningstar Direct benchmark	11
	Primary prospectus benchmark	30
France		1,150
	AIF(AIFMD)	318
	Morningstar Direct benchmark	86
	NONE	106
	Primary prospectus benchmark	126
	UCITS	832
	Morningstar Direct benchmark	243
	NONE	3
	Primary prospectus benchmark	586
Luxembourg		893
	AIF(AIFMD)	33
	Morningstar Direct benchmark	18
	Primary prospectus benchmark	15
	UCITS	860
	Morningstar Direct benchmark	158
	NONE	7
	Primary prospectus benchmark	695
TOTAL		2,086

Source: Own elaboration based on the Morningstar Direct Database, 2018

Table 1 shows the distribution of funds within each domicile (France, Belgium, Luxembourg) by legal form (UCITS/AIF), each category being sub-divided by the type of corresponding benchmark available, i.e. own benchmark (Primary Prospectus) and the assigned benchmark by the data provider (MDd). The rows indicating “NONE” reflect the number of funds for which a benchmark is not available.

Using the benchmark availability criteria, only 1,970 equity funds could be further analysed for the purpose of this study. Using the cost figures availability criteria, 200 funds out of 2,086 funds did not have publicly available information on any kind of fees, costs or charges in the Morningstar Direct database. For the remaining 1,886 funds:

- **1,652** funds have the data published in their Annual Report - Net Expense Ratio (NER);
- **125** funds have the data published in their Annual Report - Ongoing Charges;
- **109** funds have available information only on Management fee (latest available).

As such, for the purpose of computations including fees and benchmark comparisons, the data sample comprises 1,886 funds.

Table EX.2. Fee data availability				
Annual Report				
	Ongoing Charges	NER	Management Fee	Total
Belgium	41	2	0	43
UCITS	40	1	0	41
AIF	1	1	0	2
France	3	954	18	975
UCITS	3	811	10	824
AIF	0	143	8	151
Luxembourg	81	696	91	868
UCITS	74	680	88	842
AIF	7	16	3	26
Total	125	1652	109	1,886

Source: own composition

Having defined the filtering criteria and what data to extract from the data source (MDd), the research team began analysing and computing performance measures, the first being the relative performance to the benchmark, also referred to as excess return or alpha (α). In order to do so, alpha ($\alpha_{i,t}$) was calculated for each fund i with a relevant benchmark in the time horizon t , net of fees.⁹

Having defined the filtering criteria, indicators and performance measurements, the study focused on answering the following main research questions:

- I. ***What percentage of analysed funds were able to outperform (underperform) the market (benchmark) during the analysed periods and 5-year holding periods?***
- II. ***What is the relationship between the fund return (and/or excess return - alpha) and fund manager activity (measured by Turnover Ratio)?***
- III. ***What is the relationship between the Fund Return (and/or excess return - alpha) and charges?***

In order to answer the first research question, related to the excess return and ability of fund managers to overperform their respective benchmarks, we proposed three further sub-questions:

- i. *whether there is a significant number of funds able to deliver positive alpha over one year;*
- ii. *how many consecutive years the fund managers delivered positive excess return ("performance persistence");*
- iii. *whether we could identify a significant number of funds that were able to deliver positive alpha during a 5-year holding period.*

The second and third research questions were approached using the *correlation* and *regression analysis*, since these explore the empirical relationship between independent

⁹ According to the Morningstar Direct methodology, the data points represent the "Total Return" as performance type both for the fund and benchmark returns. See the Glossary of Terms at the end of the paper for the definition of *total return*.

(explanatory) variables, such as tracking error, turnover ratio or average fees, and the dependent (response) variable, excess return (α).

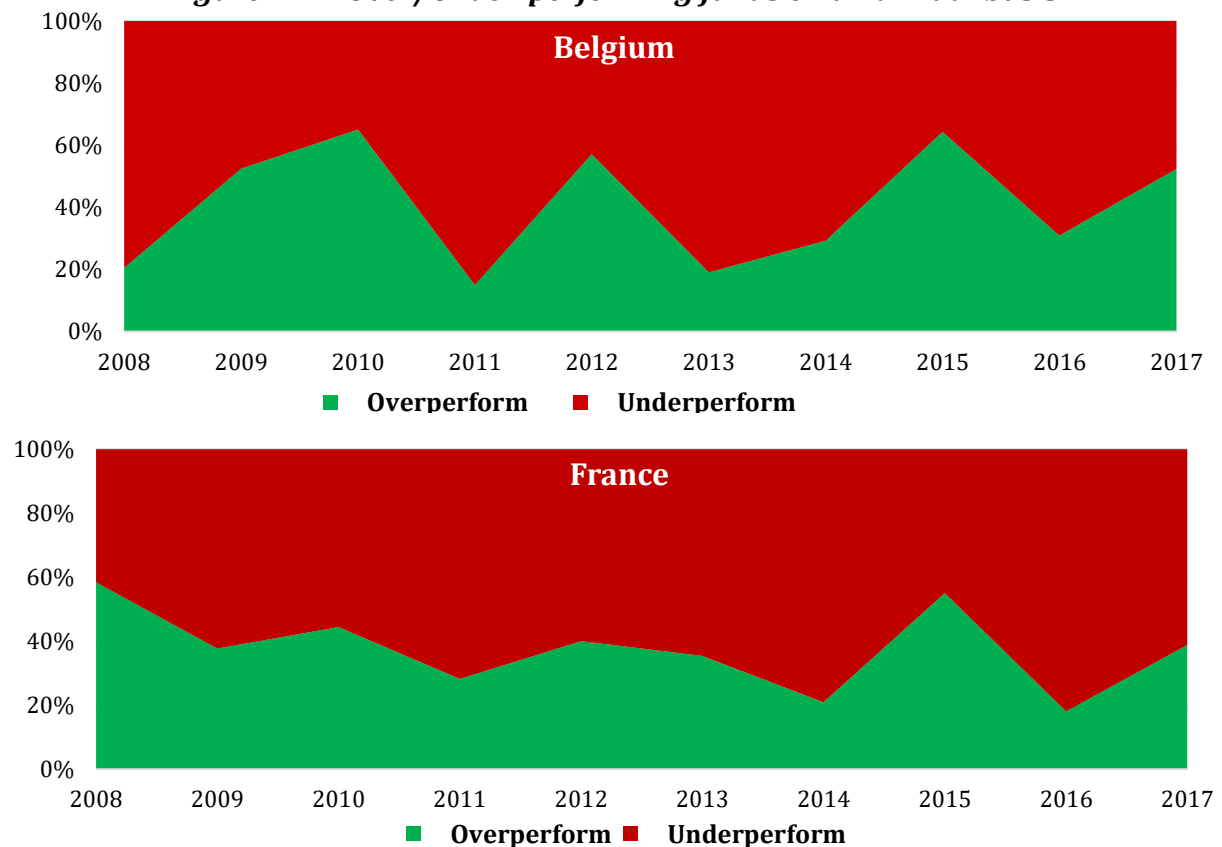
Analysis and Results

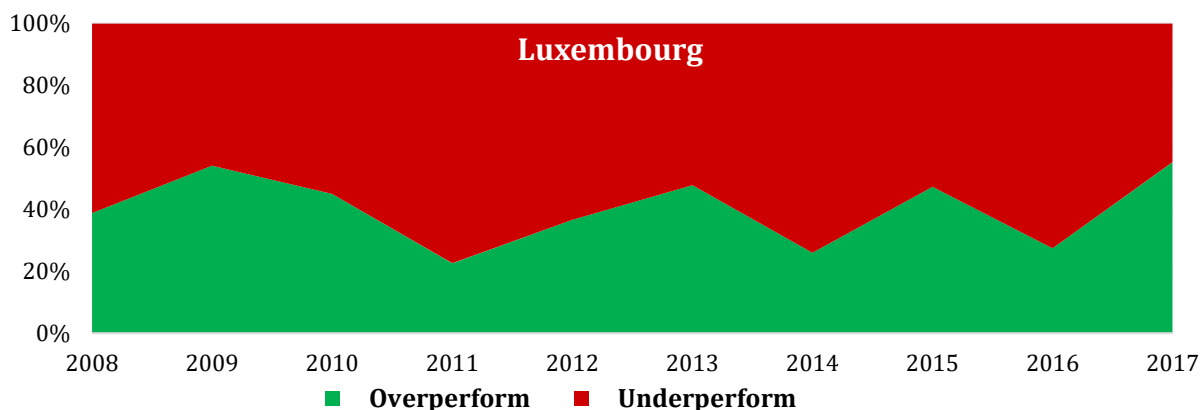
Below we provide a short description of the analytical process and the results and findings of this study based on each main research question and the sub-questions.

I. What percentage of analysed funds were able to outperform (or underperform) the market (benchmark) during the analysed periods (annual and 5-year holding periods)?

I.i). We answered the first sub-question by calculating the excess return (α) on an annual basis. The results for the first sub-question therefore mirror the relative number of funds outperforming (or underperforming) their benchmarks on an annual basis during the period of 2008 – 2017.

Figure EX.2. Over/Under-performing funds on an annual basis



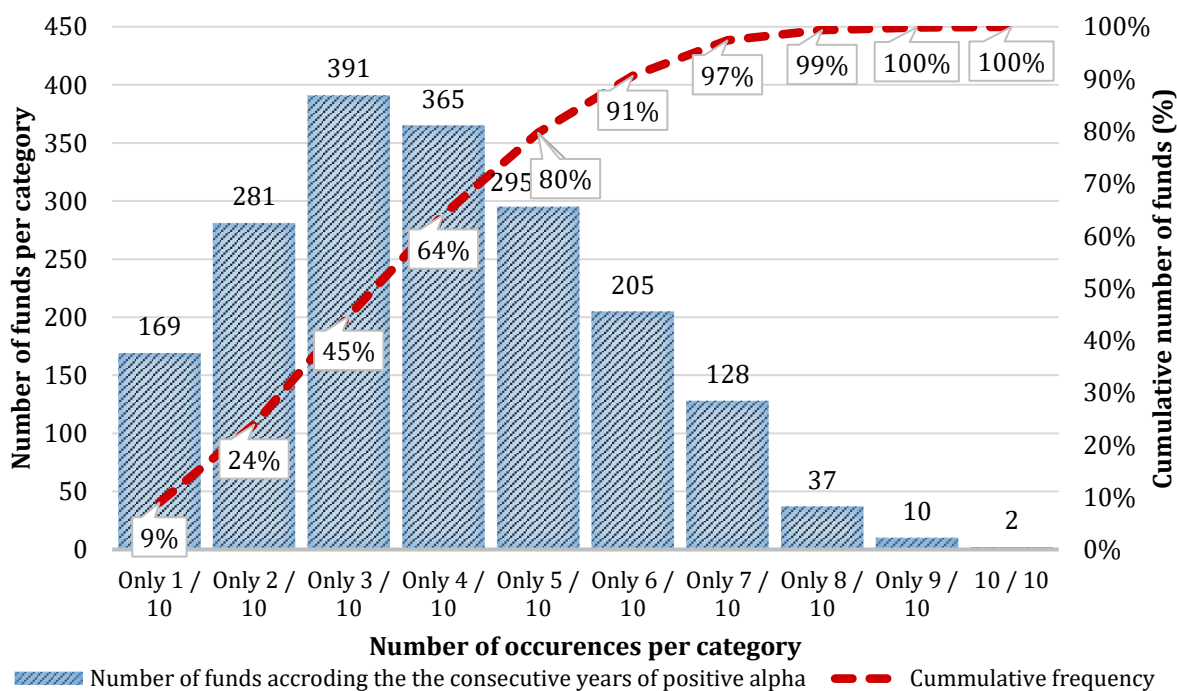


Source: own elaboration

I.ii). The second sub-question attempts to answer what a typical investor should ask: *Is the fund manager able to consistently overperform the market?* This question could be deemed as the most interesting from a layman (retail) investor's perspective. In order to answer this question, we counted the number of years fund managers were able to beat their funds' benchmarks. The results achieved through this exercise determine the assurance and stability of positive alphas, also referred to as "**performance persistency**".

Figure 3 presents the performance persistency results in the form of a histogram, where the number of years during which the fund manager overperformed the market is presented on the "x"-axis, and the number of funds on the "y"-axis. The graph also illustrates the cumulative distribution function, which shows how many funds (as % of all funds) **were able** to deliver positive excess return for up to "X" years out of 10.

Figure 10. Overperformance Persistence



Source: own elaboration

The figures above, including the cumulative curve, show the number of funds that, out of 10 years, managed to deliver a certain number of annual overperformances. For instance, 128 funds managed to overperform (in the period 31.12.2007 – 31.12.2017) exclusively (not up to) the benchmark seven times, without including, for instance, the funds that managed to deliver alpha only six times.

Still a relatively high number of funds (391) managed to deliver compound returns higher than their benchmarked market index for 3 out of 10 years. Nevertheless, the graph clearly shows the tendency of funds to underperform as the holding period increases (from 1 to 10 years, progressively); 80 % of active equity funds could not overperform their benchmark more than half of the time (5 years out of ten).

Nevertheless, the unfortunate finding is that, over a full holding period of 10 years, the average investor only had a 0.11% chance to pick a retail equity fund that overperforms its benchmark every year.

In our view, the information above must be coupled with a distribution of under/overperforming funds based on the level of fees charged. In order to do so, we defined fee brackets of 50 bps (for instance, one bracket would contain fees higher than 0.5% and lower or equal to 1%) and we arranged the funds that generated positive or negative alpha in these brackets.

This is necessary in order to show which funds mostly underperform: the higher or the lower cost funds?

Table EX.3. Dispersion of excess return by fee brackets (Fees vs. alfa 2013 – 2017)

Fees	Alpha	Belgium		France		Luxembourg		All funds		
		UCITS	AIF	UCITS	AIF	UCITS	AIF	UCITS	AIF	Total
[0%, 0.5%)	alpha ≥ 0%	2.50%	0%	1.72%	1.35%	1.97%	0.00%	1.86%	1.18%	1.80%
	alpha < 0%	7.50%	50.00%	1.47%	5.41%	1.35%	0.00%	1.56%	5.33%	1.91%
[0.5%, 1%)	alpha ≥ 0%	5.00%	0%	1.60%	1.35%	1.48%	0.00%	1.50%	1.18%	1.47%
	alpha < 0%	17.50%	0%	6.14%	6.08%	3.32%	26.32%	5.05%	8.28%	5.34%
[1%, 2%)	alpha ≥ 0%	25.00%	50.00%	12.16%	4.73%	19.68%	0.00%	16.16%	4.73%	15.10%
	alpha < 0%	40.00%	0%	32.68%	39.86%	31.24%	26.32%	32.19%	37.87%	32.72%
[2%; 3%)	alpha ≥ 0%	2.50%	0%	8.11%	4.05%	11.32%	0.00%	9.55%	3.55%	9.00%
	alpha < 0%	0%	0%	21.50%	20.27%	24.11%	47.37%	22.28%	23.08%	22.36%
[3%+]	alpha ≥ 0%	0%	0%	3.32%	1.35%	1.60%	0.00%	2.40%	1.18%	2.29%
	alpha < 0%	0%	0%	11.30%	15.54%	3.94%	0.00%	7.45%	13.61%	8.02%

Source: own composition

In all domiciles, it is apparent that a vast majority (more than 60%) of the underperforming funds charge fees higher than 1%. French-domiciled funds seem more expensive: in the highest fee bracket (equal or higher to 3%), a relative number of 11.3% of UCITS and 15.6% of AIFs underperformed their benchmark over the analysed period compared to 3.94% UCITS domiciled in Luxembourg. On the AIF side, our data sample does not contain Luxembourg-domiciled AIFs that charge fees equal or higher to 3%.

I.iii). The third sub-question examines whether fund managers were able to deliver excess returns over any 5-year holding period. In this case, the excess return had to be positive for the entire 5-year holding period, regardless of any excess return during any single year out of the analysed 5-year holding period. In other words, at the end of the 5 years, did the fund score higher than the market? This analysis implies that the client

holds his investment for 5 consecutive years. The following table contains the number of funds delivering positive or negative alpha over the 5-year holding period between 2008 and 2017.

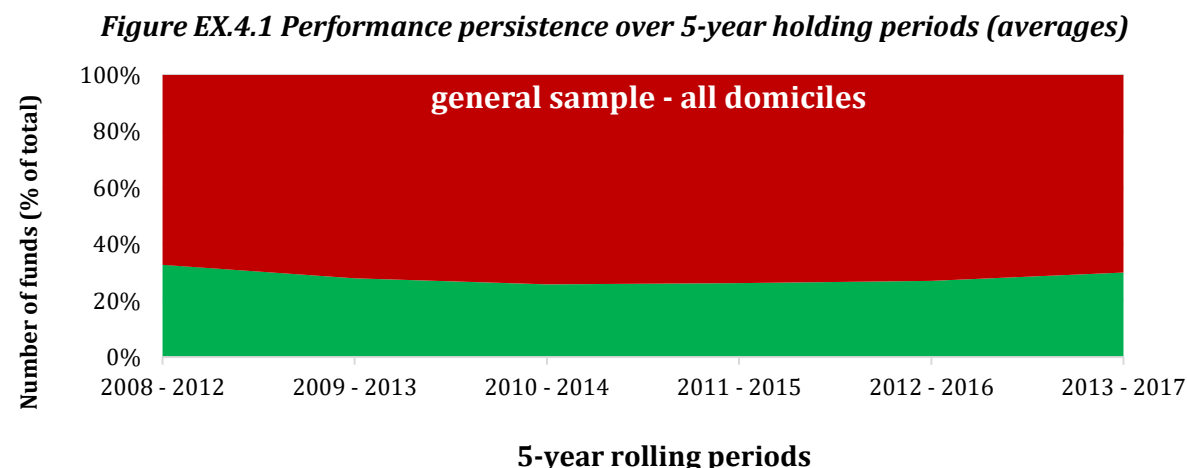
Table EX.4. Relative Frequency (Annual)											
	Alpha 2008	Alpha 2009	Alpha 2010	Alpha 2011	Alpha 2012	Alpha 2013	Alpha 2014	Alpha 2015	Alpha 2016	Alpha 2017	AVG
Belgium											
Overperform	18.6%	48.8%	60.5%	14.0%	55.8%	18.6%	28.6%	62.8%	30.2%	51.2%	38.9%
Underperform	72.1%	44.2%	32.6%	79.1%	41.9%	79.1%	69.0%	34.9%	67.4%	46.5%	56.7%
No value	9.3%	7.0%	7.0%	7.0%	2.3%	2.3%	2.4%	2.3%	2.3%	2.3%	
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	
France											
Overperform	51.1%	33.7%	39.6%	25.1%	35.7%	31.6%	18.7%	49.3%	16.2%	34.8%	33.6%
Underperform	36.3%	55.5%	49.4%	63.9%	53.5%	57.7%	70.4%	40.3%	73.4%	54.8%	55.5%
No value	12.6%	10.9%	11.0%	11.0%	10.8%	10.8%	10.9%	10.4%	10.4%	10.4%	
Total	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	
Luxembourg											
Overperform	35.6%	49.8%	41.6%	21.2%	34.4%	45.0%	24.4%	44.6%	26.0%	52.4%	37.5%
Underperform	56.1%	42.3%	50.9%	72.5%	59.4%	49.2%	69.8%	49.8%	68.9%	42.5%	56.1%
No value	8.3%	7.8%	7.5%	6.3%	6.2%	5.8%	5.7%	5.6%	5.2%	5.2%	
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	
Total											
Overperform	43.8%	40.9%	40.9%	23.2%	35.6%	37.1%	21.3%	47.6%	20.7%	42.6%	35.4%
Underperform	45.5%	49.6%	49.7%	67.9%	55.8%	54.5%	70.2%	44.2%	71.4%	49.4%	55.8%
no value (%)	10.7%	9.5%	9.4%	8.9%	8.6%	8.5%	8.5%	8.2%	8.0%	8.0%	

Source: own composition

Our analysis groups four averages of 20 quarters each under 5 consecutive periods, categorized by the year of the starting quarter of computations: for instance, 2008-2012, for all 5 years starting with quarters 1, 2, 3 and 4 of 2008, and so on. The only period with only one average (20 quarters) is that of 2013-2017 (2013Q1-2017Q4).

The analysis of the overperformance persistence for 5-year rolling periods presents a more sceptical view with regard to fund managers' skills. On average, 30% of LU-domiciled funds overperformed, followed by BE-domiciled ones (28%) and those from FR (23%).

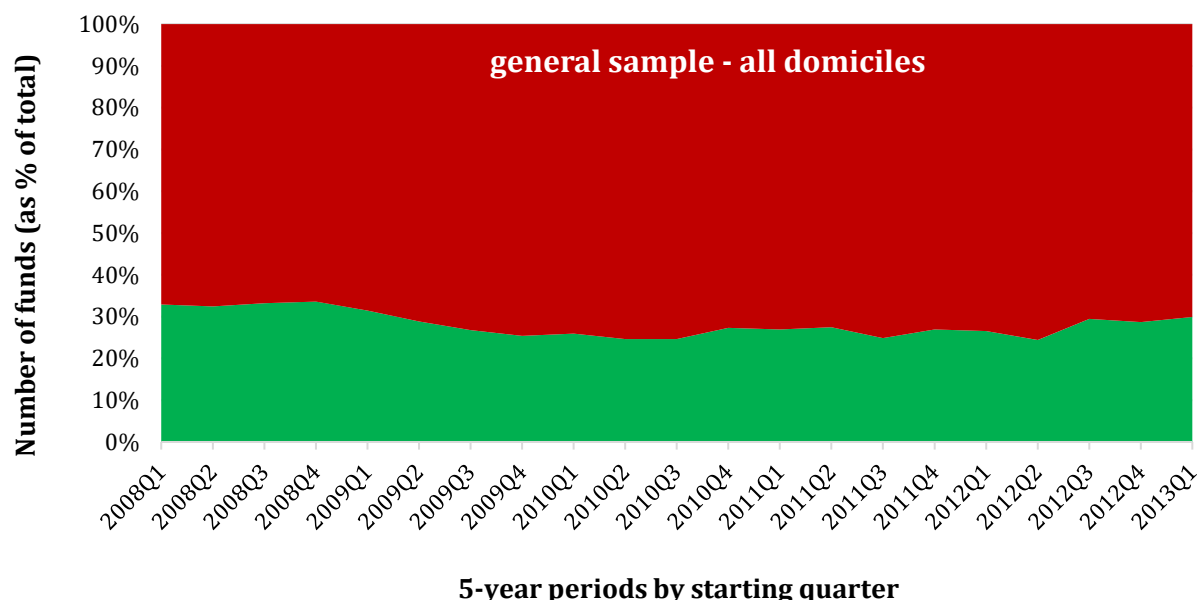
The graph below aggregates the figures for all domiciles (BE, LU and FR) and shows that the ratio between under and overperformers started to decline as of the end of 2008.



Source: own composition

Starting with the last quarter of 2008, we witness a decrease in the number of overperforming funds until the end of 2010. The “best” performing rolling 5-year periods are at the beginning (2008-2012) and at the end of the observation (2013-2017), which was subject to the regression analysis.

Figure EX.4.2 Performance persistence over 5-year holding periods (continuous)



Source: own composition

The graph above shows the ratio between the number of overperforming and underperforming funds on 5-year periods according to the starting quarter of computations. As such, the highest level of overperforming funds was achieved in the 5-year period of 2008Q4 – 2013Q3, when 643 (34%) funds managed to deliver excess returns compared to the market index, and the lowest in the period between 2012Q2 – 2017Q1, with merely 24% overperforming.

Overall, these results suggest that the longer the holding period, the lower the probability that a fund manager will be able to deliver positive excess return.

Retail investors investing in an actively managed equity fund will probably be worse off on a long period than an investor who has chosen an index fund with the same benchmark.

II. What is the relationship between the fund return (and/or excess return - alpha) and fund manager activity (measured by Turnover Ratio)?

The second research question relates to the fund manager’s activity. When inspecting the relationship between the Turnover Ratio (trading activity, “TR”) and excess return, most of the analysed funds (91%) had a turnover ratio higher than 100%, which points to a high trading activity of fund managers. However, is it reasonable to expect that a higher trading activity (*turnover ratio*) will generate excess returns?

Relationship between TR and excess return

	<i>coeff b</i>	<i>s.e.</i>	<i>Wald</i>	<i>p-value</i>	<i>exp(b)</i> <i>ODDS Ratio</i>
<i>Intercept</i>	-0.726246746	0.122390905	35.21033	2.96E-09	0.483721
Turnover Ratio	-0.001201076	0.001449876	0.686245	0.407444	0.9988

Source: own computations

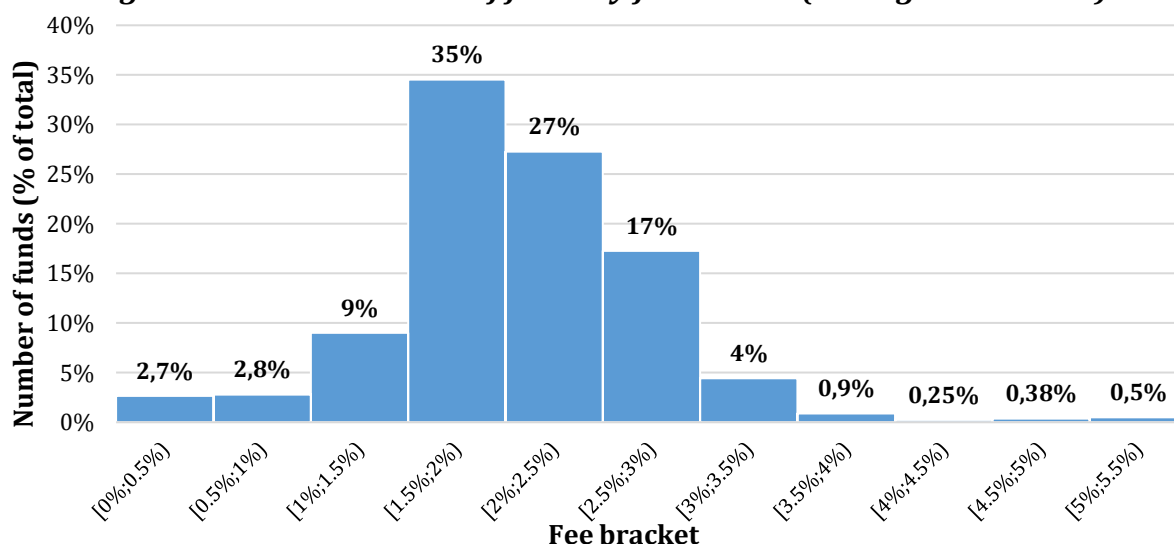
The relationship between TR and Excess return is clear: If an investor chose a fund with high TR (> 100%), there is only a 31% chance that the fund will deliver returns higher than the passively managed peer. Interesting results have been obtained for AIFs as well. The odds ratio is 8.5:1 (9.4% probability), which means that an investor choosing a highly active AIF would have a 90.6% probability of choosing an underperforming fund.

However, when we applied the “noise” control to the excess return ($1\% > \alpha > -1\%$) parameter, we found no clear evidence to suggest that a higher (or lower) turnover ratio is associated with a higher (or lower) excess return. This indicates that even highly active managers try to at least achieve the returns of their benchmarks. In general, regardless of the fund manager’s trading activity, the ratio between over and underperforming funds is close to 1-to-3 over ten years. Although the performed logical regression showed some indications of a negative relation, the indicator itself is not statistically significant. Research results indicate that the TR does not have a significant relationship with excess return to the benchmark.

III. What is the relationship between the Fund Return (and/or excess return - alpha) and charges?

The last research question looks into the role and impact of charges. First, we analysed the distribution of funds according to the level of fees charged over the last 5 years (2013 – 2017).

Figure EX.5. - Distribution of funds by fee bracket (average 2013-2017)



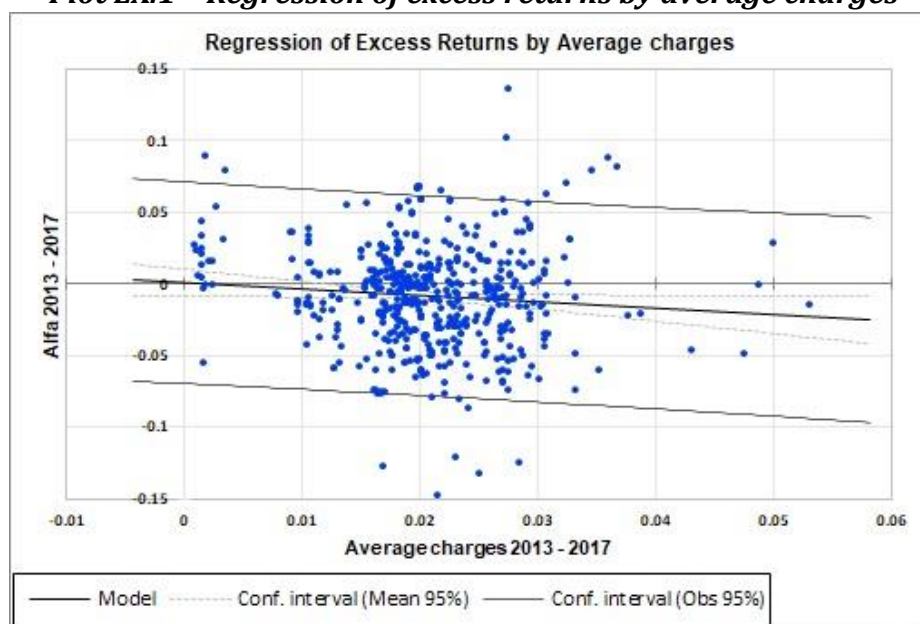
Source: Own elaboration, 2018

The graph above arranges funds by average fee charges in the period 2013-2017 and shows the distribution of the number of funds (as % of total, y-axis) by fee brackets. For instance, the first block from the left means that 2.7% of funds from the data sample

analysed charge fees higher than 0% but lower or equal to 0.5%. Thus, we observed that the large majority of funds (79%) charge fees between 1.5% and 3%. Only a marginal number of funds cost more than 3% (6%) and below 1.5% (14.5%). Overall, funds in our sample cost on average between 0.1% and 5.3%.

When analysing the impact fees might have on excess return, we found a statistically significant negative influence. The regression coefficient of charges is estimated at -0.445 and is statistically significant at a 0.05 confidence interval. This suggests that charges do play a significant role in explaining the excess returns. Our analysis found that a 1 unit increase in charges (or 100 bps) would decrease the excess return by a magnitude of 0.445 (or 44.5 bps), with the lower and upper confidence values of -0.882 (0.88%) and -0.007 (-0.07%). **In other words, an increase in charges by 100 basis points (or 1%) would on average reduce the mean excess return by 45 basis points (0.45%).** This magnitude ranges between 0.7 basis points (0.07%) up to 88 basis points (0.88%).

Plot EX.1 – Regression of excess returns by average charges



Source: own composition

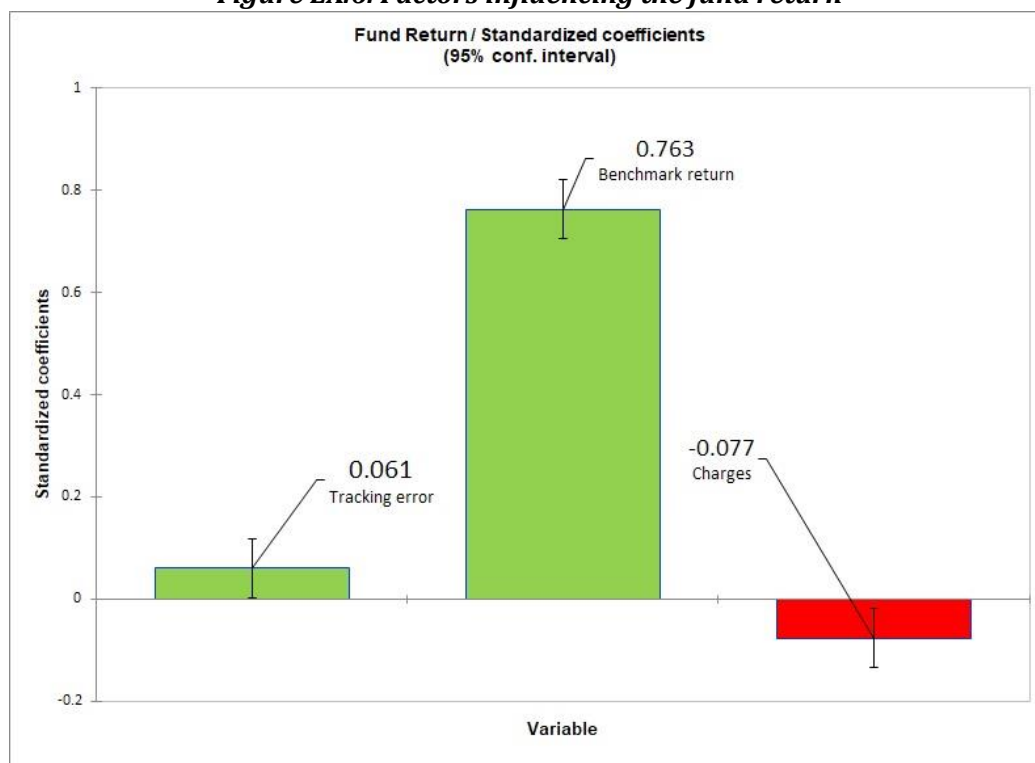
The final analysis focused on understanding the impact of the three analysed factors on fund returns, i.e. turnover ratio, costs, and tracking error. We employed a Multiple Linear Regression (MLR) to analyse the relationship between these three factors and excess return. All three have proven to be statistically significant. Put all together, the impact of TE is estimated at an average value of 0.061 (or 6.1 bps, with lower bound at 0.004, or 0.4 bps, and upper bound at 0.149). If all other factors remain unchanged, one-unit change in tracking error would increase the fund return by a magnitude of 6.1 basis points (0.061%).

The most influential factor for fund returns is the benchmark return. If other factors are unchanged (*caeteris paribus*), one-unit change in the benchmark return (increase of 100 bps) would change the fund return to the magnitude of 0.852 (lower bound at 0.789 and upper bound at 0.916). In other words, if the benchmark return would have increased by

10 percentage points (p.p.), the fund return would also increase by 8.52 p.p. This indicates that many fund managers do significantly follow their benchmarks.

Interesting results can be drawn when interpreting the influence of charges. If other explanatory variables do not change, the one unit increase in charges would decrease the fund return by 0.681. **Simply said, if the charges are increased by 100 basis points, the fund excess return would decrease by 68 basis points only due to the charges.** This magnitude could be as low as -1.189 (lower bound) and as high as -0.174 (upper bound).

Figure EX.6. Factors influencing the fund return



Source: Own calculations, 2018

Finally, the purpose of the *multiple linear regression* is to see what a one-unit increase in all three dependent variables would do to the average return of the funds in our sample. As such, based on the table below:

Table EX.5. Standardized regression coefficients of explanatory variables

Source	Value	Standard error	t	Pr > t	Lower bound (95%)	Upper bound (95%)
Tracking error	0.061	0.029	2.065	0.039	0.003	0.118
Benchmark return	0.763	0.029	26.244	< 0.0001	0.706	0.821
Average Charges	-0.077	0.029	-2.639	0.009	-0.135	-0.020

Source: own composition

The easiest explanation for the above table is by way of a hypothetical example. We assume that a retail investor chose to invest in a fund from our fund universe on 31.12.2012, held his investment until 31.12.2017, paid a 1% fee and obtained a performance equal to that of the benchmark (*fund return – benchmark return = 0*).

Assuming that all other conditions stay the same (*caeteris paribus*):

- if the benchmark return is the same, increasing the tracking error by 1 standard deviation and the level of charges by 1 standard deviation, would have lowered the fund return by 1.6 bps, or -0.016%, generating a negative alpha;
- if the level of charges stayed the same, but the deviation from the benchmark (tracking error) increased by 1 standard deviation and the market also performed better by 1 standard deviation, the fund excess return would have increased by +0.824% (82.4 bps);
- **however**, with the actual (unchanged) tracking error of the fund in the period of 2013-2017, **only** an increase of the market return would generate a positive alpha if the level of fees changed.

Table EX.6. Standardized coefficients (fund size vs average charges 2013 - 2017):

Source	Value	Ste	t	Pr > t	Lower bound (95%)	Upper bound (95%)
Fund Size	0.216	0.043	5.074	< 0,0001	0.132	0.300
Average charges	-0.084	0.043	-1.979	0.048	-0.168	-0.001

Source: own composition

This last example also shows how dependent overperformance is on variables not related to asset management skills: an increase by 1% in the level of charges could only have been offset in the period of 2013-2017 by an increase of €1 billion in the size of the fund, generating an increase of 13.2 bps (or +0.132%).

The study brings some insight into the debate on the persistence of equity mutual funds' performance offered on the EU market with domiciles in France, Belgium and Luxembourg. At the same time, the results open the discussion on the weak correlation between the performance (not the excess return) and charged fees. Many studies suggest that the fund's performance (not the excess return) is to a significant extent a matter of external environment (market conditions) and not the manager's ability to deliver consistent returns. Fees, as we have shown, are a significant factor influencing expected returns. However, the analysed sample of funds shows that the benchmark return is a far more dominant factor affecting a fund's return, which sparks debate on multiple fronts, one of which is the real active management and the second one is the desperate need for retail investors to have the information on the past returns of a fund together with the returns of a respective fund's benchmark.

The study tried to clarify the generation of fund returns from the perspective of retail investors. However, there are many obstacles to obtaining publicly available data that would allow a typical retail investor to investigate these three parameters in order to find a good investment fund for long-term investing.

Only the last parameter (charges) is available in the PRIIPs KID (UCITS KIID). In order to make an informed decision and select a good investment fund for long-term investing, retail investors need to have the information on past performance supported by the information on the performance of a relevant benchmark and tracking error a fund manager recorded for a recommended holding period. Only then will these three

indicators be able to satisfactorily answer the key investor question: ***“How to choose a good performing fund?”***

Conclusions

The research team draws several conclusions following this study. The hypothesis is that the average investor has two choices: either invest indirectly, through funds, or directly, by buying and holding securities, such as shares in companies. Both have advantages, but the question is which option's advantages outweighed that of the other in the past?

First, this study confirms once more that, at least in the field of equity funds, active management underperforms its market, regardless of whether it's the broad (all caps) or narrow (large caps) index. This could be explained by a lack of skills (stock picking, market timing, business arrangements) of active asset managers.

Second, our analysis shows a persistent negative correlation between the level of fees and excess return of funds. This does not mean that the funds reporting a negative alpha have recorded negative returns, just that the market performed better during a certain observation period. What is more, funds may actually record *gross returns* higher than the market, but the very high level of fees of European-domiciled UCITS and AIFs will offset this in 6 out of 10 cases.

As such, we see that fees tend to explain bad performances of investment funds. Considering that there is no possible way to determine which factors will determine overperformance of the market in the future, we instead looked at the past and estimated which would have made a positive or negative difference.

Thus, we observed that the four main drivers of performance can be divided in two categories:

- the “positive” drivers: those that would have increased the excess return of the fund, i.e. Assets under Management (AuM), tracking error and benchmark returns;
- the “negative” drivers: those that would have decreased excess return, i.e. fees.

Therefore, the most positive effect on fund performance comes from an increase in AuM, whilst the worst impact would result from an increase in fees. In other words, fees are the most detrimental element impacting what an investor's fund has achieved and what it could have achieved.

Last, put all together, the negative effect of fees can only be offset by very good market returns coupled with a capital injection of at least €1 billion. None of the latter are related to asset management skills.

Retail investors have been driven more and more into complex, fee laden investment products, packaged and wrapped with multiple layers of fees, making them less transparent, more expensive and less performant than traditional direct investments.

This study shows that the retail investor should be more careful with regards to the cost structure of his or her investment product and whether the fund manager achieved its stated purposes in the past by looking at the track record of a fund.

Policy Recommendations

BETTER FINANCE regrets having to reaffirm the same recommendations put forward every year since 2013, with the report on the *Real Returns of Pension Savings*, and those put forward in 2015 for the CMU Action Plan, since, in practice, the situation worsens.

1. Restore standardised relative past performance and cost-disclosure for all investment products

The retail investor cannot be expected to see the effect of fees and how its fund is performing compared to the market if mandatory disclosure documents (currently, the PRIIPs KID) only show future performance scenarios and only future “Reduction-in-Yield” of one of these future scenarios instead of actual costs. Fortunately, the UCITS KIID still presents past performance graphs, but this exemption will end by 31 December 2020.

2. Better align the pricing of investment products with the interests of savers and end biased advice at the point of sale.

Regarding low fee funds, in particular low-cost index funds, they are seldom promoted or even talked about by retail distributors due to the predominance of the commission-based remuneration model. Biased advice should be prohibited, in particular in “closed-architecture” distribution models (distributors distributing only their own products).

3. Simplify, standardise and streamline the range of product offerings

This report clearly shows that the main way to lower fees for active funds is through economies of scale, i.e. to grow in size. Currently, the market for mutual funds in the EU is significantly fragmented, and a considerable number of AIFs is offered to the retail sector.

Public authorities should restrict the use of non-UCITS funds in all packaged long-term and pension products promoted to savers and individual investors. At the same time, the excessive number of UCITS on offer in the EU should be reduced.

4. Improve financial literacy of retail investors and retail distributors.

Households and citizens rely too much on investment advice and, due to the sheer complexity of the product offering, are no longer expected to take an informed decision. In order to incentivise competition and price formation, retail investors should be aware of the alternatives for long-term investing.

5. Improve financial literacy of retail investors.

EU citizens are in dire need of comparable information on investment products, including past performance relative to the objectives of the providers (their “benchmarks”), and costs. It should be accessible via independent web-based comparison tools for retail, long-term and pension-savings products.

I. Introduction

The value of active management has been a source of debate for decades. The majority of United States (US) studies conclude that actively managed portfolios, on average, underperform market indices (Otten and Bams, 2004¹⁰). For example, the studies of Jensen (1968) and Sharpe (1966) argue that mutual funds do and will underperform the market at least by the amount of expenses they charge the investor.

From an investor perspective, searching for “recent winners” (fund managers that have achieved overperformance) could be a very risky strategy known as “alpha chasing”. Berk and Green¹¹ (2004) show theoretically that a fund manager's informational advantage will be short-lived when investors direct their capital to recent winners. Understanding fund managers’ ability to deliver positive “alpha” (performance higher than the respective market benchmark) is key to successful investing. However, there are still other aspects that should be closely analysed. Achieving positive alpha should not be short-lived – in other words, it should be persistent - while charged fees also play important role in this process.

An individual retail investor thus should inspect whether the fund manager is able to deliver alpha, whether the alpha is delivered persistently and whether the fees are justified compared to the generated alpha and volatility of the fund performance.

The fund manager selection is a fundamental decision, reflecting whether an investor is capable of finding the actively managed fund delivering stable returns above those of the market benchmark under acceptable charges. Choosing between active and passive strategies, linking their investments to a particular index, is basically a fundamental decision for an investor.

The majority of fund managers still claim that they can add value to investors by actively managing their portfolios. Therefore, the basic question is whether active fund managers deliver superior performance for investors, as they claim, or just aggressively solicit additional funds when they are lucky and downplay their poor performance when they are not (Hunter et al.¹², 2014).

Consequently, the literature on active fund management has been expanding rapidly in its attempt to answer the same basic question: *Does active management produce persistent superior investment returns compared to the corresponding market performance?*

This report should bring some insight into the debate on the persistence of equity mutual funds’ performance offered on the EU market, domiciled in France, Belgium and Luxemburg. At the same time, we open the discussion on the weak correlation between the performance (not the excess return) and charged fees. Many studies suggest that the fund’s performance (not the excess return) is to a significant extent a matter of external

¹⁰ Rog r Otten, Dennis Bams. 2004. How to measure mutual fund performance: economic versus statistical relevance. In: Accounting and Finance, 2004, vol. 44, pages 203–222

¹¹ Jonathan B. Berk and Richard C. Green. 2004. Mutual Fund Flows and Performance in Rational Markets. In: Journal of Political Economy, 2004, 112:6, pages 1269-1295

¹² David Hunter, Eugene Kandel, Shmuel Kandel, Russ Wermers. 2014. Mutual fund performance evaluation with active peer benchmarks. In: Journal of Financial Economics, 2014, Volume 112, Issue 1, pages 1-29

environment (market conditions) and not the manager's ability to deliver consistent returns. Fees are therefore an insignificant factor of expected returns.

II. Existing research

II.A Size of the market

In order to understand the mutual fund market, one should have an overall picture of it. Measured in euro (€), worldwide investment funds' net assets stood at €45.65 trillion at the second quarter of 2018 (EFAMA, 2018). This number includes funds of funds, exchange-traded funds and institutional funds. Geographically, two markets dominate the industry: US and Europe.

Table 1. Geographical trends in net assets by type of fund in 2018 (€ bln)							
	USA	Europe	Australia	Brazil	Canada	Japan	China
Equity	11,580	4,597	814	71	410	1,405	100
% change in €	7.8%	5.7%	5.4%	-15.7%	6.9%	1.8%	-0.9%
% change in local currency	2.0%	5.7%	3.5%	-7.4%	3.8%	0.0%	-1.3%
Bonds	4,033	3,556	58	917	159	34	233
% change in €	6.7%	3.0%	6.7%	-8.3%	3.1%	0.2%	8.1%
% change in local currency	1.0%	3.0%	4.8%	0.7%	0.0%	-1.6%	7.6%
Money Market	2,419	1,264	-	64	17	92	1,000
% change in €	6.7%	0.1%	-	-3.1%	6.9%	4.7%	-0.6%
% change in local currency	1.0%	0.1%	-	6.3%	3.7%	2.9%	-1.0%
Balanced/ Mixed Assets	3,052	3,267	-	352	841	-	204
% change in €	6.1%	1.5%	-	-6.4%	5.0%	-	-7.7%
% change in local currency	0.4%	1.5%	-	2.8%	1.9%	-	-8.1%
Other[1]	59	2,833	924	93	13	13	11
% change in €	1.6%	4.1%	3.1%	-5.1%	11.1%	4.9%	-3.5%
% change in local currency	-3.8%	4.1%	1.3%	4.2%	7.8%	3.1%	-3.9%

Note: % change in € represents the second quarter of 2018 compared to the first quarter; the % change in local currency represents the second quarter of 2018 compared to the first quarter where € is used as the local currency for Europe; data covers up to end of 2018Q3;

[1] includes guaranteed/protected funds and real estate funds

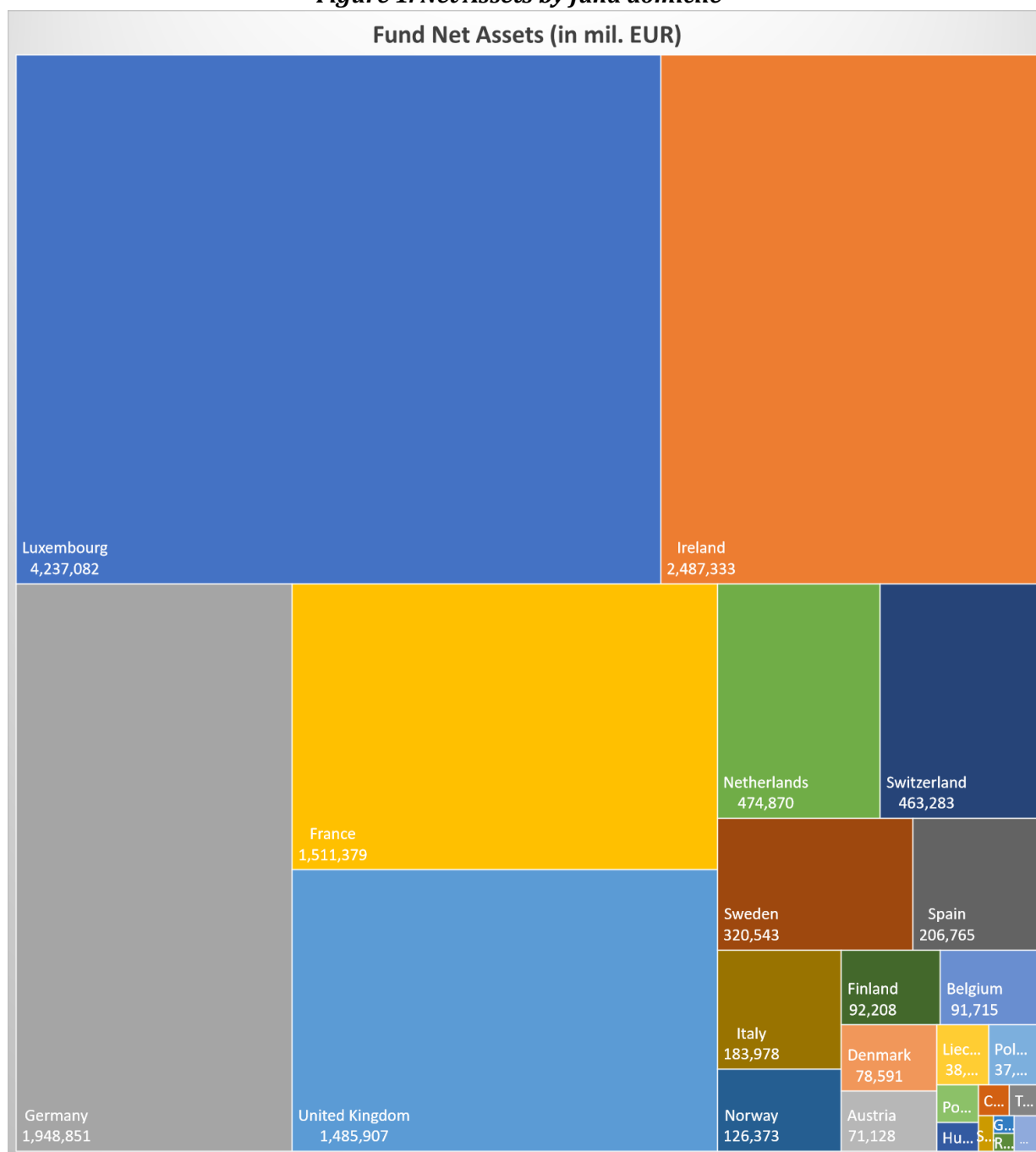
Source: EFAMA International Statistical Release 2018Q3¹³

By asset class, equity funds represent 42.1% of all net assets. This market is therefore the dominant part of mutual fund industry.

Looking at the equity appetite of Europeans, it should be noted that Europe is more conservative compared to other regions. Europe accounts for 34% of all fund net assets, while equity funds account for more than €4.59 trillion, which is only 24% of all equity fund allocations worldwide. Europeans are thus far more diversified across assets classes than the rest of the world.

¹³https://www.efama.org/Publications/Statistics/International/Quarterly%20International/180928_International%20Statistical%20Release%20Q2%202018.pdf.

Figure 1. Net Assets by fund domicile



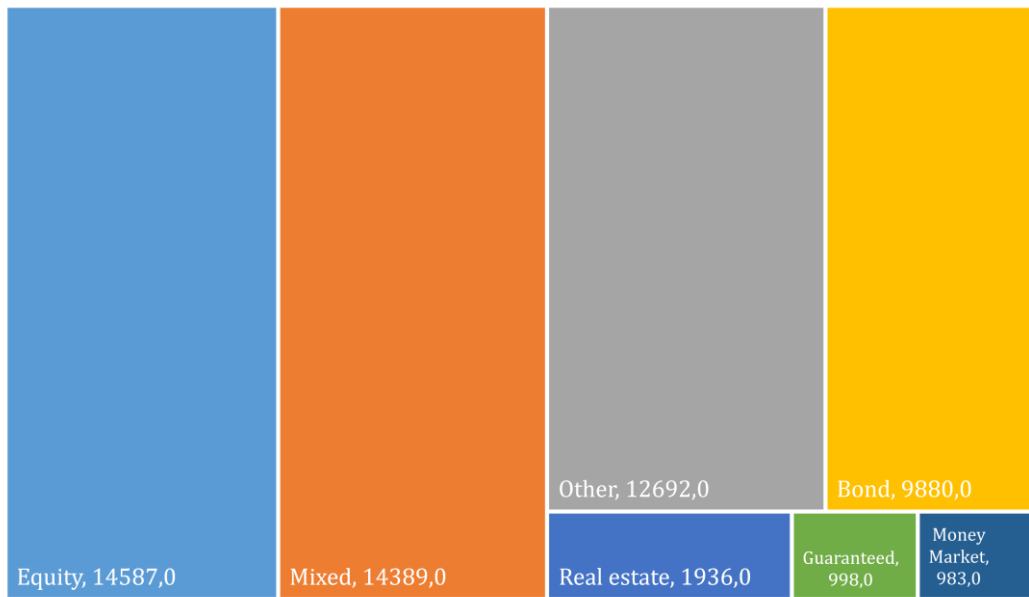
Source: Own elaboration based on the EFAMA International Statistical Release (2018)

* Remark: Data excluding fund of funds

When considering the domicile of the funds, in the second quarter (Q2) of 2018, Europe is dominated by Luxembourg (9.3% of worldwide fund assets) followed by Ireland (5.4%), Germany (4.5%) and France (4.2%).

There are more than 55 thousand funds domiciled in EU, while equity funds account for 14,587 (27%). ETFs account for 1,617 funds (3%). Almost 11 thousand funds are solely sold to the institutional investors (around 20%).

Figure 2. Number of funds by asset class in Europe



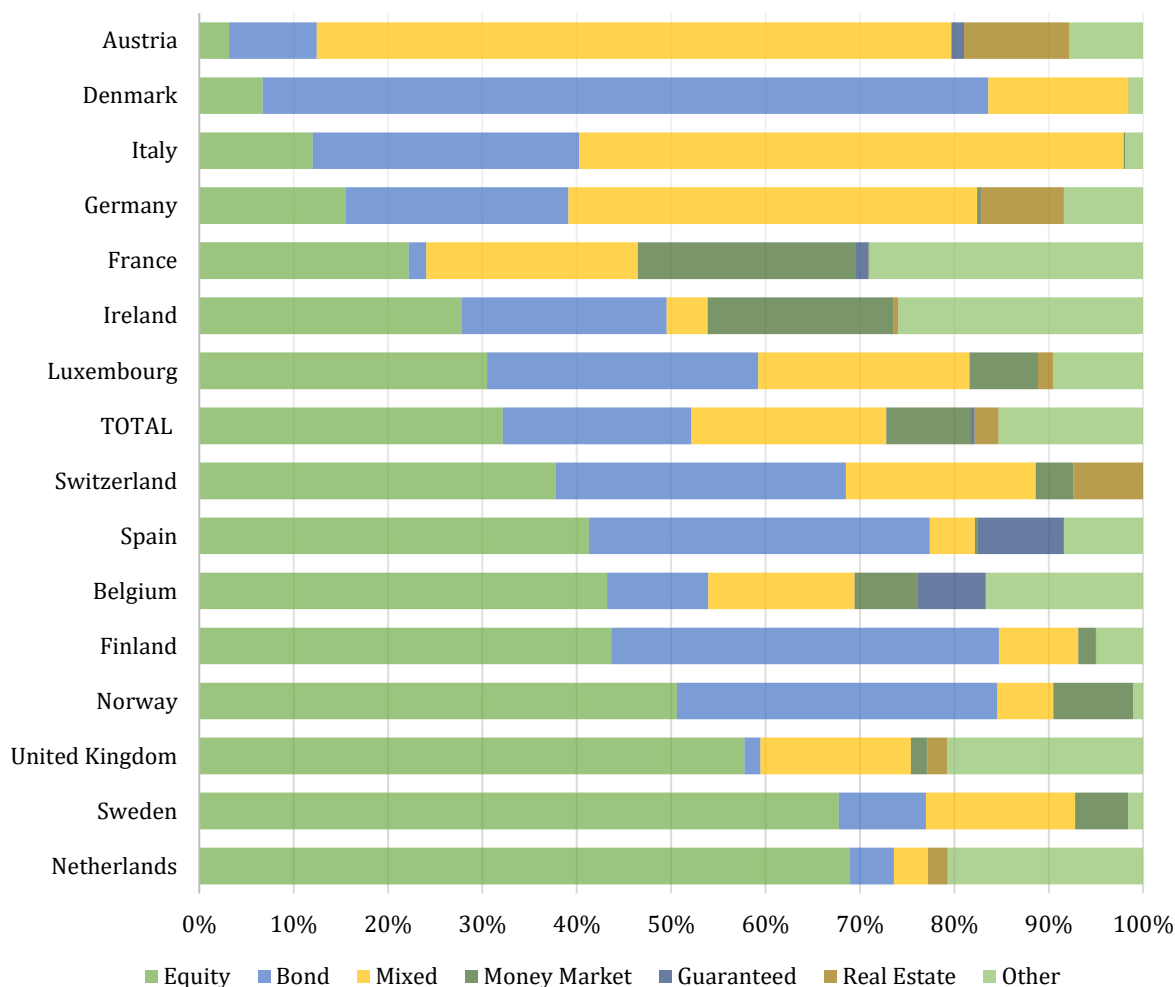
Source: Own elaboration based on the EFAMA International Statistical Release (2018)

* Remark: Data excluding fund of funds

However, the fund market in Europe is far more fragmented than in the US. Considering the fact that the fund net assets in EU are 70.56% of the fund net assets in US, the number of funds offered in EU is twice the number of funds offered in US.

Even within EU, the risk appetite of retail investors is significantly different. Comparing only 14 countries accounting for almost 98.5% of all EU fund net assets, we can see that the equity allocation ranges from 3% in Austria to almost 69% in the Netherlands (see detailed graph below).

Figure 3. Risk Appetite - Net Assets by fund types in 14 countries in Europe



Source: Own elaboration based on the EFAMA International Statistical Release (2018)

* Remark: Data excluding fund of funds

II.B. Active Management and the Ability to Outperform the market

A vast amount of literature finds little evidence that fund managers generate positive abnormal returns (excess returns or *alpha*) over long horizons either by following a stock selection or a market timing strategy (Bollen and Busse¹⁴, 2004). Examples used to support the argument include Jensen¹⁵ (1969) and Elton et al.¹⁶ (1992) for stock selections over periods of 10–20 years, and Treynor and Mazuy¹⁷ (1966) and

¹⁴ Nicolas P. B. Bollen, Jeffrey A. Busse. 2004. Short-Term Persistence in Mutual Fund Performance. In: The Review of Financial Studies, 2004, Vol. 18, No. 2.

¹⁵ Jensen, M. 1968. The Performance of Mutual Funds in the Period 1945–1964. In: Journal of Finance, 1968, vol. 23, pages 389–416.

¹⁶ Elton, E., M. Gruber, S. Das, and M. Hlavka. 1992. Efficiency with Costly Information: A Reinterpretation of the Evidence for Managed Portfolios. In: Review of Financial Studies, 1992, Vol. 6, pages 1–22.

¹⁷ Treynor, J., and K. Mazuy. 1966. Can Mutual Funds Outguess the Market? In: Harvard Business Review, 1966, Vol. 44, pages 131–136.

Henriksson¹⁸ (1984) for market timing over periods of 6–10 years. However, one could argue that the industry (models) and skills have changed since the mentioned studies came out.

Nowadays, active asset management remains still popular, even though its track record has long been unimpressive. Newer research confirming the low ability to generate sustainable positive returns over the market benchmark could include the famous study of Fama and French¹⁹ (2010) arguing that actively managed mutual funds cannot outperform passively managed funds. They indicate that, on average, the analysed fund managers do not possess stock picking skills. Similarly, Bollen and Busse²⁰ (2004) found that superior performance from mutual fund managers do appear but are very short-lived (up to 2 quarters). If the length of time over which the measurement of risk-adjusted returns is applied increases (more than 2 quarters), the findings confirmed that the abnormal return (excess return or *alpha*) of the top decile disappears.

There is also plenty of evidence that fund performance worsens with fund size (Pastor and Stambaugh²¹, 2012; Chen et al.²², 2004) and fees (Gil-Bazo and Ruiz-Verdu²³, 2009). Pastor and Stambaugh²⁴ (2012) analysed US equity mutual funds and confirmed that as the industry's size increases, every manager's ability to outperform passive benchmarks declines. The poor track record occurred before the growth of indexing modestly reduced the share of active management to its current size. At this size, better performance is expected by investors who believe in decreasing returns to scale. Such beliefs persist because persistence in the industry's size causes learning about returns to scale to be slow. However, they conclude that industry should shrink only moderately even if its underperformance continues.

Limited performance persistence has been detected in the US fund industry in papers such as Carhart²⁵ (1997) and Berk and van Binsbergen²⁶ (2014). Parallel theoretical work by Berk and Green²⁷ (2004) shows that there should be no persistence in fund performance even in the presence of manager skill if the assumptions of perfect capital

¹⁸ Henriksson, R. 1984. Market Timing and Mutual Fund Performance: An Empirical Investigation. In: Journal of Business, 1984, Vol. 57, pages 73–97.

¹⁹ Fama, E.F. and K.R. French. 2010. Luck versus Skill in the Cross-Section of Mutual Fund Returns. In: Journal of Finance, 2010, Vol. 65(5), pages 1915–1947.

²⁰ Nicolas P. B. Bollen, Jeffrey A. Busse. 2004. Short-Term Persistence in Mutual Fund Performance. In: The Review of Financial Studies, 2004, Vol. 18, No. 2.

²¹ Lubos Pastor and Robert F. Stambaugh. 2012. On the Size of the Active Management Industry. In: Journal of Political Economy, 2012, vol. 120(4), pages 740 – 781.

²² Chen, J., Hong, H., Huang, M., Kubik J. 2004. Does fund size erode performance? Liquidity, organizational diseconomies, and active money management. In: American Economic Review, 2004, vol. 94, pages 1276-1302.

²³ Gil-Bazo, J., Ruiz-Verdu, P. 2009. Yet another puzzle? The relation between price and performance in the mutual fund industry. In: Journal of Finance, 2009, vol. 64, pages 2153-2183.

²⁴ Lubos Pastor and Robert F. Stambaugh. 2012. On the Size of the Active Management Industry. In: Journal of Political Economy, 2012, vol. 120(4), pages 740 – 781.

²⁵ Carhart, M. 1997. On Persistence in Mutual Fund Performance. In: Journal of Finance, 1997, Vol. 52, pages 57–82.

²⁶ Berk, Jonathan B. and van Binsbergen, Jules H. 2014. Measuring Skill in the Mutual Fund Industry (August 14, 2014). Available at SSRN: <https://ssrn.com/abstract=2038108> or <http://dx.doi.org/10.2139/ssrn.2038108>

²⁷ Berk, J., and R. Green. 2004. Mutual Fund Flows and Performance in Rational Markets. In: Journal of Political Economy, 2004, vol. 112, no. 6.

markets, rational learning of fund performance, and decreasing returns to scale in fund management hold.

Miguel et al.²⁸ (2015) studied fund persistence using a worldwide sample of open-ended domestic equity mutual funds from 27 countries and analysed whether the US-based findings regarding persistence translate (apply *mutatis mutandis*) to other fund industries. Contrary to other studies, they found that the performance persistence is present in most fund industries with even decreasing returns to scale. They confirmed that differences in mutual fund industry developments are responsible for returns to scale differences across countries. Several high impact studies find evidence that stock selection ability persists over periods as short as one year. These studies conclude that, although funds on average generate negative abnormal returns, relative performance persists.

A number of prior studies provide significant and diverse evidence for the model's performance predictions (Gârleanu and Pedersen²⁹, 2018). First, Evans and Fahlenbrach³⁰ (2012) found that mutual funds that have an institutional share class outperform other mutual funds, consistent with the idea that institutional investors are more likely to have performed due diligence.

Some evidence on the short-lived existence of performance persistency due to the portfolio holdings (stock picking ability) have been found by Bennett et al.³¹ (2018). They investigated the existence and sources of performance persistence for Australian equity funds, using monthly portfolio holdings data. The research found significant persistence among outperforming rather than underperforming funds, which is primarily related to security selection skill, and is associated with growth-oriented funds. The relation between persistence and momentum is secondary and nuanced. Persistence largely derives from existing holdings, while subsequent active trading contributes only moderately to the positive returns for both outperforming and underperforming funds. The affirmative conclusion, similar to other previous studies, is that the persistence fades beyond 6 months and vanishes after 24 months.

Miguel et al.³² (2013) build their argumentation from the investor's vantage point, where the latter are increasingly interested in mutual fund selection, demanding detailed information and investment advice. Many authors have tried to explain the performance of mutual funds, which is a critical aspect in the investor's fund selection process. Several

²⁸ Miguel, Antonio & Ferreira, Miguel & Keswani, Aneel & Ramos, Sofia. 2015. Is there performance persistence after all? International evidence. 2015. available at: https://www.researchgate.net/publication/280741319_Is_there_performance_persistence_after_all_International_evidence

²⁹ Gârleanu, N. and Pedersen, L. H. 2018. Efficiently Inefficient Markets for Assets and Asset Management. In: The Journal of Finance, 2018, Vol. 73, pages 1663-1712. doi:10.1111/jofi.12696

³⁰ Evans, Richard B., and Rüdiger Fahlenbrach. 2012. Institutional investors and mutual fund governance: Evidence from retail-institutional fund twins. In: Review of Financial Studies, 2012, Vol. 25, pages 3530-3571.

³¹ Bennett, S., Gallagher, D. R., Harman, G., Warren, G. J. and Xi, Y. 2018. A new perspective on performance persistence: evidence using portfolio holdings. In: Account Finance, 2018, Vol. 58, pages 91-125. doi:10.1111/acfi.12212

³² Miguel A. Ferreira, Aneel Keswani, António F. Miguel, Sofia B. Ramos. 2013. The Determinants of Mutual Fund Performance: A Cross-Country Study. In: Review of Finance, Volume 17, Issue 2, 1 April 2013, Pages 483-525, <https://doi.org/10.1093/rof/rfs013>

fund characteristics have been analysed as potential determinants of future fund performance, including fund size, age, fees and expenses, loads, turnover, flows, and returns. Most authors conclude that mutual funds underperform the market, but some others find that managers display some skill. In particular, there is evidence of short-term persistence in funds' performance and that money flows to past good performers. Investors display some fund selection ability as they tend to invest in funds with subsequent good performance ("smart money" effect).

So, if the high-performing funds do exist, what are their characteristic features?

An interesting study of Berkowitz et al.³³ (2017) focused on mutual funds' characteristics associated with periods of extreme performance. They found that funds with either positive (hot-hand) or negative (icy-hand) performance persistence tend to have portfolio similarities consistent with riskier positions: compared to no-streak funds, they hold fewer stocks, invest more in top ten holdings, and have a higher portfolio beta. Also, both hot-hand and icy-hand funds have significantly higher asset turnover than benchmark funds. Icy-hand funds tend to be more extreme with riskier positions and asset turnover than hot-hand funds. At the same time, icy-hand (hot-hand) funds tend to have larger (smaller) management teams and are less (more) likely to be managed by one person. Finally, they haven't observed many funds changing their management teams either before or after extreme performance. Also, there is no evidence that the beginning of an extreme performance period is associated with changes in management or that it induces changes in management.

If the superior and consistently overperforming fund does exist, it is hard to find continuous evidence on its overperformance persistence. Even if some funds do appear to have performance persistence, it is not long-lived. Funds that earn higher one-year returns do so not because fund managers successfully follow momentum strategies, but because some mutual funds just happen by chance to hold relatively larger positions in last year's winning stocks (Carhart³⁴, 1997). On the other hand, an investor should also pay attention to the management team as, when the team is rather small, decisions are made by one person.

What existing research taught us is to evaluate the performance (and its persistence) of mutual funds through the alpha, which is tied to the market index (benchmark). Basically, alpha, also referred to as excess return or positive abnormal return, is the measurement of the ability of a fund manager to deliver solid return. From the retail investor perspective, alpha-generating skill (either stock-picking or momentum) is important, however discovering it is rather costly.

When considering the tools and information provided to the retail investor on a voluntarily or regulatory basis, one should stress out that even the two fundamental parameters are fading-off from the disclosure practices: past performance and respective benchmark performance.

³³ Berkowitz, J. P., Schorno, P. J. and Shapiro, D. A. 2017. Characteristics of mutual funds with extreme performance. In: Review of Financial Economics, 2017, Vol. 34, pages 50-60. doi:10.1016/j.rfe.2017.04.003

³⁴ Carhart, M. 1997. "On Persistence in Mutual Fund Performance". Journal of Finance, vol. 52, pages 57-82.

Without delving too much in the details, the EU financial framework obliged UCITS management firms to provide a standardized key investor information document (KIID) where the maximum or 10-year track record of the product, along with that of the market index, must be presented. As of January 1st, 2018, the harmonized key information document (KID) for almost all retail investment products (PRIIPs³⁵) has eliminated both abovementioned elements.

II.C. Understanding the impact of fees on mutual fund performance

Academic research (Fama and French, 2010; Casavecchia and Hulley. 2018; Gârleanu and Pedersen, 2018) suggests that fewer active managers were able to outperform their benchmark than would be expected by chance. Thus, investors would be better off by choosing any well-diversified mutual fund with low fees or by doing an extensive research on several key factors driving performance persistence. Even if investing is not a “rocket science”, this rule of thumb supported by research evidence has some shortfalls requiring more in-depth understanding of the problem.

One can argue that if the fund manager is able to deliver positive alpha after fees are deducted, the latter are irrelevant. At the same time, if the selection and/or timing skills do exist, then wide diversification is a loss over the long run for an investor. Cremers and Petajisto (2009) suggest that active fund managers who choose a concentrated stock picking strategy tend to outperform their benchmarks even if they charge higher fees than their peers. They conclude that even if fees are significant factor, attention should be paid to the fund managers’ activity type/investment style. Funds with a low “active share” (which is defined as the fraction of portfolio holdings that differ from those of the benchmark) and high tracking error tend to do worse, both in terms of net and gross returns, which implies that factor bets tend to destroy value for unit holders. Closet indexers (low active share, low tracking error, high coefficient of determination or R-squared) also exhibit no ability and tend to lose money after deduction of fees and transaction costs. The best performers are concentrated stock pickers (high active share, high tracking error), followed by diversified stock pickers (high Active Share, low tracking error). Both groups appear to have a stock-picking ability, and even after fees and transaction costs, the most active of them beat their benchmarks.

Presenting the argument that fees are the key driver of poor mutual fund performance compared to its broader market benchmark or to passively managed index funds could be one common finding of many existing researches. By stating this, one should add that the mutual fund fee structure has been under the constant pressure due to two main drivers: increasing competition among mutual fund managers caused by the learning ability of investors and increasing preference of investors for low-cost transparent index funds.

³⁵ PRIIPs is the acronym for packaged retail and insurance-based investment products, as per Article 4(3) of Regulation (EU) No 1286/2014 of the European Parliament and of the Council of 26 November 2014 on key information documents for packaged retail and insurance-based investment products (PRIIPs), OJ L 352, 9.12.2014, p. 1–23.

Investors pay fees to mutual funds through the operating expense applied fix or as a percentage of the assets under management or through load fees charged when investors purchase units in mutual fund. The effect of fees could be presented in many ways, while the TER (Total Expense Ratio) or TCR (Total Cost Ratio) are applied by virtue the incident regulation. A newer concept for measuring costs is the TCO (Total Cost of Ownership) that tracks all costs associated with the ownership of a mutual fund. Hence, a better indicator showing the “performance drain” caused by fees is the Reduction-in-Yield. Barber et al.³⁶ (2005) argue that investors have learned by experience to avoid mutual fund expenses. However, they learned more quickly about front-end-load fees, which are large, salient, one-time fees, compared to operating expenses, which are smaller, ongoing costs that are easily masked by the volatility of equity returns. They have studied mutual funds flows for 30 years (1970 – 1999) and confirmed that investors are increasingly trying to avoid visible front-end-loaded fees and found significant negative correlation between front-load fees and mutual fund inflows.

Operating expenses are less visible to an investor. While operating expenses constitute a steady drain on a fund’s performance, the effect of that drain is masked by the considerable volatility in the returns on equity mutual funds (Barber et al., 2005). As the mutual funds report returns net of operating expenses, investors may be less sensitive to operating expenses than if operating expenses and gross returns were reported separately. Thaler³⁷ (1985) shows that, in general, people are less sensitive to losses (e.g. operating expenses) when those losses are aggregated with other losses (e.g. negative gross fund returns) or with larger gains (e.g. gross fund returns in excess of expenses).

Existing research evidence supports a worrying finding that mutual fund investors are generally unable to assess the trade-off between different fees charged by mutual funds. Wilcox³⁸ (2003) studied 50 consumers who invested in equity mutual funds with different expense ratio and load combinations. He found that 90% of consumers overemphasized loads relative to expense ratios. Alexander, Jones, and Nigro³⁹ (1998) concluded that less than 20% of 2,000 surveyed mutual fund investors could give an estimate of the expenses incurred for their largest mutual fund holding. **Furthermore, 84% of respondents believed that mutual funds with higher expenses earned average or above average returns.**

Investors pay all costs associated with the ownership of the mutual fund, i.e. front-loads, operating expenses, back-loads etc. Gil-Bazo and Ruiz-Verdú⁴⁰ (2009) found a significant negative relationship between the total ownership costs (defined as operating expenses plus one-seventh of loads) and before-fee alphas. A dominant driver of this negative relationship is due to operating expenses (ongoing charges). There are two possible

³⁶ Barber, Brad R., Terrance Odean, and Lu Zheng. 2005. Out of Sight, Out of Mind: The Effects of Expenses on Mutual Fund Flows. In: Journal of Business, 2005, Vol. 78, No. 6 (November 2005), pages 2095–2119.

³⁷ Thaler, Richard. 1985. Mental accounting and consumer choice. In: Marketing Science, 1985, Vol. 4, pages 199– 214.

³⁸ Wilcox, Ronald T. 2003. Bargain hunting or star gazing? How consumers choose mutual funds. In: Journal of Business, 2003, Vol. 76, no. 4 (October 2003), pages 645–665.

³⁹ Alexander, Gordon, Jonathan D. Jones, and Peter J. Nigro. 1998. Mutual fund shareholders: Characteristics, investor knowledge, and sources of information. In: Financial Services Review, 1998, Vol. 7, pages 301–316.

⁴⁰ Gil-Bazo, J., Ruiz-Verdu, P. 2009. Yet another puzzle? The relation between price and performance in the mutual fund industry. In: Journal of Finance, 2009, vol. 64, pages 2153-2183.

explanations for the negative dependence of the total costs of ownership on net offees returns. The first explanation underlines that competitive pressures may force poorly performing funds to concentrate on unsophisticated investors, whose insensitivity to performance can be exploited by charging higher fees. The second explanation of negative dependence is tied to the strategic marketing hypothesis. According to this hypothesis, poor performance acts as a catalyst for more intensive marketing and distribution efforts, so that poorly performing funds naturally incur higher marketing and distribution costs. Casavecchia and Hulley⁴¹ (2018) have confirmed the hypothesis while suggesting that the negative dependence of operating expenses on alphas net of fees is almost entirely driven by the non-advisory fees associated with marketing and distribution.

Fees are generally tied to the size of the fund. The larger the fund, the smaller the expense ratio. This is due to the existence of economies of scale. Barber et al.⁴² (2005) studied this relation and the results of their analysis shows that, out of all analysed funds, for the largest 70% of funds, and funds older than 5 years, there is strong evidence that growth leads to lower expenses for mutual funds. New money and strong returns lead to lower expenses. For example, the coefficient is estimated at -0.00591 on a fund's prior year return, meaning that a 10% return is associated with an average decrease in the expense ratio of 6 basis points in the following year. However, existing evidence has shown that lower fees, due to the economies of scale, can be faded out by larger funds that have a lower ability to outperform the passive index funds or even their actively managed peers.

Analysing existing research on understanding the deeper consequences of fees on mutual fund performance proved that fund managers understand the impact of fees on their performances and are trying to exploit unsophisticated investors while trying to adjust their fees according to the existing competition on the mutual fund market.

In addition, we must highlight that the strong rise of passively managed index funds, charging significantly lower fees, does play an important role in the price formation of active mutual funds.

Therefore, the objective of this study is to assess whether there is a significant correlation between performance and fees of the funds offered to retail investors in the selected domiciles, i.e. Belgium, France and Luxembourg. The study focuses also on excess returns and on fund managers' activity of actively managed equity funds as well as its relation to the charged fees.

⁴¹ Lorenzo Casavecchia, Hardy Hulley. 2018. Are mutual fund investors paying for noise? In: International Review of Financial Analysis, 2018, Volume 58, pages 8-23. <https://doi.org/10.1016/j.irfa.2018.04.002>.

⁴² Barber, Brad R., Terrance Odean, and Lu Zheng. 2005. Out of Sight, Out of Mind: The Effects of Expenses on Mutual Fund Flows. In: Journal of Business, 2005, Vol. 78, No. 6 (November 2005), pages 2095–2119.

III. Objective, Methodology and Data

The main objective of the study is to assess whether there is a significant correlation between performance and fees of the retail equity funds domiciled in France, Belgium and Luxemburg, their excess return (alpha – if any) in relation to the charged fees, tracking error, portfolio turnover ratio and the size of the fund.

In particular, the study evaluates fund managers' ability to, and persistence of, overperform (deliver alpha) the respective market (benchmarks) and assesses the relation between the total fund charges and the 5-year average net past over- or underperformance, calculated quarterly.

The data on funds (sample, returns, costs, ratios) and benchmarks is sourced from the Morningstar Direct database. In addition, data is complemented by the Thomson Reuters and Money.net databases in order to verify its correctness / accuracy.

Below we explain the detailed methodology that served as a foundation for this report. The methodology is divided into 7 elements: 4.1 - Fund selection criteria; 4.2 - Timeframe; 4.3 - Relative performance to a benchmark and excess return (α - alpha);⁴³ 4.4 – Fees or costs⁴⁴ in return (ongoing charges); 4.5 - Tracking error (TE) to benchmark; 4.6 - Turnover ratio; 4.7 - Evaluation Criteria.

III.A. Fund selection criteria

This research paper is centered on mutual investment funds sold to retail investors. In the EU, the most spread form of open-ended investment funds is that of UCITS, or undertakings for collective investment in transferable securities, which represents 75% *“of all collective investments by small investors in Europe”*.⁴⁵

In addition, we also focus on Alternative Investment Funds (AIFs), due to the fact that in many Member States the latter are largely distributed to the retail sector. Other forms of collective investment schemes (mutual funds) may be distributed to the retail sector but are not of relevance for this study.

Due to data availability limitations, the main part of the fund sample is limited by the criteria explained below and cannot cover all asset classes or domiciles in the EU. Since the dominant type of UCITS and AIFs – by asset class and by number of funds – are invested in equities the initial fund sampling criteria are retail equity UCITS and AIFs.

⁴³ By relative performance to the benchmark we understand as the difference in the returns of the fund and of the benchmark over a predefined period of time, also referred to as alpha (α)

⁴⁴ See for example, the report of the UK Investment Association and Fitz Partners: Investment costs and performance – Empirical evidence of UK fund industry delivery, August 2016

⁴⁵ European Commission, 'Investment Funds' https://ec.europa.eu/info/business-economy-euro/growth-and-investment/investment-funds_en.

Fund universe

In order to determine a universe of funds to analyse, the authors chose a geographic focus of three domiciles: France, which is one of the largest domiciles for AIFs; Luxembourg, which is the largest domicile for UCITS; and Belgium, and an asset class of equities. We use following criteria for fund selection directly in Morningstar Direct database (MDd):

- **Domicile:** France, Luxembourg and Belgium;
- **Fund type:** UCITS & AIF(AIFMD);
- **Management type:** Active (see Glossary of Terms for definition).
- **Initial investment (share class):** retail – and all those below or equal to €200,000 or any other currency (in order to capture the funds accessible to retail investors, either directly or via unit-linked products);
- **Inception date**⁴⁶: before 31.12.2007 (ten years minimum track record);
- **Global Broad Category Group** (asset class): only equity funds
- **Survivorship:** only surviving investments for the last 10 years.

After applying the selection criteria, we identified **2,086** funds possibly offered to retail investors and eligible for further research. Out of the 2,086 selected funds, 1,733 of the funds are classified as standard UCITS fund and remaining 353 funds are AIFMD.

It should be acknowledged that there is a significantly larger amount of funds offered to retail investors (latest data report approx. 60,000 funds in the EU+EEA). AIFs are a particularly large group. However, applying the last criterion “10-year of fund existence” significantly decreased the amount of final selection of funds for further processing.

The final number of funds comprised in the sample is **2,086**, out of which:

- UCITS: **1,733**;
- AIFs: **353**.

Country	UCITS funds	AIF funds	TOTAL
France	832	318	1,150
Belgium	41	2	43
Luxembourg	860	33	893
TOTAL	1,733	353	2,086

Source: Morningstar Direct Database, 2018

⁴⁶ As the research sample includes funds that have been on the market for at least 10 years (since 31.12.2007), we should expect that the results could be subject to the overestimation of returns due to the survivorship bias. Survivorship bias is the tendency to view the fund performance of existing funds in the market as a representative comprehensive sample. Survivorship bias can result in the overestimation of historical performance and general attributes of a fund as the ceased funds not included in the sample could have influenced the variables in an opposite way. For further understanding of the existence, significance and the drivers of survivorship bias, we refer to the working paper of Martin Rohleder, Hendrik Scholz and Marco Wilkens (2011).

The analysed funds are classified as Equity funds (Global Broad Category Group) as their primary investment classes are solely oriented on equities. This defines the expected returns to be quite volatile and allows for better analysis against their benchmarks.

The total assets under management (AuM) of analysed funds was more than €920 billion, using the respective currency conversion rates as of 31.12.2017.

The analysed UCITS funds totalled €883 billion of AuM and AIFs managed more than €37 billion until 31.12.2017. More details on the value of AuM of analysed funds based on the domicile and fund type are presented below.

Table 3. AuM of analysed funds based on domicile and fund type		
Domicile	Number of funds	Fund Size
Belgium	43	€ 16,742,888,182.65
AIF(AIFMD)	2	€ 133,890,554.00
UCITS	41	€ 16,608,997,628.65
France	1,150	€ 229,314,226,248.00
AIF(AIFMD)	318	€ 31,121,253,575.00
UCITS	832	€ 198,192,972,673.00
Luxembourg	893	€ 673,943,048,070.04
AIF(AIFMD)	33	€ 5,746,227,231.17
UCITS	860	€ 668,196,820,838.87
TOTAL	2,086	€ 920,000,162,500.69

Source: Morningstar Direct Database, 2018

We acknowledge that the geographical orientation of the mutual fund investment strategy could be different and that the mutual fund performance could be presented in various currencies based on the reporting (base) currency. The structure of analysed funds based on the base currency is presented below.

Table 4. Base currency of analysed funds										
Country	Fund type	Fund base currency								
		EUR	USD	GBP	CHF	DKK	JPY	NOK	SEK	SGD
France	UCITS	826	6							
	AIFMD	318								
Belgium	UCITS	39	2							
	AIFMD	2								
Luxembourg	UCITS	476	290	11	24	1	7	10	39	2
	AIFMD	31	2							

Source: Morningstar Direct Database, 2018

In order to compare the results, all returns of the funds with different base currency than Euro has been converted on a quarterly basis to the Euro-based returns. This process was repeated also for their respective benchmarks.

It is necessary to mention that Luxembourg domiciled funds are mostly sold within the EU and not exclusively in Luxembourg. The funds' legal structure type in our sample includes: FCP⁴⁷ (1,004), FCPE⁴⁸ (63), FCPI⁴⁹ (65), FIP⁵⁰ (41) and SICAV⁵¹ (913).⁵²

III.B. Funds' benchmarks data availability

III.B.1. Short introduction on fund benchmarking

A central element to this paper's analysis is the existence of an objective comparison indicator for fund performance, usually taking the form of market indices by the asset class the fund was invested in. The entire debate is centered around the results of the UCITS or AIF compared to their market counterpart (index or benchmark), thus the analysis cannot be done for investment funds that are not susceptible of having a benchmark.

However, at times it proved very difficult to determine a fund's benchmark due to regulatory loopholes at national and EU level. The investment strategy or objective of the fund is not fundamental in determining whether the fund has a benchmark or not. The fund management industry has argued that the benchmark is that indicated by the UCITS/AIF as per the mandatory disclosure documents (Prospectus, KIID) or marketing communications (Factsheets), occurring only when the investment objectives or policy are directly or indirectly anchored in a certain index. The simplest example is that of an index-tracker, whose investment policy is to replicate the performance of a benchmark, case in which the benchmark of the fund is the one the fund aims to "track". In cases of active management, a traditional example is that of a fund which specifically aims to overperform a certain index, case in which the latter will be the fund's benchmark.

In all other cases that do not fall in either of the two mentioned examples, most fund managers argued that the fund does not have a benchmark. A classic example is that of a fund that aims to provide capital growth: it can be hardly stated whether the investment policy or objectives are dependent or not on the market index.

Nevertheless, the issue of the benchmark is not cored in the dependency of a management strategy on it, but it revolves around the concept of an *objective indicator* with which the funds' performance can be compared to. This is used to determine: (i) if the fund was able to achieve its stated objectives over a certain holding period, and, directly linked to the purpose of this study, to show (ii) whether an investor would have been better off not paying fees and directly holding securities on exchanges or investing in a UCITS/AIF.

⁴⁷ FCP is the acronym for *fonds commun de placement* (mutual investment fund), which is a sub-category of a Undertaking for Collective Investment in Transferable Securities (UCITS).

⁴⁸ FCPE stands for *fonds commun de placement pour l'épargne* (retirement mutual investment fund) and it distinguishes from FCPs by its special purpose, that of retirement provision.

⁴⁹ FCPI is a type of FCP (*fonds commun de placement à l'innovation*) that is characterised by investment in innovative small- and -medium-sized enterprises.

⁵⁰ FIP stands for *fonds d'investissement de proximité* (proximity investment fund) is a category of UCITS that provides risk capital and invests in securities issued by SMEs domiciled in up to 4 marginal geographic areas of the EU.

⁵¹ The SICAV is a variable capital investment undertaking (*société d'investissement à capital variable*), a sub-class of UCITS, which is distinguished by the other types of funds (FCP, FIP) by the fact that the company can issue new units, thus the capital underwritten may vary.

⁵² The fund classifications are that of the French legal system, according to the Law on Economic Initiatives (2003).

There is, of course, a category of investment funds that are not susceptible of having as comparison indicator a market index, due to characteristics such as asset diversity or heterogeneity. For example, if a fund invests in equities, bonds, ETFs, other UCITS, and uses financial derivative transactions without a specific geographic or sectorial focus, it would be clear that there is no particular market counterpart for that fund.

The discussion on benchmarking for investment funds became significantly important in the context of *closet indexing* (mentioned below in relation to the “noise control”). If a fund declares itself to be active but, in fact, statistical analyses prove that it closely tracked the returns of a benchmark, then the fund would be a masked index-tracker, or *closet indexer*. However, if the fund did not declare its benchmark, even an objective assignment was argued to be arbitrary and unjustified. Thus, to perform a statistical analysis on the performance of the fund compared to the performance of a benchmark, some fund managers deemed it irrelevant.

Following the European Securities and Markets Authority’s (ESMA) publication of clarifications in the Guidelines for UCITS with regards to benchmarking, fund managers are now specifically obliged to indicate the benchmark and publish past performances in many more instances than those reiterated above, practically making it impossible for a UCITS to out rule a benchmark with only very few, objective exceptions.

III.B.2. Benchmark sources

So far, the certain way of determining which benchmark correspond to a fund was to analyse the KIID and Prospectus, which would have proven impractical for this study. Therefore, we relied on the commercial data provider to indicate, based on their own research, which is the benchmark of a fund.

The commercial database contains two data series for benchmarks: the fund’s own benchmark, referred to as the (i) Primary Prospectus Benchmark, and the assigned benchmark, referred to as the (ii) Morningstar Category Benchmark. The first (i) is based on a research done on the Prospectus of every fund individually and represents the benchmark specifically mentioned by the UCITS/AIF management company. The second (ii) is a concept developed by the data provider to show the “true” benchmark of a fund – that is, in cases where the Prospectus does not mention a market index or it does, but it is not representative for the fund’s strategy and asset allocation, the Morningstar Category Benchmark is the result of a qualitative analysis of all fund characteristics that would allow to determine which is, in fact, the true market counterpart.

Therefore, for the purpose of this research, the analysis is primarily performed on the Primary Prospectus Benchmark and, when the latter is unavailable, using the Morningstar Category Benchmark.

In our fund sample, the number of funds with primary prospectus benchmark and at the same time with available data for that prospectus benchmarks is **1,453**. Number of funds with primary prospectus benchmark, but no data available for respective prospectus benchmarks: **377**. Although these funds have the primary prospectus benchmark assigned to the analysed funds, the MDd database does not contain any data available for

further processing. The benchmarks for these funds have been replaced by the Morningstar Direct benchmark.

The number of funds with no primary prospectus benchmark where only Morningstar Direct benchmark is available: **140**.

Detailed structure of analysed funds based on the benchmark availability is presented in the table below.

Table 5. Number of funds (and) benchmarks		
Domicile	Fund type Type of Benchmark	Number of funds
Belgium		43
	AIF(AIFMD)	2
	Morningstar Direct benchmark	1
	Primary prospectus benchmark	1
	UCITS	41
	Morningstar Direct benchmark	11
	Primary prospectus benchmark	30
France		1,150
	AIF(AIFMD)	318
	Morningstar Direct benchmark	86
	NONE	106
	Primary prospectus benchmark	126
	UCITS	832
	Morningstar Direct benchmark	243
	NONE	3
	Primary prospectus benchmark	586
Luxembourg		893
	AIF(AIFMD)	33
	Morningstar Direct benchmark	18
	Primary prospectus benchmark	15
	UCITS	860
	Morningstar Direct benchmark	158
	NONE	7
	Primary prospectus benchmark	695
TOTAL		2,086

Source: Own elaboration based on the Morningstar Direct Database, 2018

The number of funds both a without primary prospectus benchmark or any other benchmark: **116**. As we are not able to analyse the respective excess returns for these funds as we have no indication for their respective benchmarks, we have removed these funds from the analysis of excess return and any further examinations connected to the funds' excess return.

III.C. Data on Costs and Charges

Only **212** funds out of 2,086 funds have publicly available information on Ongoing charges⁵³ presented in the MDd. However, only **1,886** funds of the total 2,086 have publicly available data on charges:

- **1,652** funds have published in Annual Report - Net Expense Ratio,
- **125** funds have published in Annual Report - Ongoing Charge,
- **109** funds have available information only on Management fee (latest available).

As such, for the sample of funds to be analysed for the performance computations (alpha) and regression analysis, only these 1,886 funds have been selected. Nevertheless, section III.F. below shows how the general *fees and costs* figures have been computed based on the above-mentioned information on fees.

Table 6. Fee data availability				
Annual Report				
	Ongoing Charges	NER	Management Fee	Total
Belgium	41	2	0	43
UCITS	40	1	0	41
AIF	1	1	0	2
France	3	954	18	975
UCITS	3	811	10	824
AIF	0	143	8	151
Luxembourg	81	696	91	868
UCITS	74	680	88	842
AIF	7	16	3	26
Total	125	1652	109	1,886

Source: own composition

III.D. Timeframe

At the beginning, we were looking for rolling periods of ten years, but the available fund databases do not have the necessary older data, respectively the scope of passing funds would be too narrow for a robust analysis. The purpose was initially to analyse rolling 10-year periods, with the first period starting in 1997 and ending 2017. However, there are no data available and the number of analysed funds would have been very limited. This exercise would have required 20 years of available data. In order to overcome this limitation, we have limited our analysis to the last 10 years (2008-2017), which significantly increased the scope of passing funds.

As a result of the compromise between the length of the analysed period and size of the fund sample, we analysed the funds based on an annual as well as quarterly basis from 31.12.2007 up to 31.12.2017. We achieved a sample of funds with a 10-year track record.

⁵³ The ongoing charges figure is relevant since it is the one prescribed by the UCITS Key Investor Information Document (KIID) as per Article 10(2)b of Commission Regulation (EU) No 583/2010 of 1 July 2010 implementing Directive 2009/65/EC of the European Parliament and of the Council as regards key investor information and conditions to be met when providing key investor information or the prospectus in a durable medium other than paper or by means of a website, OJ L176/1 – “a single figure shall be shown for charges taken from the UCITS over a year, to be known as the ‘ongoing charges,’ representing all annual charges and other payments taken from the assets of the UCITS over the defined period, and based on the figures for the preceding year”.

The sample is divided into sub-samples based on 5-year rolling periods (shortest recommended holding period for an equity fund). Moving the fund performance quarter by quarter, we obtain twenty 5-year periods for the analysis of mutual funds' performance persistence.

We mark each quarterly data as t where $t \in \{1, 2, \dots, T\}$ and $T = 40$.

In total, we get data for 40 quarters, representing 10 years. This gives us the opportunity to perform rolling analysis up to 2017Q4 and examine the defined research questions.

III.E. Relative performance to benchmark (alpha - α)

By **relative performance to the benchmark** we understand the difference in the returns of the fund and its respective market index (benchmark) over a pre-defined period of time, also referred to as alpha (α) or excess return, although not always confoundable. Alpha is the difference between the return of the fund and that of the benchmark, hence it can be positive or negative, while excess return is by essence positive. If alpha is positive, the fund manager proved the ability to “beat” the benchmark and delivered excess return to an investor. If alpha is negative, the fund manager simply underperformed the benchmark (particular market) and delivered a lower return than an investor may have achieved if invested passively into a financial instrument tied to the market benchmark or actually buying the market.

We calculate the alpha (excess return) using quarterly data on each fund performance compared to its benchmark. We mark quarterly returns as $r_{i,t}$ for each fund i , where:

($i \in \{1, 2, \dots, I\}$ where $I = \text{number of all funds from database according to selection criteria}$)

and the returns of the market index (benchmark) $r_{b,i,t}$ for each benchmark b

($b \in \{1, 2, \dots, B\}$ to relevant fund i in time t ,

where $B = \text{all benchmarks referred for the analyzed funds}$, thus corresponding to each fund I .

It should be noted that one benchmark may be used as a reference unit for multiple funds, so the number of benchmarks is lower than the number of analysed funds.

In total, we have identified 379 different benchmarks.

We calculate alpha ($\alpha_{i,t}$) for each fund i with relevant benchmark in time t as follows:

$$\alpha_{i,t} = r_{i,t} - r_{b,i,t}$$

Then we calculate average $\bar{\alpha}_{i,t^*}$, where $t^* \in \{t + 20, t + 21, \dots, T\}$ for each 5-year rolling period of fund relative return as follows:

$$\bar{\alpha}_{i,t^*} = \frac{\sum_t^T r_{i,t}}{20}$$

III.F. Fees and costs

Considering that not all funds have available data on the *ongoing charges figure* (in fact, a very small proportion), we calculated the *expected shortfall (ES)*. Expected shortfall measures the impact of fees on the fund performance, through which we refer to the fees and costs figures of the fund. Based on the MDd availability, we calculate the expected shortfall⁵⁴ as the sum of the ongoing charges and explicit transaction costs, where:

$$ES = OCF + Transaction\ cost$$

Example: OCF (ongoing charges figure) is 0.7 % and transaction costs are 0.3% then ES is equal to 1% ($ES = OCF + Transaction\ cost = 0.7 + 0.3 = 1$). For reasons of comprehensibility, the terms “fees and costs” is used throughout the report.

In cases where we cannot extract the ongoing charges directly from the Morningstar Direct database and calculate ES, we combine different types of fees for each fund according to following criteria:

- a) we use an “Annual Report Net Expense Ratio” (number of funds with this type of fee is 1,657; where only 59 funds have data available for the year 2017 and 1,519 funds have no specific publication date on their Net Expense Ratio).

Definition: The percentage of fund assets used to pay for operating expenses and management fees, including 12b-1 fees, administrative fees, and all other asset-based costs incurred by the fund, except brokerage costs. Fund expenses are reflected in the fund's NAV. Sales charges are not included in the expense ratio. The expense ratio for fund of funds only includes the wrap or sponsor fees and does not include the underlying fund fees.

If some funds don't have Annual Report Net Expense Ratio, we use the fee charge type:

- b) we use the Annual Report Ongoing Charge (number of funds with this type of fee is 125, where only 28 funds have available data for this type of fee for the year 2017 and 62 funds have no specific publication date).

Definition: Ongoing charge (OGC), which is required to publish in Key Investor Information Document (KIID) for EU UCITS fund since 1st July 2012, has also been required to publish in Annual Report for some countries. In Annual Report, OGC is equivalent to what funds previously had to publish as a Total Expense Ratio (TER) except that:

1. OGC must exclude any Performance Fee
2. OGC potentially may have other minor technical differences e.g. the inclusion of transaction related depositary & custody fees.

If some funds don't have publicly available information about both Annual Report Net Expense Ratio and Annual Report Ongoing Charge, we use the next fee charge type:

⁵⁴ See for example, the report of the UK Investment Association and Fitz Partners: Investment costs and performance – Empirical evidence of UK fund industry delivery, August 2016

- c) Management Fee (304 funds have available data for this type of fee, only 1 fund have data for the year 2017 and 283 funds have no specific publication date).

Definition: The management fee is the most recently reported actual percentage that was deducted from an investment's average net assets to pay the investment's management.

III.G. Tracking error to benchmark

Tracking error is the annualized divergence of the difference between the return on a portfolio or fund, and the benchmark it is expected to mirror (or track). In other words, it reflects the standard deviation of the difference in returns for a given period.⁵⁵ There are two ways to calculate the tracking error. The first alternative is more straightforward and easier for interpretation. It is a simple subtraction of the fund's return from the return of the index it is supposed to track.

We use the following formula to calculate the Tracking Error indicator for the period t :

$$TE_t = \sigma_{r_f - r_{b,t}}$$

where:

TE represents the Tracking Error,

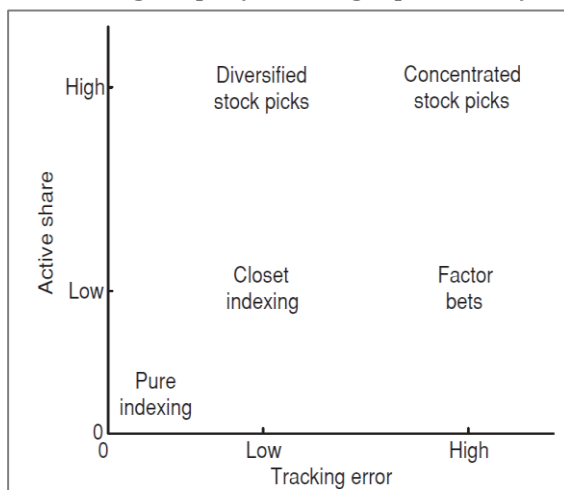
σ is the standard deviation,

r_f indicates the Return of a Fund,

r_b indicates the Return of the respective Benchmark,

T is the Number of Return Periods t .

Tracking error is also one of the factors explaining the type of active management. When the tracking error is combined with Active Share, we can sort the fund managers into four different groups (see the graph below) as presented by Petajisto⁵⁶ (2009).



Infographic 1. Different Types of Active Management

Source: Cremers, K. J. M., Petajisto, A. 2009. How Active Is Your Fund Manager? A New Measure That Predicts Performance. In: Review of Financial Studies, 2009, vol. 22, no. 9, pages 3329–3365.

⁵⁵ Formula for calculating the Tracking error over the defined period t could be expressed also like:

$$TE_t = \sigma_{R_f - R_{b,t}} = \sqrt{\frac{\sum_{t=1}^N (R_{f,t} - R_{b,t})^2}{N - 1}}$$

⁵⁶ Petajisto, Antti. 2009. "Active Share and Mutual Fund Performance". Financial Analysts Journal, vol. 69, Number 4, 2009. Available at: <https://www.cfapubs.org/doi/pdf/10.2469/faj.v69.n4.7>

Cremers and Petajisto⁵⁷ (2009) used two indicators (Active Share and Tracking Error) to distinguish mutual funds based on their managers' active management style. Active Share represents the fraction of portfolio holdings that differ from the benchmark index, thus emphasizing stock selection. Tracking error bets on systematic risk. As they point out, these two indicators allow an investor to recognize the active management styles as they have a significant impact on fund returns. A diversified stock picker can be very active despite its low tracking error, because its stock selection within industries can still lead to large deviations from the index portfolio. In contrast, a fund betting on systematic factors can generate a large tracking error even without large deviations from index holdings. A concentrated stock picker combines the two approaches, thus taking positions in individual stocks as well as in systematic factors. A "closet indexer" scores low on both dimensions of active management while still claiming to be active. Finally, a pure index fund has almost zero tracking error and Active Share. Their research suggests that fund's excess return is significantly related to active management, as revealed by a two-dimensional sort of non-index funds by Active Share and tracking error. Funds with the highest Active Share exhibit some skill and pick portfolios that outperform their benchmarks by 1.51% up to 2.40% per year. After fees and transaction costs, this outperformance decreases to 1.13% – 1.15% per year. In contrast, funds with the lowest Active Share have poor benchmark-adjusted returns and alphas before expenses (between 0.11% and –0.63%) and do even worse after expenses, underperforming by –1.42% to –1.83% per year. The differences in performance across the top and bottom Active Share groups are also statistically significant. Closet indexers, unsurprisingly, exhibit zero skill but underperform because of their expenses.

III.H. Turnover ratio (TR)

The portfolio turnover ratio (TR) is the percentage of a mutual fund or other investment's holdings that have been replaced in a given year, which varies by the type of mutual fund, its investment objective and/or the portfolio manager's investing style. This is a measure of the fund's trading activity, which is computed by taking the lesser of purchases or sales (excluding all securities with maturities of less than one year) and dividing by average monthly net assets.

As Cremers and Petajisto (2009) pointed out, tracking error (TE) turns out to predict turnover better than Active Share, implying that the strategies generating a high tracking error also involve more frequent trading.

A TR of 100% or more does not necessarily suggest that all securities in the portfolio have been traded during the analysed period (usually 1 year). In practical terms, the resulting percentage loosely represents the percentage of the portfolio's holdings that have changed over the past year.

Knowing the historical TR of a mutual fund helps an investor determine the fund's expected performance in the future. Some funds such as bond funds and small-cap stock

⁵⁷ Cremers, K. J. M., Petajisto, A. 2009. How Active Is Your Fund Manager? A New Measure That Predicts Performance. In: Review of Financial Studies, 2009, vol. 22, no. 9, pages 3329–3365.

funds have naturally high turnover ratios. Generally, high turnover ratio could result in increased costs for the fund and keeps fund manager “busy” with the positions. As Cremers and Petajisto (2009) argue, although portfolio turnover implies an action (i.e., trading) by the fund manager, turnover per se cannot add value to a portfolio - only holding a position does. Turnover just measures the frequency of revisions in the manager’s active bets (i.e., positions), but it does not measure the activeness of the bets themselves. These are two different kinds of activeness: either “being busy” with the portfolio or holding positions that differ significantly from the benchmark and thus have a chance to outperform or underperform.

The TR could also indicate the chance of decreased returns for investors due to fund manager’s activity when buying and selling stocks. A low TR (up to 30%) would indicate a buy-and-hold strategy of the fund. High turnover ratio (more than 100%) would indicate an investment strategy involving considerable buying and selling of securities during the year. However, it tells nothing on how the manager differs from the benchmark and thus should have no indicative power on fund’s excess return.

For the purpose of this study, we do not calculate TR on our own, but we extract it directly from MDD. However, Morningstar does not calculate itself the turnover ratios as these figures are pulled out directly from the financial highlights of the fund's annual report and presented in the Morningstar Direct database as a raw number.

III.I. Research questions and evaluation criteria

Having defined the fund universe to be analysed, what data to extract for each fund and what performance parameters, we move forward to the research questions. In order to fulfil the main objective of the study, we shall focus on answering several interconnected research questions presented in following sub-sections below.

1. What percentage of analysed funds were able to outperform the market (benchmark) during the analysed periods?

In order to answer this research question, we have to rank the analysed funds according to their alphas (brackets) during each of the analysed 5-year rolling periods. One can expect that, as the fund managers presents themselves as active managers, accepting the existing research on promoting lower betas (lower downside risk) to investors, we could see better results during the more volatile periods or periods when negative benchmark returns have been recorded.

2. What percentage of analysed funds were able to deliver excess return in the selected intervals (brackets) during the analysed periods?

All analysed funds have been sorted based on the level of alpha (left side) and their domicile and type (upper side) as seen in the example table below. On top of it, we have controlled for the “noise” attribute. We define the “noise” attribute as an alpha in the range of (- 1%;1%). Within this range, the fund manager could be considered either as a passive one, since the difference between the fund and respective benchmark returns have occurred most likely unintentionally and not due to the active management strategy, or

as a “closet indexer”, since the net excess returns simply fall inside this range. We have not studied in depth the “noise” segment and we leave it to other researchers to deal with these assumptions.

Results of the analysis are at the beginning presented in the form of an overview table, as presented below, where the reader can see the number of analysed funds based on their domicile and type grouped according to the ranges.

Example table	Belgium		France		Luxembourg		ALL funds
	UCITS	AIFMD	UCITS	AIFMD	UCITS	AIFMD	
$\alpha \geq 3\%$							
$3\% > \alpha \geq 2\%$							
$2\% > \alpha \geq 1\%$							
$1\% > \alpha \geq 0\%$							
$0\% > \alpha \geq -1\%$							
$-1\% > \alpha \geq -2\%$							
$-2\% > \alpha \geq -3\%$							
$-3\% > \alpha$							

It can be argued that active management should prove its effectiveness exclusively by delivering net overperformance (positive net alpha) to an investor. However, from a methodological point of view, we need to carefully consider marginal ranges, e.g. ranges of alpha around the value of 0% as indicated above, the “noise” segment. A simple explanation would be that, due to the assumed existence of an active part of the portfolio that differs from the benchmark and does not represent a real strategic allocation, some differences might occur by chance or due to the unexpected and unintended changes in portfolio composition. The academic literature calls this situation as a “noise”.

Within our methodology, we mark the ranges of $(-1\%; 1\%]$ ⁵⁸ as the returns that can’t be viewed as an intended deviation from the benchmark, as these occurrences may be simply a matter of luck or other unexplained factors.

The selected intervals for ranking the analysed funds among overperforming and underperforming are as follows (**example table**)

	$\alpha \geq 3\%$
Overperformers	$3\% > \alpha \geq 2\%$
	$2\% > \alpha \geq 1\%$
Potential indexers (no clear evidence)	$1\% > \alpha \geq 0\%$
	$0\% > \alpha \geq -1\%$
Underperformers	$-1\% > \alpha \geq -2\%$
	$-2\% > \alpha \geq -3\%$
	$-3\% > \alpha$

⁵⁸ The bracket does not include the absolute value of -1% and that of 1%.

3. What is the relation between the Fund Return (and/or excess return - alpha) and Fund manager activity?

This is measured as a relation of Fund Return and Turnover Ratio (TR), while the Turnover Ratio (TR) range is between:

- A. $0\% \leq TR \leq 50\%$,
- B. $50\% < TR \leq 75\%$
- C. $75\% < TR \leq 100\%$
- D. $100\% < TR$

The results are presented as an absolute and relative number of funds falling into the defined brackets. The subsequent relationship analysis among the attributes is realized using the correlation and regression coefficients.

4. What is the relation between the Fund Return (and/or excess return - alpha) and Charges?

This can be measured as a correlation, coupled with a regression coefficient between the Return (or Alpha) and Charges applying two approaches:

- 4.1. What percentage of relative performance (alpha) is tied to 1 unit of costs (charges)?
- 4.2. What level of charges is significant for overperformance (positive alpha)?

As mentioned earlier, the correlation (and regression) analysis will be carefully tested for the funds with marginal alphas in the range $(-1\%;1\%)$.

Fee %	Alpha	Belgium		France		Luxembourg		ALL funds
		UCITS	AIFMD	UCITS	AIFMD	UCITS	AIFMD	
[0%; 1%)	$\alpha \geq 0\%$							
	$\alpha < 0\%$							
[1%; 2%)	$\alpha \geq 0\%$							
	$\alpha < 0\%$							
[2%; 3%)	$\alpha \geq 0\%$							
	$\alpha < 0\%$							
[3%; more)	$\alpha \geq 0\%$							
	$\alpha < 0\%$							

Fund size: this can be calculated as the relation (correlation, regression) between the Return (and/or Alpha) and the size of the fund measured by the Assets under Management (data on the fund size available only for the year 2017, according to MDd).

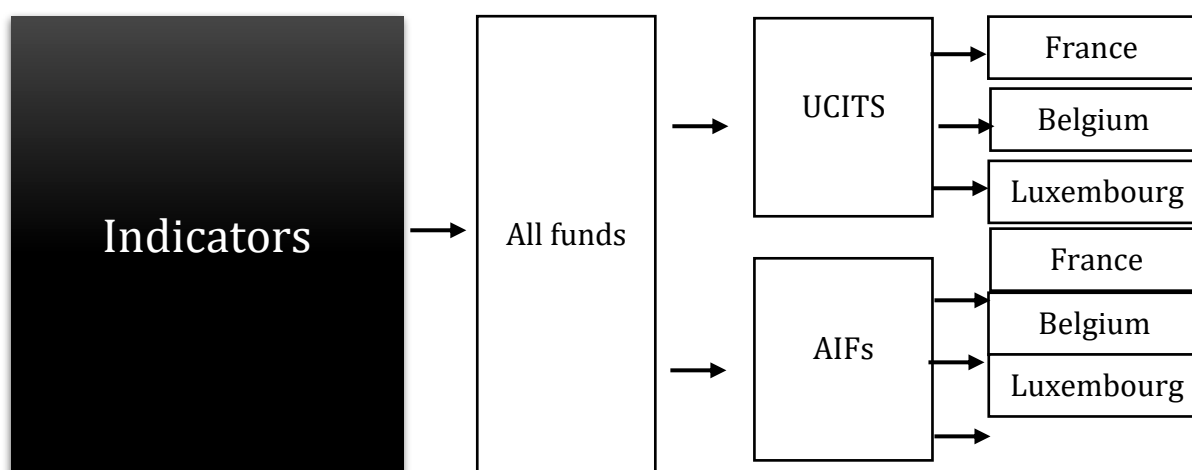
Again, we carefully consider the funds that deliver the alphas in marginal ranges $(-1\%;1\%)$.

Fund size (in € mil.)	Alpha/ Fees	France			Belgium			Luxembourg		
		0% - 1%	2% - 3%	3% and more	0% - 1%	2% - 3%	3% and more	0% - 1%	2% - 3%	3% and more
0 - 250	$\alpha \geq 0\%$									
	$\alpha < 0\%$									
250.01 - 500	$\alpha \geq 0\%$									
	$\alpha < 0\%$									
500.01 - 750	$\alpha \geq 0\%$									
	$\alpha < 0\%$									
750.01 - 1000	$\alpha \geq 0\%$									
	$\alpha < 0\%$									
1,000.1 and more	$\alpha \geq 0\%$									
	$\alpha < 0\%$									

To calculate the relation between the fund alpha and the risk (volatility, beta), two measurements are available:

1. Fund Returns vs. Returns Volatility
2. Alpha vs. Standard Deviation of the Alpha

For all results, we present the “Tree Structure” as follows:



IV. Results and Interpretation

Before the presentation of our research's results, it would be useful to have a broader overview of nominal returns and descriptive statistics of returns the analysed funds have recorded during the timeframe 2008 – 2017.

Below, we present the basic descriptive statistics of the sample of equity funds and their respective benchmarks over the defined period of time. Nevertheless, it should be clearly noted that the excess return calculation was performed on a fund-by-fund basis, where the fund's excess return for each period (quarterly as well as annually) was calculated as a difference between the fund's return and fund's representative benchmark return. The broader picture on funds' performance and benchmarks' performance should serve only for the presentation of markets overview during the analysed 10 years (2008 – 2017).

Table 7. Descriptive statistics of the analysed fund returns										
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Average	-42.28%	37.83%	16.92%	-12.95%	15.30%	16.14%	8.66%	9.64%	6.59%	12.29%
StDev	10.39%	23.53%	12.22%	8.33%	8.34%	15.99%	12.20%	10.43%	13.53%	8.00%
10. percentile	-54.18%	17.96%	1.72%	-22.63%	6.10%	-5.26%	-1.44%	-3.24%	-3.82%	4.44%
25. percentile	-46.96%	24.39%	8.27%	-17.96%	11.72%	10.82%	2.03%	5.66%	0.14%	8.03%
50. percentile	-42.01%	31.35%	16.78%	-14.02%	16.03%	19.71%	6.62%	10.58%	4.26%	11.47%
75. percentile	-37.34%	45.14%	23.84%	-8.06%	20.30%	24.84%	14.48%	15.28%	9.17%	16.91%
90. percentile	-30.88%	67.89%	30.90%	-1.82%	24.05%	30.40%	23.48%	21.53%	16.08%	22.29%

Source: Own calculations, 2018

The **average** row shows a geometric average of the funds in sample return on each year (columns), and the **standard deviation** (second row) calculated the distribution spread of results. In other words, standard deviation indicates how close together the returns reported by all funds on average were, year by year, to an expected value of return. The standard deviation is useful to show volatility risk, or how extreme fluctuation in returns were. A low standard deviation value (8.06%) shows that the returns recorded were more homogenous. The last 5 rows (10th, 25th, 50th, 75th, 90th percentiles) show how many, as % of total, returns are below the value indicated. For instance, in 2012 25% of fund returns were under the value of 11.72%.

As the following research questions are oriented on the over/under performance compared to the respective fund benchmarks, the next table presents the descriptive statistics of the respective benchmark returns during the period of 2008 – 2017.

Table 8. Descriptive statistics of benchmarks

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Average	-42.19%	36.85%	16.72%	-9.83%	16.75%	16.86%	11.54%	9.29%	9.38%	11.91%
StDev	8.86%	20.59%	10.68%	8.49%	6.97%	14.78%	11.27%	8.68%	11.44%	7.11%
10. percentile	-50.91%	22.53%	2.40%	-18.74%	11.91%	-6.08%	2.71%	-4.99%	2.58%	5.90%
25. percentile	-46.52%	25.94%	11.10%	-14.89%	14.05%	17.49%	4.32%	8.22%	3.59%	7.51%
50. percentile	-43.39%	30.18%	19.53%	-11.24%	17.29%	21.20%	9.17%	9.81%	7.44%	10.41%
75. percentile	-37.64%	41.68%	23.62%	-4.25%	19.63%	23.36%	19.50%	12.79%	10.73%	13.90%
90. percentile	-33.73%	67.83%	28.37%	2.45%	23.86%	28.76%	28.17%	19.36%	15.31%	21.13%

Source: Own calculations, 2018

Comparing the “Average” rows in both tables, it is possible to see what kind of alphas have been delivered across the analysed sample of funds. In general, UCITS funds’ returns were comparable across domiciles. The differences have been found between fund types, where French AIFs has delivered significantly lower returns compared to the Belgium and Luxembourg peers as well as to the respective benchmarks.

A first look at the tables could give the reader the impression that the analysed funds are higher-beta funds that seek to deliver higher returns during the up-trending markets, while investor suffer bigger losses during the downtrends. However, it should be noted that averaging the results across the large sample could lead to false signals or conclusions. The subsequent analysis attempts to uncover whether the fund managers actually possess active management skills that would allow overperforming their corresponding markets (benchmarks) and whether they have composed their portfolios to this extent.

IV.A. What percentage of analysed funds were able to outperform (underperform) the market (benchmark) during the analysed periods?

If we assume that fund managers that claim active management have a corresponding ability to carry out active management, then there should be a significant number of outperforming funds. Initially, we sorted the analysed funds based on their excess return (alpha) into two groups: 1) overperformers ($\alpha \geq 0\%$); 2) underperformers ($\alpha < 0\%$).

The research question was then reinterpreted into three sub-questions: 1) whether there is a significant amount of funds able to deliver positive alpha during one year; 2) whether there is a performance persistence, which means the existence of significant amount of funds able to deliver positive alpha during a 5-year holding period; 3) whether the fund manager is able to deliver the positive alpha over the whole period of 10 years.

We calculated alpha on an annual basis. The results for the first approach therefore present the number of funds outperforming (or underperforming) their respective benchmarks on an annual basis during the whole analysed period of 2008 – 2017.

Table 9. Number of over/underperforming funds on an annual basis

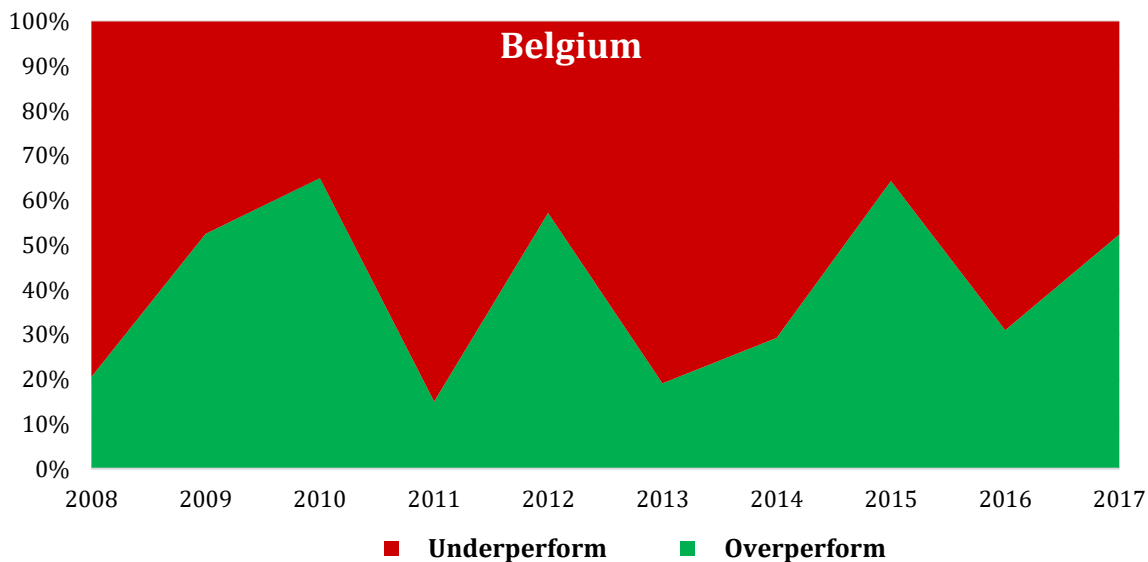
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Belgium										
Overperform	8	21	26	6	24	8	12	27	13	22
Underperform	31	19	14	34	18	34	29	15	29	20
No value	4	3	3	3	1	1	1	1	1	1
TOTAL	43	43	43	43	43	43	42	43	43	43
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
France										
Overperform	587	387	454	289	410	363	214	567	186	400
Underperform	417	638	567	735	614	663	808	463	843	630
No value	145	125	126	126	124	124	125	120	119	120
TOTAL	1,149	1,150	1,147	1,150	1,148	1,150	1,147	1,150	1,148	1,150
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Luxembourg										
Overperform	318	445	371	189	307	402	218	398	232	467
Underperform	501	378	454	647	530	439	623	444	615	379
No value	74	70	67	56	55	52	51	50	46	46
TOTAL	893	893	892	892	892	893	892	892	893	892

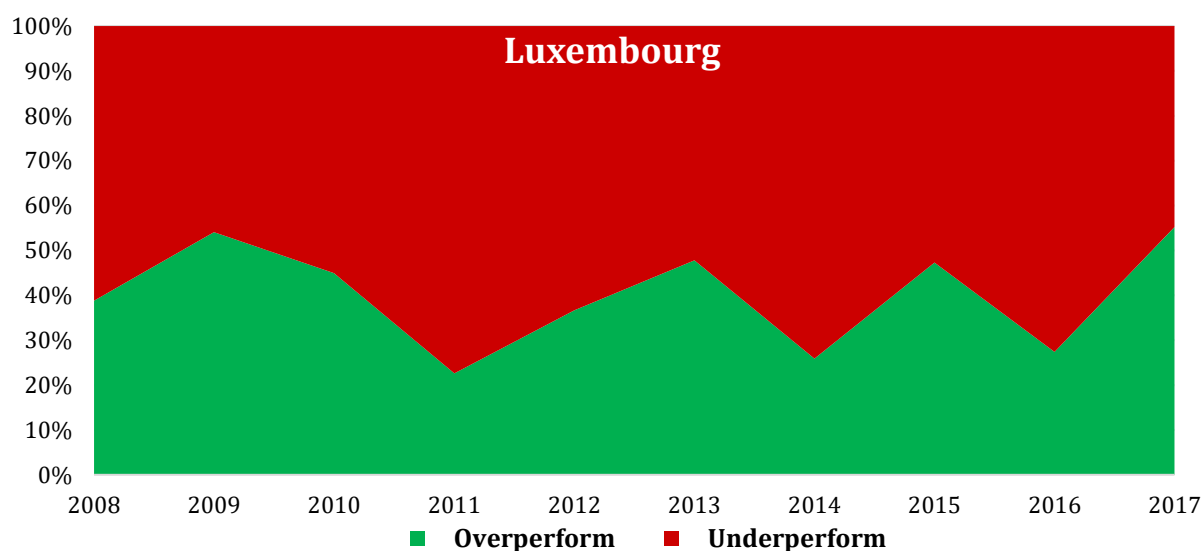
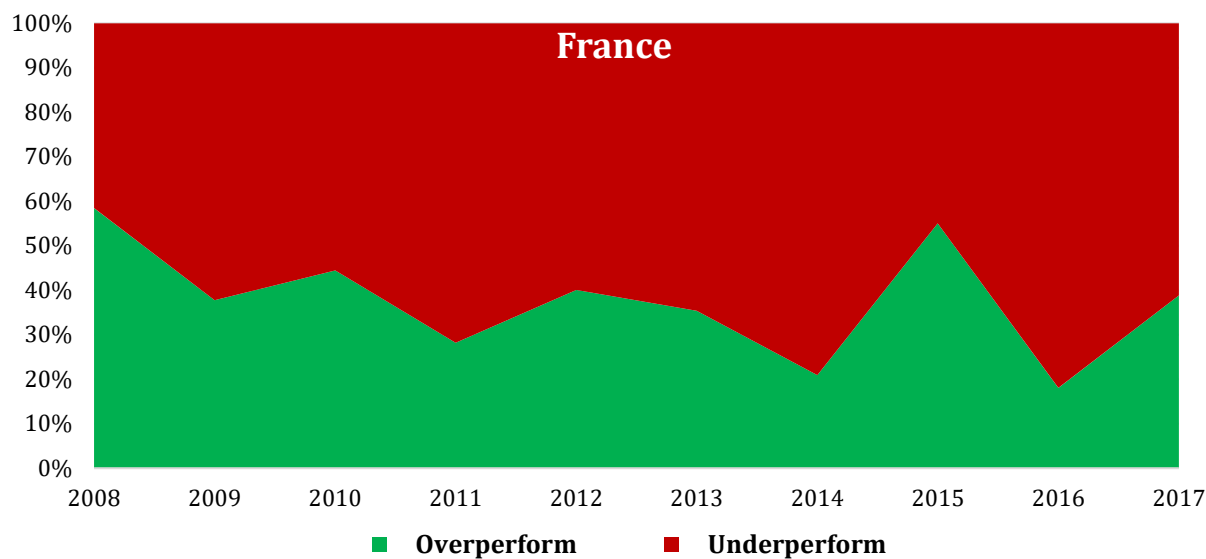
Source: Own calculations, 2018

Comment: "No value" represents the number of funds, for which the benchmark was not available.

In order to see the performance instability, the following graphs present the relative number of over/under performing funds on an annual basis based on the fund domicile.

Figure 3. Relative number of over/under performing funds on an annual basis and domicile





Source: Own elaboration, 2018

When analysing the broader market and the ability to outperform the corresponding benchmark during rising/falling trends, the abovementioned hypothesis would suggest that a higher number of outperforming funds should occur during the falling markets. This is mainly due the tendency of the fund managers to underweight the high-beta positions and their ability to keep cash positions and achieve lower draw-downs (and respective lower volatility of the fund prices) contrary to index funds, which take to full impact of a market downturn due to the full portfolio exposure. However, we are not able to confirm the validity of the hypothesis as there is no indication that falling markets would position the fund managers in delivering positive alphas, which in this case would mean that during the market downturns, the fund managers record smaller negative returns than the respective benchmarks. We had only 2 years (out of 10), during which the broader markets ended up in negative territory.

An investor could also ask, if he can expect an actively managed fund to at least outperform the passive benchmark and thus constantly deliver positive alpha. This question could be deemed as the most interesting from the unsophisticated retail investor

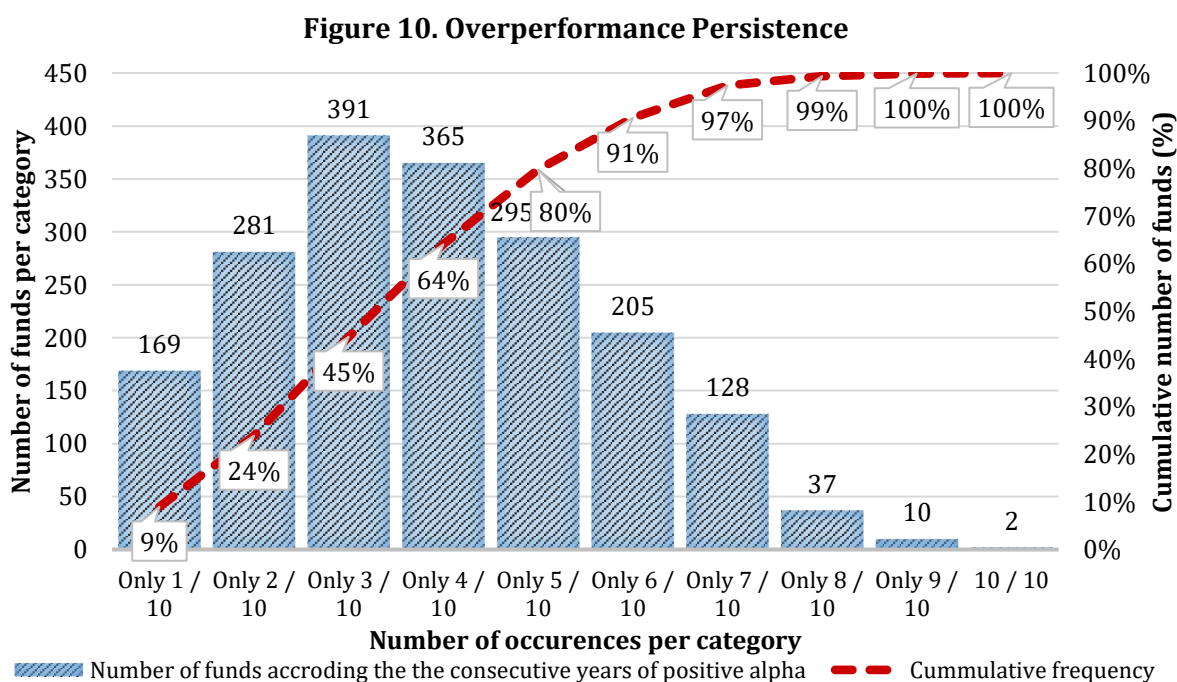
vantage point. In order to answer this important question, we have analysed the real active management skills of fund managers from the angle of the number of years fund managers were able to beat their benchmarks. From an investor point of view, this approach answers the question on the assurance and stability of delivered positive alphas, otherwise referred to as performance persistence.

Figure 4 presents the results in the form of a histogram, where the number of years during which the fund manager overperformed the market (out of 10-year holding period) is presented on the “x”-axis, and the number of funds on the “y”-axis. The graph also illustrates the cumulative distribution function, whose interpretation can be summarized as the answer to the following question: “How many funds (as % of all funds), **were not able** to deliver the positive excess return for up to “X” years out of 10?”.

Figure 4 highlights two findings. First, the bars indicate the number of funds (Y axis, primary vertical axis) that have managed to outperform the benchmark a certain number of times (X axis, number of years), not necessarily consecutive. However, this indicator cannot be interpreted alone, as some funds may underperform for 9 years, but have one exceptional outperformance that brings it, at the end of a certain holding period, above the market.

Therefore, we must couple it with an analysis of overperformance at the end of a holding period (dotted line, secondary vertical axis). We calculated an additional indicator for this purpose, compound α , which is the difference between the compound return of the fund and the compound return of the benchmark after a certain number of years (X axis). Most funds (391) managed to deliver for three out of 10 years compound returns higher than the market index. Nevertheless, the graph clearly shows the tendency of funds to underperform as the holding period increases (from 1 to 10 years, progressively).

Figure 4. Number of consecutive years of delivering positive excess return



Source: Own calculations, 2018

Just above a third of funds were able to outperform the benchmark for up to four consecutive years. Only 20% of funds were able to deliver excess returns for 5 consecutive years, while only 3% of analysed funds performed better than their markets for 7 consecutive years. For the rest, basically, only a marginal number of funds (2 funds or 0.1% of all analysed funds) were able to beat their respective benchmarks for the whole analysed period of 10 years.

Another interpretation of the findings would be that if the investment horizon is more than 7 years, retail investors would be better off choosing passively managed fund as they can only expect a 3% chance of choosing a fund that would deliver better returns than a respective benchmark.

Nevertheless, the unfortunate finding is that, on a full holding period of 10 years, the average investor had a 0.11% chance to choose a “winning” retail equity fund from France, Luxembourg or Belgium.

The third question concerns whether the fund managers were able to deliver positive excess return over the 5-year holding period. In this case, the excess return had to be positive for the whole 5-year holding period regardless of any excess return during any year out of the analysed 5-year holding period. In other words, at the end of the observation period, did the fund score higher than the market? This small analysis implies that the client holds his investment for 5 consecutive years, regardless of whether in one year or another it performed below the benchmark or negatively. The following table contains the number of funds delivering positive / negative alpha between 2008 – 2017.

From the retail investor point of view this works on the assumption that the investment in the fund was held for the entire 5-years period, regardless of whether in one (or more) years the fund recorded negative alpha. From the asset manager point of view, this hypothesis would assure that an investor would hold the investment fund during the recommended holding period, allowing the asset manager to showcase his active management skills. The following table contains the number of funds delivering positive / negative alpha over the 5-year holding period analysed between 2008 – 2017.

Table 10. Relative Frequency (Annual)

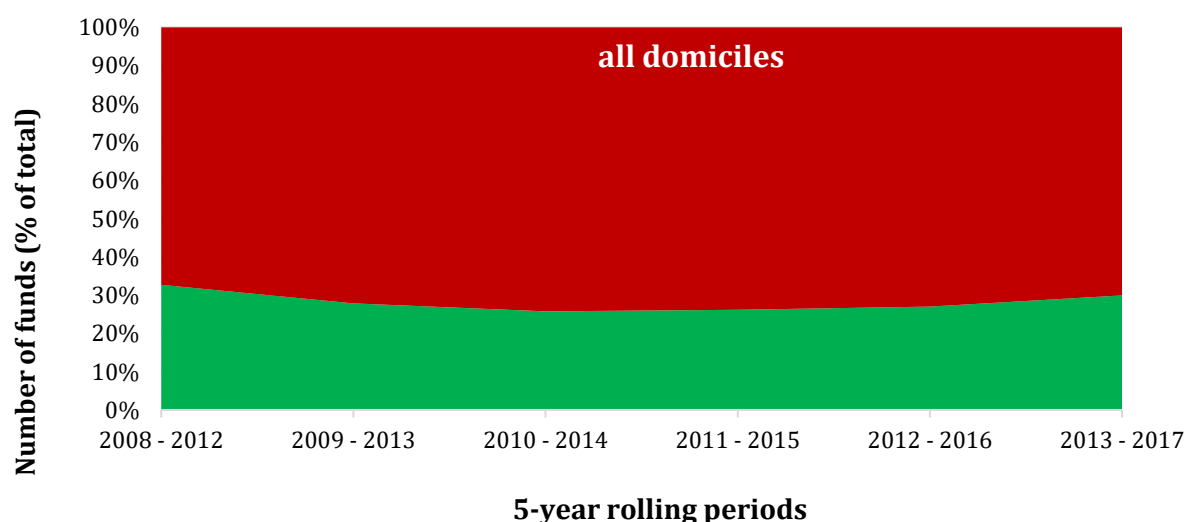
	Alpha 2008	Alpha 2009	Alpha 2010	Alpha 2011	Alpha 2012	Alpha 2013	Alpha 2014	Alpha 2015	Alpha 2016	Alpha 2017	AVG
Belgium											
Overperform	18.6%	48.8%	60.5%	14.0%	55.8%	18.6%	28.6%	62.8%	30.2%	51.2%	38.9%
Underperform	72.1%	44.2%	32.6%	79.1%	41.9%	79.1%	69.0%	34.9%	67.4%	46.5%	56.7%
No value	9.3%	7.0%	7.0%	7.0%	2.3%	2.3%	2.4%	2.3%	2.3%	2.3%	
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	
France											
Overperform	51.1%	33.7%	39.6%	25.1%	35.7%	31.6%	18.7%	49.3%	16.2%	34.8%	33.6%
Underperform	36.3%	55.5%	49.4%	63.9%	53.5%	57.7%	70.4%	40.3%	73.4%	54.8%	55.5%
No value	12.6%	10.9%	11.0%	11.0%	10.8%	10.8%	10.9%	10.4%	10.4%	10.4%	
Total	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	
Luxembourg											
Overperform	35.6%	49.8%	41.6%	21.2%	34.4%	45.0%	24.4%	44.6%	26.0%	52.4%	37.5%
Underperform	56.1%	42.3%	50.9%	72.5%	59.4%	49.2%	69.8%	49.8%	68.9%	42.5%	56.1%
No value	8.3%	7.8%	7.5%	6.3%	6.2%	5.8%	5.7%	5.6%	5.2%	5.2%	
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	
Total											
Overperform	43.8%	40.9%	40.9%	23.2%	35.6%	37.1%	21.3%	47.6%	20.7%	42.6%	35.4%
Underperform	45.5%	49.6%	49.7%	67.9%	55.8%	54.5%	70.2%	44.2%	71.4%	49.4%	55.8%
no value (%)	10.7%	9.5%	9.4%	8.9%	8.6%	8.5%	8.5%	8.2%	8.0%	8.0%	

Source: Own calculations, 2018

By aggregating the relative figures in the table above, the research team observed: first, that an average of merely 27% of the funds in our sample managed to overperform their corresponding benchmarks during the six 5-year rolling periods, calculated quarterly.

We can observe that, if aggregated on an annual basis (annual alpha), 35% of the funds in the sample managed to overperform their benchmarks, when analysed from a performance persistence perspective, less funds manage to deliver constant overperformance (27%, as mentioned above).

Figure 4. Performance persistence over 5-year holding periods (averages)



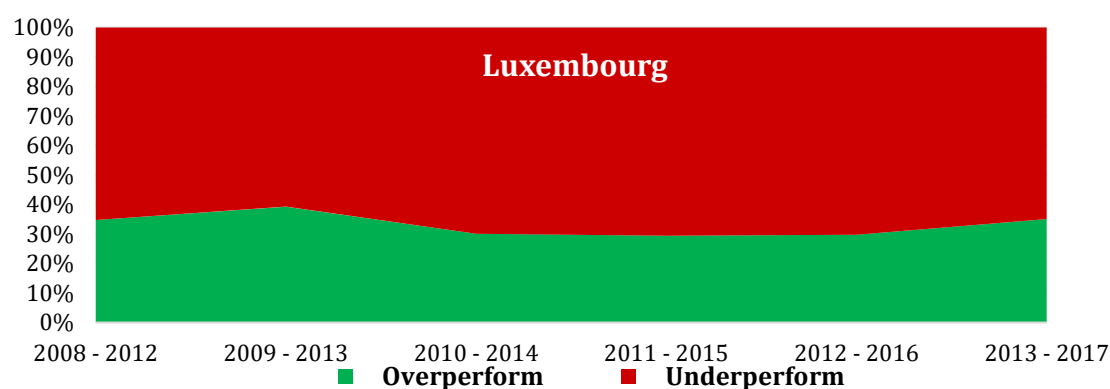
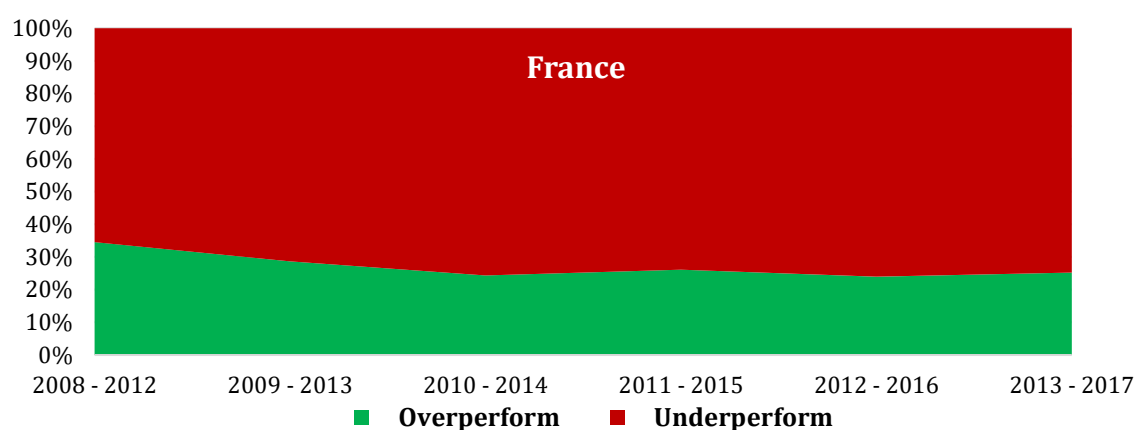
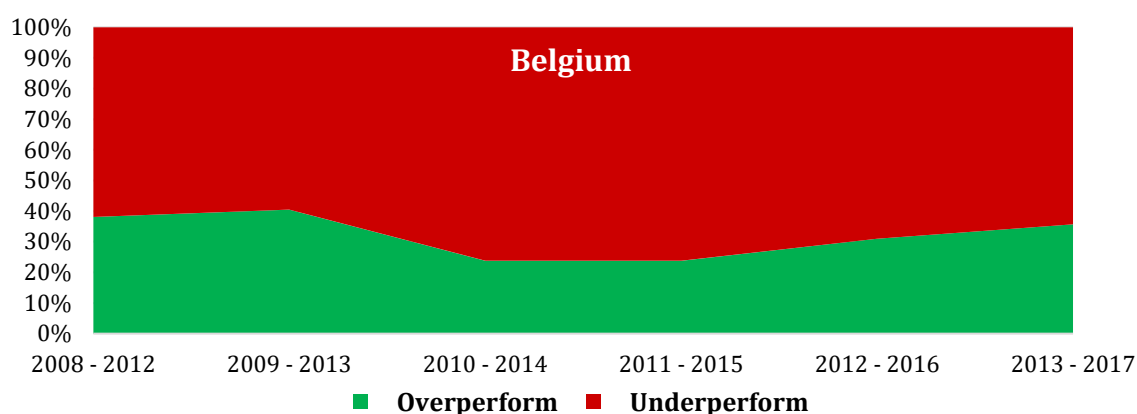
Source: own composition

Our analysis groups four averages of 20 quarters each under 5 consecutive periods, categorized by the year of the starting quarter of computations: 2008-2012, for all 5 years starting with quarters 1, 2, 3, and 4 of 2008, and so on. The only period with only one average (20 quarters) is that of 2013-2016 (2013Q1-2017Q4).

We can observe that the average number of overperforming funds in the six holding periods is heavily outbalanced by that of underperforming. In Belgium and Luxembourg, 31% of funds managed to obtain net returns higher than that of the market index, while in France only 24%.

The graphs below show the time evolution of the relative number of funds to deliver positive alphas of the 5-year holding period.

Figure 5. Relative number of over/under performing funds on a 5-year holding period and domicile



Source: own composition

The analysis of performance persistence over the 5-year holding period presents a more sceptical view on fund managers' skills. Compared to the 1 year holding period (where 35% of funds provided excess return), only 27% of analysed funds proved their ability to deliver excess returns.

Our findings suggest that the longer an investor holds an actively managed fund, the lesser chance of beating the market benchmark he or she has.

If an investor takes on such risk and invests into an actively managed fund, he/she should be rewarded with a return higher than that of an investor choosing a passive index fund. However, our research results suggest that the longer holding period, the lower the probability that a fund manager will be able to deliver consistent excess return, meaning the ability to beat the respective market benchmark at the end of the recommended holding period.

Retail investors holdings units in an actively managed equity fund thus will pay for the assurance that he/she will be most probably worse off on a longer period than an investor who have chosen a passively managed fund with the same benchmark.

IV.B. What percentage of analysed funds were able to achieve “excess return” in selected intervals (ranges) during the analysed periods?

The following analysis gives more detail to the idea of alpha persistence, where the range (-1%;1%) for alpha is deemed as a “**noise**” (see the explanation in the methodological part), trying to determine how scattered, close or high differences are between the two returns.

Answering the research question lies on the ability to assess, what level of “alphas” are the fund managers able to deliver over time. Again, we employ the similar approach as in the previous research question. The results are presented both in absolute number of analysed funds as well as ratio of under and overperforming funds. The difference to the previous question is that we control for the “**noise**”, where funds recording the excess return in the range of (-1%;1%) are considered either as closet indexers with no specific active management compared to their respective benchmarks or as managers where their positive above benchmark returns were “eaten” by the charged fees and they simply fall within this range.

Table 11. Number of over/under performing funds with the “noise” control on an annual basis (1-year holding period)

Alpha (in %)	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
All Funds										
(1; more than +3)	770	449	365	169	274	356	187	386	207	437
<-1;1>	318	1,054	1,089	1,103	1,152	1,125	1,107	1,138	1,105	1,139
(-1; less than -3)	774	385	432	628	477	428	610	390	606	342
No Value	223	198	196	185	180	177	177	171	166	167
Belgium										
(1; more than +3)	6	18	19	5	16	8	5	19	11	13
<-1;1>	9	7	11	9	15	8	14	13	12	18
(-1; less than -3)	24	15	10	26	11	26	22	10	19	11
No Value	4	3	3	3	1	1	1	1	1	1
France										
(1; more than +3)	498	16	17	14	13	11	7	28	8	17
<-1;1>	192	985	985	991	990	988	988	992	991	996
(-1; less than -3)	314	24	19	19	21	27	27	10	30	17
No Value	145	125	126	126	124	124	125	120	119	120
Luxembourg										
(1; more than +3)	266	415	329	150	245	337	175	339	188	407
<-1;1>	117	62	93	103	147	129	105	133	102	125
(-1; less than -3)	436	346	403	583	445	375	561	370	557	314
No Value	74	70	67	56	55	52	51	50	46	46

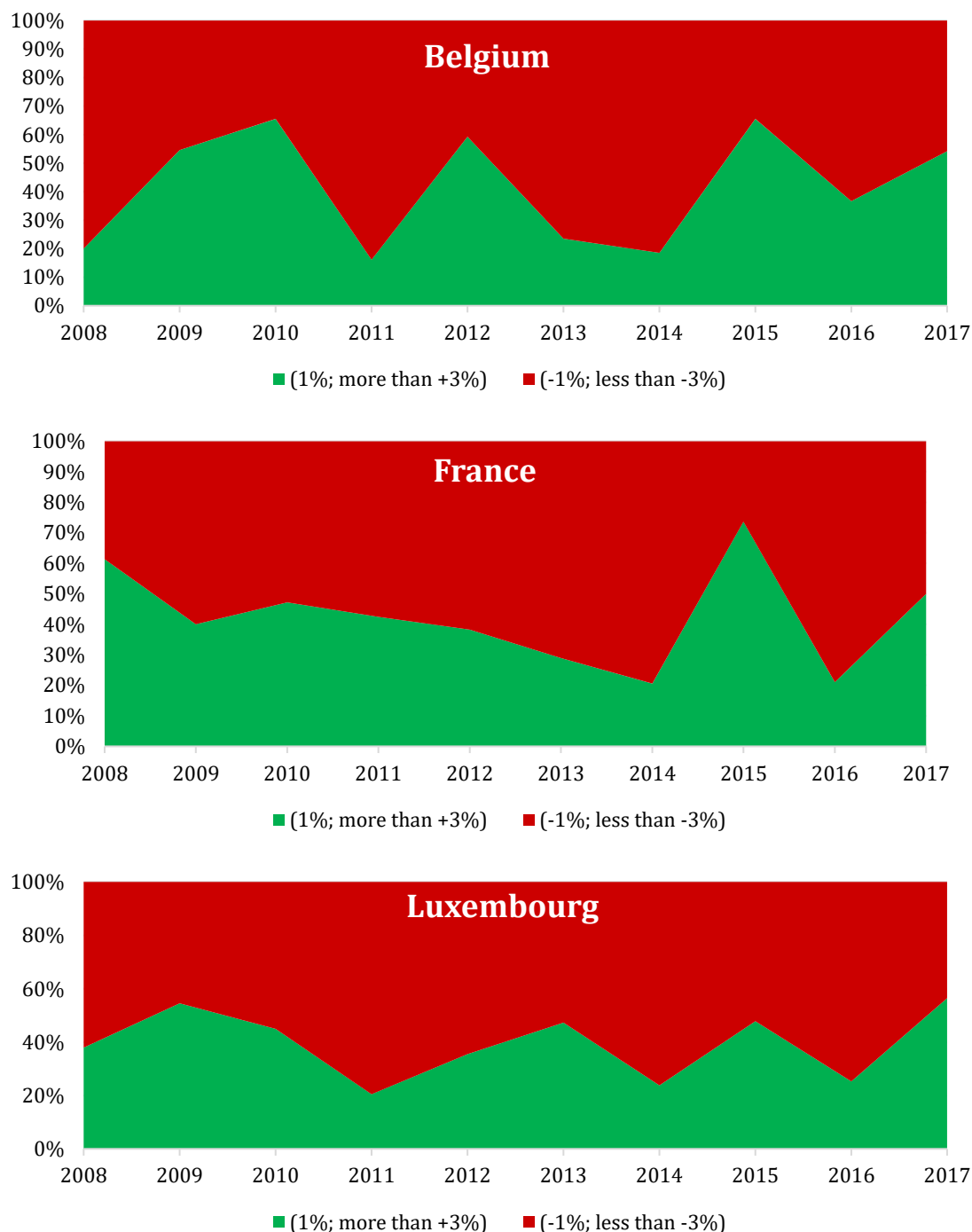
Source: Own elaboration, 2018

What is observable at first is that the majority of funds are in the “noise” bracket, meaning that the annual returns from 2008-2017 are within a bracket of -1% to +1%. Out of these “noise” funds, a third delivered excess return (0%-1%) and the rest were on the negative side (-1%-0%). In order to determine a potential indication of closet indexing, we would have needed to determine the persistency of a fund falling in the “noise” category. Nevertheless, there is a clear image that funds that manage to outperform the benchmark by a significant difference (more than 1%) represent less than a fifth of the total number of funds (with data), those who underperform by a margin (more than 1% negative) represent a fourth. This tends to confirm previous findings that outperformance may come more as a luck rather than skill. If the average investor has more or less the same chances of picking a winning fund, he or she should pay attention to this “distribution” of alpha on brackets, since it may prove a better pay-off to choose a fund from a universe that has more volatile returns than one which is more tight around the market.

Generally, we can observe that tendency to overperform the benchmark occurs during broad market downturns. In this case, we can observe ability of the fund managers to deliver better results (smaller declines) due to the less aggressive portfolios. The opposite behaviour of fund managers can be observed during the upturns. Most of the funds are then struggling to beat their benchmarks.

Interesting results can be seen among the French domiciled funds. Almost 97% of analysed funds during the up-trending markets recorded excess returns within the tight range of (-1%;1%), which could indicate benchmark mimicking strategy. On the other hand, especially French domiciled funds have been able to beat the benchmark during the significant downtrend period (year 2008). This suggest that many French funds have built their strategies on beta factors (limiting the volatility) than the alpha factors. Again, the graphs below show the ratio of over and underperforming funds for respective domiciles.

Figure 5. Relative number of over/under performing funds with the "noise" control on an annual basis and domicile



If one would take the funds' bracket with an assumption that the recommended holding period is one year, our analysis shows that there is a 40% (1 in 2.5) chance to choose a fund that will overperform the benchmark. On the other hand, there is no strong evidence on the ability of the fund manager to continue the streak and deliver positive alpha also in the consecutive year. In other words, this indicates that an investor has a lower probability of achieving the same positive alphas with funds that have a recommended holding period higher than 1 year.

We also analysed the ability of fund managers to deliver excess returns also over longer holding periods – 5-year holding period. The aim is to evaluate whether an investor who was able (or more precisely “lucky enough”) to pick a good performing fund at the beginning (after the first year, as evidenced above) would end-up with the well-performing fund at the end of a 5-year holding period. The results are presented in the table below.

Table 12. Number of over/under performing funds with the “noise” control over the 5-year holding period

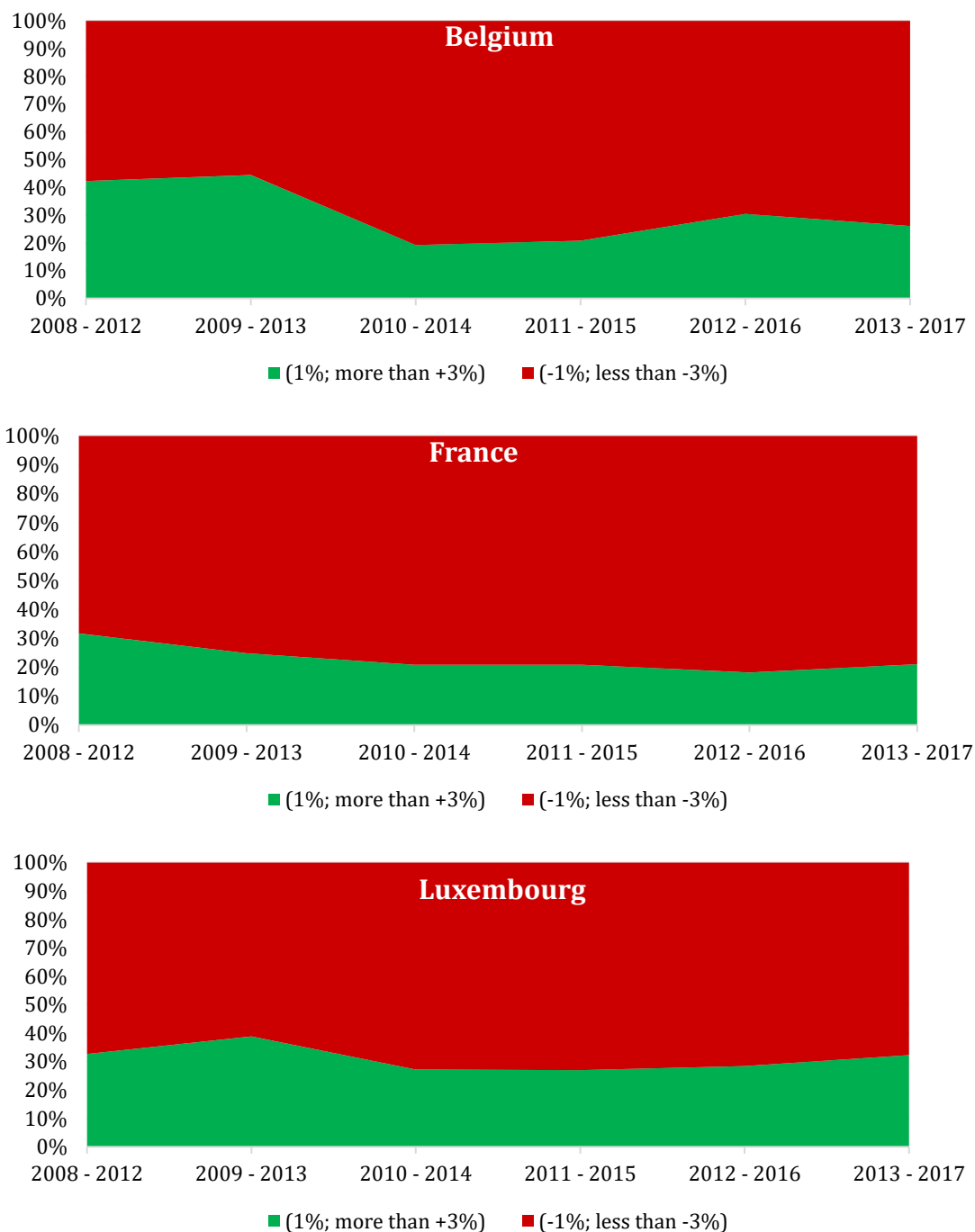
Alpha	2008 - 2012	2009 - 2013	2010 - 2014	2011 - 2015	2012 - 2016	2013 - 2017
All Funds						
(1; more than +3)	452	465	347	340	321	359
<-1;1>	1,000	1,021	1,053	1,061	1,121	1,130
(-1; less than -3)	945	1,007	1,111	1,091	1,063	1,008
No Value	177	174	173	168	161	161
Belgium						
(1; more than +3)	11	12	5	5	7	6
<-1;1>	16	15	16	18	19	19
(-1; less than -3)	15	15	21	19	16	17
No Value	1	1	1	1	1	1
France						
(1; more than +3)	227	192	158	151	129	153
<-1;1>	311	254	272	308	325	309
(-1; less than -3)	489	581	598	574	580	572
No Value	123	123	122	117	116	116
Luxembourg						
(1; more than +3)	214	261	184	184	185	200
<-1;1>	184	171	167	161	197	230
(-1; less than -3)	441	411	492	498	467	419
No Value	53	50	50	50	44	44

Source: Own elaboration, 2018

Our first observation is that the results calculated on an annual basis tend to be confirmed for the computations on 5-year holding periods. Almost a majority of funds fall within the “noise” attribute category (alpha between -1% and +1%) and only a sixth manage to obtain a marginal return to the benchmark of more than +1%.

The following graphs present the relative amount of outperforming funds compared to the underperforming peers using the 5-year holding period as a reference criteria.

Figure 6. Relative number of over/under performing funds with the "noise" control on a 5-year holding period and domicile



One can easily understand that an unsophisticated investor has a “1-to-4” chance of choosing a good performing “actively managed” fund. Comparing the data with the results where only the 1-year holding period was considered, we can draw a conclusion that the broadly advised recommendation to stick with the fund for a longer period in order to record a return higher than the market does not hold.

An investor has a higher probability to be worse off the longer he holds the investment. Thus, a different strategy than a simple belief in a longer holding period has to be applied in order to identify a fund manager with real active management skills.

IV.C. What is the relation between the Fund Return (and/or excess return) and Fund manager activity?

Inspecting the activity of a fund manager with regard to the achieved alpha could, according to many research studies, contribute to the better understanding of what generates overperformance.

The indicator that tracks the trading activity of a fund manager, giving some insight into the active management strategy, is the Turnover Ratio (TR).

Intuitively, a lower TR could be interpreted as an indication towards passive management, where the strategic allocation represents the dominant part of the investment strategy of a fund manager, underpinned by a “buy and hold” principle. On the opposite, a higher TR could indicate higher trading activity, where some tactical allocation principles could be seen. Typically, tactical allocation strategies consider momentum and trend strategies that seek better buying and selling prices over time.

Within the methodology, we have set four Turnover Ratio ranges that respect fall in the brackets determined and generally used by the existing literature:

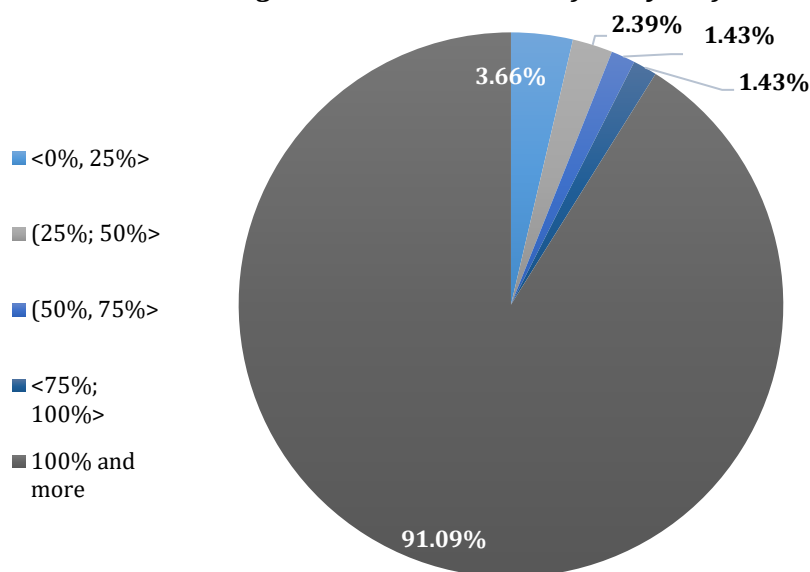
- (i) The first bracket, where the TR is at least equal to 0%, but not higher than 50% ($0\% \leq TR \leq 50\%$);
- (ii) The second bracket, where the TR is higher than 50% but not higher than 75% ($50\% < TR \leq 75\%$);
- (iii) The third, where the TR is at least higher than 75% and maximum equal to 100% ($75\% < TR \leq 100\%$);
- (iv) Last, when the TR is higher than 100% ($100\% < TR$).

First, we will present the results as an absolute and relative number of funds falling into the abovementioned ranges, compared to their achieved alphas. We will then analyse the relation between the Turnover ratio and delivered alphas and describe the results based on the fund type (UCITS/AIF) and domicile. This analysis is underpinned by the relation for fund types lies on the hypothesis claiming that AIFs exhibit more active management and thus record higher Turnover ratios accompanied with higher probability of positive alphas in both market upturns and downturns.

At the same time, as the data on the Turnover Ratio are available for the last year (2017), we compare recorded alphas of analysed funds to the last available data on the TR.

The graph below presents the distribution of analysed funds based on their Turnover ratio.

Figure 7. Turnover ratio of analysed funds



Most analysed funds (91.09% of all analysed funds) have a TR higher than 100%, suggesting a high trading activity. However, is it possible to expect that the higher activity will result in positive excess returns? If proven to be true, answering this research question could help retail investors to reassess their decision-making from sticking with the low-performing fund for a longer period rather than choosing a fund that has a higher trading activity (in other words, the better choice would be a fund with a lower TR).

The table below presents the results of the mentioned analysis based on funds' TR and alpha.

Table 13. Relation of Turnover Ratio and achieved Alpha based on domicile and fund type

Turnover Ratio	Alpha	Belgium		France		Luxembourg		All funds		TOTAL
		UCITS	AIF	UCITS	AIF	UCITS	AIF	UCITS	AIF	
[0%, 25%)	$\alpha \geq 0\%$	0.00%	0.00%	2.05%	2.53%	10.73%	25.00%	6.10%	5.38%	6.05%
	$\alpha < 0\%$	6.67%	0.00%	5.48%	7.59%	17.82%	50.00%	11.34%	12.90%	11.46%
[25%; 50%)	$\alpha \geq 0\%$	26.67%	0.00%	5.31%	0.00%	8.18%	0.00%	7.22%	0.00%	6.68%
	$\alpha < 0\%$	10.00%	50.00%	11.30%	13.92%	11.27%	8.33%	11.25%	13.98%	11.46%
[50%, 75%)	$\alpha \geq 0\%$	6.67%	50.00%	2.57%	1.27%	4.00%	0.00%	9.28%	18.28%	9.94%
	$\alpha < 0\%$	13.33%	0.00%	10.79%	21.52%	7.45%	0.00%	9.28%	18.28%	9.94%
[75%; 100%)	$\alpha \geq 0\%$	0.00%	0.00%	2.91%	0.00%	4.73%	0.00%	3.69%	0.00%	3.42%
	$\alpha < 0\%$	20.00%	0.00%	5.14%	13.92%	8.36%	0.00%	7.04%	11.83%	7.40%
[100% and more	$\alpha \geq 0\%$	10.00%	0.00%	10.27%	5.06%	16.36%	0.00%	10.31%	4.30%	9.86%
	$\alpha < 0\%$	6.67%	0.00%	28.42%	22.78%	17.09%	16.67%	22.51%	21.51%	22.43%

Source: Own elaboration, 2018

A preliminary observation is that the optimal turnover ratio in the last 5 year holding period (2013-2017) proved to be that between 50% and 75% during the course of one year, where the number of over- and underperforming funds was equal. From an underperformance point of view, the best funds were those that had between 75% and 100% TR, since it is the category with the lowest number of underperformers, and the highest is that of funds that had a turnover ratio of more than 100% (22.43%).

A first interesting observation is that the worst performers were, again, those funds having a TR of more than 100%, which implies in these cases analysed that a higher trading activity does not have the added value of increasing the yield, but on the contrary, it just diminishes returns. Interesting results can be seen in the last two rows of table 13 above. The ratio of outperforming funds compared to the underperforming is close to 1-to-2 (or 31% of highly active funds outperformed).

Our interpretation of the results is straightforward: If an investor chose a fund with high trading activity (Turnover ratio higher than 100%), there is only 31% chance that the fund will deliver returns better than the passively managed peer.

Interesting results concerning the AIFs have been obtained. The odds ratio is 1-to-8.5 (a 9.4% probability), which means that an investor choosing a highly active AIF would have a probability of 90.6% to choose an underperforming fund.

When approaching the question in an even more detailed manner, the ratio changes quickly when up/down trending market conditions are considered. Lower-activity funds tend to keep with the broader markets during the up-trends, while higher-activity funds tend to deliver better results during the down-trending and “choppy” markets.

However, if we control for the “noise” in excess return ($1\% > \alpha > -1\%$), we can examine how many funds fall into this unclear range (see table below). Again, we analyse the relation among excess return and turnover ratio of funds on an annual basis.

Table 14. Relation of Turnover Ratio and Excess Return when controlling for “noise”										
Turnover Ratio	Excess Return	Belgium		France		Luxembourg		All Funds		Total
		UCITS	AIF	UCITS	AIF	UCITS	AIF	UCITS	AIF	
[0%; 25%)	$\alpha \geq 0\%$	0.00%	0.00%	1.41%	1.57%	6.22%	13.64%	3.83%	3.27%	3.79%
	$\alpha < 0\%$	3.64%	0.00%	3.76%	4.72%	10.33%	27.27%	7.12%	7.84%	7.17%
	$\alpha > 1\%$	0.00%	0.00%	0.59%	0.79%	4.53%	9.09%	2.59%	1.96%	2.54%
	$1\% > \alpha > -1\%$	0.00%	0.00%	1.88%	0.79%	2.85%	13.64%	2.32%	2.61%	2.34%
	$\alpha < -1\%$	3.64%	0.00%	2.71%	4.72%	9.17%	18.18%	6.04%	6.54%	6.08%
[25%; 50%)	$\alpha \geq 0\%$	14.55%	0.00%	3.65%	0.00%	4.74%	0.00%	4.53%	0.00%	4.19%
	$\alpha < 0\%$	5.45%	25.00%	7.76%	8.66%	6.53%	4.55%	7.07%	8.50%	7.17%
	$\alpha > 1\%$	5.45%	0.00%	1.76%	0.00%	3.37%	0.00%	2.70%	0.00%	2.49%
	$1\% > \alpha > -1\%$	10.91%	0.00%	4.35%	1.57%	3.58%	0.00%	4.15%	1.31%	3.94%
	$\alpha < -1\%$	3.64%	25.00%	5.29%	7.09%	4.32%	4.55%	4.75%	7.19%	4.93%
[50%; 75%)	$\alpha \geq 0\%$	3.64%	25.00%	1.76%	0.79%	2.32%	0.00%	2.10%	1.31%	2.04%
	$\alpha < 0\%$	7.27%	0.00%	7.41%	13.39%	4.32%	0.00%	5.83%	11.11%	6.23%
	$\alpha > 1\%$	0.00%	25.00%	0.71%	0.79%	1.69%	0.00%	1.19%	1.31%	1.20%
	$1\% > \alpha > -1\%$	3.64%	0.00%	2.59%	1.57%	1.79%	0.00%	2.21%	1.31%	2.14%
	$\alpha < -1\%$	7.27%	0.00%	5.88%	11.81%	3.16%	0.00%	4.53%	9.80%	4.93%
[75%; 100%)	$\alpha \geq 0\%$	0.00%	0.00%	2.00%	0.00%	2.74%	0.00%	2.32%	0.00%	2.14%
	$\alpha < 0\%$	10.91%	0.00%	3.53%	8.66%	4.85%	0.00%	4.42%	7.19%	4.63%
	$\alpha > 1\%$	0.00%	0.00%	1.06%	0.00%	2.11%	0.00%	1.56%	0.00%	1.44%
	$1\% > \alpha > -1\%$	0.00%	0.00%	2.00%	3.94%	1.79%	0.00%	1.83%	3.27%	1.94%
	$\alpha < -1\%$	10.91%	0.00%	2.47%	4.72%	3.69%	0.00%	3.34%	3.92%	3.39%
[100% and more)	$\alpha \geq 0\%$	18.18%	25.00%	11.88%	3.94%	16.02%	13.64%	14.19%	5.88%	13.55%
	$\alpha < 0\%$	27.27%	25.00%	30.24%	40.94%	26.03%	31.82%	27.99%	39.22%	28.85%
	$\alpha > 1\%$	5.45%	25.00%	6.12%	2.36%	11.70%	9.09%	8.95%	3.92%	8.57%
	$1\% > \alpha > -1\%$	14.55%	0.00%	14.47%	8.66%	10.01%	13.64%	12.19%	9.15%	11.96%
	$\alpha < -1\%$	25.45%	25.00%	21.53%	33.86%	20.34%	22.73%	21.04%	32.03%	21.87%

Source: Own elaboration, 2018

By analysing the relationship between the fund’s turnover ratio and excess return, we could find no clear evidence that a higher (or lower) TR is or can be associated with higher

(or lower) excess return. This indicates that even highly active managers try to achieve at least as well as their benchmarks. In general, regardless of the fund manager's trading activity, the ratio between the between over/underperforming funds is close to 1-to-3. These results indicate that fund manager activity is not a good indicator for predicting above benchmark performing fund.

Further on, we employed a logical regression to test whether there is a relation between the fund managers' activity - measured by the TR - and the chance (so called "odds-ratio") of overperforming the benchmark. In this case, we do not interpret the beta (β) coefficient, but rather the "odds-ratio" represented by the exponent of beta (natural logarithm of e powered by β).

In order to perform the ordinal logistic regression analysis, we defined the ranges based on the fund's TR, where we defined the values as the bracket's average; for example, the range of 50% to 75% TR has an average of 62.5%, which was used as the common denominator for the bracket thereof. This parameter is an explanatory variable for the sought chance of achieving excess return. If the fund's excess return was higher than 0%, we marked the value by a dummy variable 1, and if the fund's achieved excess return was lower than 0%, we marked the value by dummy variable 0. The "dummy variables" are used to count the funds that score a chance higher or lower to 0% and present it in a comprehensible manner.

The summary table for the ordinal logistic regression is than as follows:

Table 15. Summary table of results by bracket

Turnover Ratio Range	Overperforming	Underperforming	Total
12.5%	76	144	220
37.5%	84	144	228
62.5%	41	125	166
87.5%	43	93	136
112.5%	124	282	406
TOTAL	368	788	1,156

The calculated "odds-ratio" should be understood as an indicator to answer the following question: *What is the probability of achieving positive excess return, when the turnover ratio is increased marginally (in our case by 250 basis points)?*

Table 16. Ordinal Logistic Regression Table

	coeff b	s.e.	Wald	p-value	exp(b) ODDS Ratio
Intercept	-0.726246746	0.122390905	35.21033	2.96E-09	0.483721
Turnover Ratio	-0.001201076	0.001449876	0.686245	0.407444	0.9988

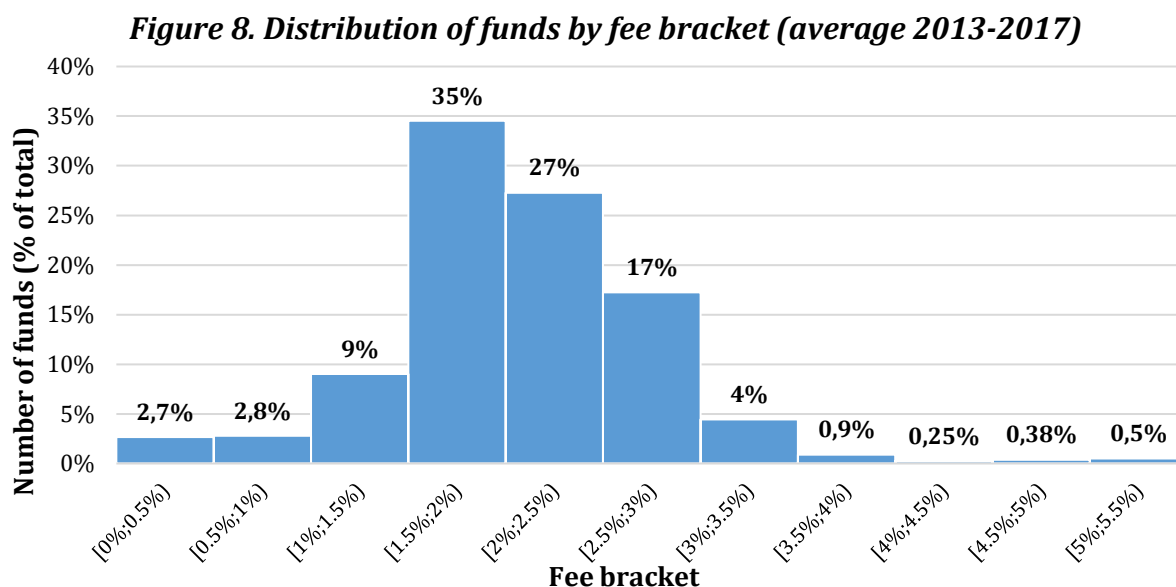
If the model and the explanatory variables would be statistically significant (p-value lower than our limit of 0.05), then we could interpret the "odds-ratio" as a chance of 0.9988 or 99.88% that, by increasing the turnover ratio of the fund by 250 bps, the fund's chances to achieve excess return double (or increase by almost 100%). However, the results do not suggest the significance of the model, nor the explanatory variable (p-value of the explanatory variable "Turnover Ratio" is at 0.407444, which is higher than the limit of 0.05). Therefore, we cannot draw any statistical conclusions on the strong relation between the turnover ratio and excess return of a fund.

As the Turnover Ratio by itself is not a significant factor explaining the excess return, we cannot say that higher/lower Turnover ratio influences the fund's excess return.

IV.D. What is the relation between the Fund Return (and/or excess return) and Charges?

Fund returns are also influenced by the cost structure. The existing research clearly concludes that costs are negatively correlated with achieved returns. The same can be said about costs and the probability of achieving positive alpha, as the charged fees lowers the recorded returns and, thus, impacting the ability of a fund manager to beat the respective benchmark.

First, we present the distribution of funds according to the charged fees over the last 5 years (2013 – 2017) in the figure below.



Source: Own elaboration

The graph above categorises funds by the average fees charged in the period 2013-2017 and shows the distribution of the number of funds (as % of total, y-axis) by fee brackets. For instance, the first block from the left means that 2.7% of funds from the data sample analysed charge fees higher than 0% but lower or equal to 0.5%. Thus, we observed that a large majority of funds (79%) charge fees between 1.5% and lower than 3%. Only a marginal number of funds cost more than 3% (6%) and below 1.5% (14.5%). In overview, funds in our sample cost on average between 0.1% and 5.3%.

When inspecting the relation between the recorded excess return and charged fees, one can intuitively expect a negative correlation, meaning that a higher fee generates a low return. So, firstly, we have ranked the analysed funds based on the recorded average annual “excess return” (alpha) during the investigated 5-year holding period (from 2013 to 2017). This period was used as the most of analysed funds had the information on charges fees recorded in the Morningstar Direct database. The table below shows the distribution of funds based on the average annual “alpha”, domicile and fund type during the inspected period.

Table 17. Distribution of funds based on the average annual “alpha”, domicile and fund type

Alpha	Belgium		France		Luxembourg		All funds		
	UCITS	AIF	UCITS	AIF	UCITS	AIF	UCITS	AIF	TOTAL
$\alpha \geq 3\%$	0%	50.00%	5.72%	1.89%	11.42%	0%	8.37%	2.08%	7.58%
$3\% > \alpha \geq 2\%$	0%	0%	2.68%	2.83%	5.35%	0%	3.92%	2.50%	3.74%
$2\% > \alpha \geq 1\%$	12.50%	0%	7.66%	5.19%	7.29%	7.69%	7.60%	5.42%	7.32%
$1\% > \alpha \geq 0\%$	22.50%	0%	11.31%	7.08%	11.79%	3.85%	11.81%	6.67%	11.17%
$0\% > \alpha \geq -1\%$	25.00%	0%	20.32%	16.04%	15.55%	15.38%	18.10%	15.83%	17.82%
$-1\% > \alpha \geq -2\%$	15.00%	0.00%	18.86%	19.34%	12.15%	15.38%	15.49%	18.75%	15.90%
$-2\% > \alpha \geq -3\%$	5.00%	50.00%	14.96%	16.04%	9.72%	19.23%	12.17%	16.67%	12.73%
$-3\% > \alpha$	20.00%	0.00%	18.49%	31.60%	26.73%	38.46%	22.55%	32.08%	23.74%

Source: Own calculations, 2018

More than 52% of all funds have recorded negative alpha and can be labeled as underperforming funds. Only 19% of funds have delivered positive alpha and outperformed on average their respective benchmarks. What are the associated fees of these funds and is there a significant relation among higher fees and negative alphas?

The table below shows this relation and gives some preliminary insight into the problem of negative influence of fees on outperformance. Again, we haven't controlled for the “noise” attribute in order to see the pure relations.

In our view, the information above must be coupled with a distribution analysis of the relative number of under/overperforming funds based on the level of fees charged. In order to do so, we defined fee brackets of 50 bps and examined how many funds from each category have generated excess return to the benchmark or not. We consider this exercise of relevance as it shows which types of funds mostly generate positive or negative alpha: the higher or lower cost funds?

Table 18. Dispersion of excess return by fee brackets (Fees vs. alfa 2013 – 2017)

Fees	Alpha	Belgium		France		Luxembourg		All funds		
		UCITS	AIF	UCITS	AIF	UCITS	AIF	UCITS	AIF	Total
[0%, 0.5%)	$\alpha \geq 0\%$	2.50%	0%	1.72%	1.35%	1.97%	0.00%	1.86%	1.18%	1.80%
	$\alpha < 0\%$	7.50%	50.00%	1.47%	5.41%	1.35%	0.00%	1.56%	5.33%	1.91%
[0.5%, 1%)	$\alpha \geq 0\%$	5.00%	0%	1.60%	1.35%	1.48%	0.00%	1.50%	1.18%	1.47%
	$\alpha < 0\%$	17.50%	0%	6.14%	6.08%	3.32%	26.32%	5.05%	8.28%	5.34%
[1%, 2%)	$\alpha \geq 0\%$	25.00%	50.00%	12.16%	4.73%	19.68%	0.00%	16.16%	4.73%	15.10%
	$\alpha < 0\%$	40.00%	0%	32.68%	39.86%	31.24%	26.32%	32.19%	37.87%	32.72%
[2%; 3%)	$\alpha \geq 0\%$	2.50%	0%	8.11%	4.05%	11.32%	0.00%	9.55%	3.55%	9.00%
	$\alpha < 0\%$	0%	0%	21.50%	20.27%	24.11%	47.37%	22.28%	23.08%	22.36%
[3%	$\alpha \geq 0\%$	0%	0%	3.32%	1.35%	1.60%	0.00%	2.40%	1.18%	2.29%
	$\alpha < 0\%$	0%	0%	11.30%	15.54%	3.94%	0.00%	7.45%	13.61%	8.02%

Source: own composition

By aggregating data on all domiciles, it is apparent that a vast majority (more than 60%) of the underperforming funds charge fees higher than 1%.

When the charges fees are low (0%; 0.5%), the ratio between over and underperforming funds is close to 1-to-1. However, when the fees are more than 3% of AuM annually, the ratio of overperforming and underperforming funds changes to 1-to-4.

- a. What percentage of relative performance (alpha) can be explained by 1 unit of costs (charges)?

The answer to this important research question can be found by employing a linear regression analysis that can explain the pure relationship between excess returns and fees. We analysed the funds' average fees over the last 5 years (2013 – 2017) as an explanatory (independent) variable. We sought to explain the excess return, which we measured as an average annual difference between the benchmark return and that of the fund over the same 5-year period (2013 – 2017). This analysis requires a set of explanatory (independent) variables to evaluate whether the response (dependent) variable is correlated, and in which way. Therefore, this filtering criteria returned 526 observations (n = 526, meaning the number of funds for which the full data is available), that can be tested.

Table 19. Sample overview

Variable	Observations	Minimum	Maximum	Mean	Std. deviation
Excess Return 2013 - 2017	526	-0.148	0.136	-0.008	0.036
Average charges 2013 - 2017	526	0.001	0.053	0.021	0.007

Source: own elaboration

What a simple linear regression can explain is what impact an increase by 1 unit of charges might have on the ability of the fund to deliver excess return. The regression presenting the impact of charges on excess return is summarized in the table below.

Table 20. Simple regression based on average charges

Source	Value	Standard error	t	Pr > t	Lower bound (95%)	Upper bound (95%)
Intercept	0.001	0.005	0.160	0.873	-0.009	0.010
Average charges	-0.445	0.223	-1.996	0.046	-0.882	-0.007

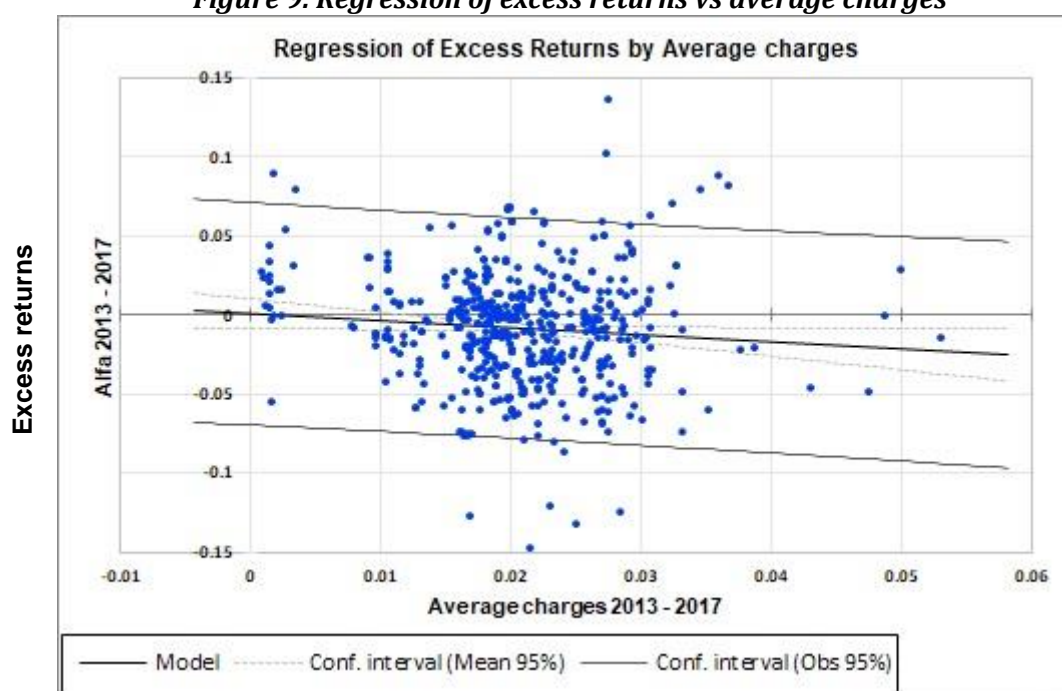
Source: own computations

The regression value of the intercept (the point where the 0 value on the “X”-axis crosses the y-axis) is not statistically significant,⁵⁹ however it is close to 0. It can be interpreted that if no change in the level of charges occurs, **this would have no impact on excess return**, which can be intuitively accepted.

The regression coefficient of the average charges is estimated at -0.445 and is statistically significant (0.046) at a 0.05 confidence interval. This suggest that charges do play a significant role in explaining excess returns. We can interpret the regression coefficient as: 1 unit increase in charges would decrease the excess return by a magnitude of 0.445, with the lower and upper confidence values of -0.882 and -0.007. In other words, an increase in charges by 100 basis points would decrease the mean excess return by 45 basis points. This decrease magnitude means that an increase in the level of charges by 100bps would decrease the lower bound (lowest excess return observed) by 88bps and the highest (upper bound) by 0.7 bps. The graph below shows the visualization of observed relations.

⁵⁹ Pr is higher than 1-0.95, meaning that too many observations fall outside the confidence interval.

Figure 9. Regression of excess returns vs average charges



Source: Own calculations, 2018

On the figure above, we can see many observations around the value of 0.02 (2%), which on the x-axis presents the average fund charges over the observed period of last 5 years. The dispersion of recorded excess return (y-axis) is quite high around the charges of 2% up to 3%.

As the excess return could change significantly due to the external environment (broader market), which we have shown in the previous text, we have performed the analysis, where we tried to understand what factors do have an impact on overall performance of the fund. In order to do so, we enhanced the analysis by further adding explanatory (independent) variables, as suggested by the literature.

We have performed similar tests, where the dependent variable was the fund return. The tests were performed with additional factors: excess return, fund size, tracking error and turnover ratio. Tracking error showed to be autocorrelated with the excess return, so we removed both variables from the model. Turnover ratio showed to be an insignificant factor. The model with two factors (charges and fund size) proved to be statistically significant. The result of the regression analysis on fund returns is presented in the table below.

Table 21. Standardised coefficients of fund size and charges vs. excess return

Source	Value	Standard error	t	Pr > t	Lower bound (95%)	Upper bound (95%)
Intercept	0.109	0.008	13.453	< 0.0001	0.093	0.125
Fund Size (EUR)	0.000	0.000	5.074	< 0.0001	0.000	0.000
Average charges	-0.711	0.359	-1.979	0.048	-1.417	-0.005

Source: own composition; the value for "Fund Size (EUR)" is 8.96×10^{-12} ;

Based on Type III sum of squares, the following variables bring significant information to explain the variability of the dependent variable fund return, i.e. fund size and average charges. These results suggest that charges do play a significant role in explaining the

overall performance of a fund. The intercept stood at the value of 0.109, which means that a mean fund return for a defined period of 5-years was 10.9%. In other words, if we would remove the impact of charges and the fund size, an average fund would return 10.9% annually. Fund size seems to be significant factor in explaining the fund returns over the analysed period. This means that fund size had (maybe surprisingly) in reality a positive effect on a fund return. However, as the average fund size is close to €1bln, we can interpret the coefficient as that an increase in the fund size by €1bln would increase the fund return by 90 basis points. On the other hand, the charges have statistically significant negative impact. If the charges are increased by 100 basis points, the performance of a fund would be negatively impacted by a decrease of 71 basis points.

Analysed together, an increase in the fund size coupled with an increase of fees by 1% would have increased the excess return by 19bps, which is solely attributable to the positive effect economies of scale seem to have.

b. Do the charges cause the fund performance to deviate significantly from the benchmark?

An average investor might ask a good question: *If I invest in an actively managed fund that charges higher fees compared to the passively managed one, should I expect that the fund returns would deviate significantly from the benchmark?*

This is quite relevant question as an average investor often anchors the fund performance to the broader market performance. He/she might look not only on the overall performance and analyse the excess return generated, but followingly, he might question why the deviation from the broader market occurred and how to understand it.

The typical response from fund managers and sales agents is that a retail investor could expect some deviations from the broader market as he has chosen an actively managed fund that seeks to beat the market while delivering lower volatility (market risk) than the passively managed peers.

Well, could this response explain the full picture of the fund performance's deviation? Or did charges have a role in explaining the deviation of fund returns from the market index returns (benchmarks)?

The fund's performance deviation from that of the benchmark is measured through Tracking Error. One part of the scholarly literature ties the increasing Tracking Error to the size of the fund. These studies suggest that the smaller the fund, measured by AuM, the more flexibility the fund manager has. He can rather swiftly apply new market conditions and adjust the fund's portfolio structure. Larger funds have to allocate a large part of the portfolio using strategic allocation, which does not change so swiftly with the market conditions and thus moves with the market. Therefore, these research studies claim that larger funds tend to have a smaller Tracking Error than the small, flexible actively managed funds. Another spectrum of research studies ties Tracking Error to the fees the fund charges its beneficial owners (investors). These studies argue that especially due to the ongoing fees, even the passively managed funds tend to have increasing Tracking Error over the longer period simply because of the compound impact of ongoing

fees tied to the assets under management and/or due to the performance fee effectively cuts down the investor's net return compared to the benchmark.

In order to examine both factors, we employed a multiple regression analysis. The dependent variable, for which we sought explanation was the fund's tracking error. The explanatory variables analysed were fund size (AuM) and average charges.

The tracking error was measured over the 5-year period (from 2013 until 2017). For the same period, the charged fees were observed and presented as average charges over the analysed period of 5 years. The fund size for all inspected funds was observed at the end of 2018Q3. Overall, we obtained 526 observations for all three indicators. The summary statistics for each variable are presented in the table below:

Table 22. Overview of observation values

Variable	Observations	Minimum	Maximum	Mean	Std. deviation
Tracking error	526	0.002	0.412	0.077	0.052
Fund Size (EUR)	526	661,185	9,245,543,039	905,980,344	1,415,820,187
Average charges	526	0.001	0.053	0.021	0.007

Source: own calculations

When testing the tracking error, the minimum value observed was 0.2% over the 5-year period, which would be deemed as an almost perfect index tracker. On the opposite site, the maximum tracking error over the 5-year period recorded was more than 41%. The average tracking error observed was 7.7% and a standard deviation of 5.2% over the 5-year period.

The sizes of the analysed funds differ significantly. While the average AuM is around €906 million, the smallest fund managed merely €662,000, while the largest fund managed more than €9.24 billion. This resulted in a rather high standard deviation of the fund size, amounting to almost €1.42 billion.

The average fee charged by the analysed funds stood at 2.1% (210 basis points) annually over the 5-year period, while the standard deviation was 0.7% (70 basis points), with minimum charges of 0.1% and maximum at almost 5.3%.

The regression model, where two explanatory variables were used, showed a high level of significance. The presentation of the regression coefficients of fund size and average charges are provided in the table below:

Table 23. Simple coefficient of explanatory variables (fund size and charges) vs tracking error

Source	Value	Standard error	t	Pr > t	Lower bound (95%)	Upper bound (95%)
Intercept	0.045	0.007	6.133	< 0.0001	0.030	0.059
Fund Size (EUR)	0.000	0.000	2.203	0.028	0.000	0.000
Average charges	1.408	0.322	4.373	< 0.0001	0.775	2.040

Source: own calculations

Interpreting the results for the “Intercept” value would be straightforward. With all other variables remaining unchanged and having no impact, the mean value of the tracking error of the analysed funds would be at 4.5% over the 5-year period. However, additional factors do exert a significant influence on the tracking error. The first one is the fund size, which is significant at given level of 5%. However, as the size of the fund is measured in € and this indicator has a much higher scale size (millions), the impact of the funds’ size is not quite visible in the table, since it is multiplied by 10 powered at -9 (10^{-9}). However, it can be claimed that the fund size is a statistically significant factor contributing positively to the increase in the fund’s tracking error. This might be rather surprising considering the studies that claim the opposite relation. The most influential factor is that of the average fees. The beta coefficient, which means the slope for the dependent variable, is 1.408. This can be interpreted meaning that a 1-unit increase in fund fees would increase the fund’s tracking error by a magnitude of 1.41. It should be noted that the magnitude can be as low as 0.775 (lower bound) and as high as 2.04 (upper bound).

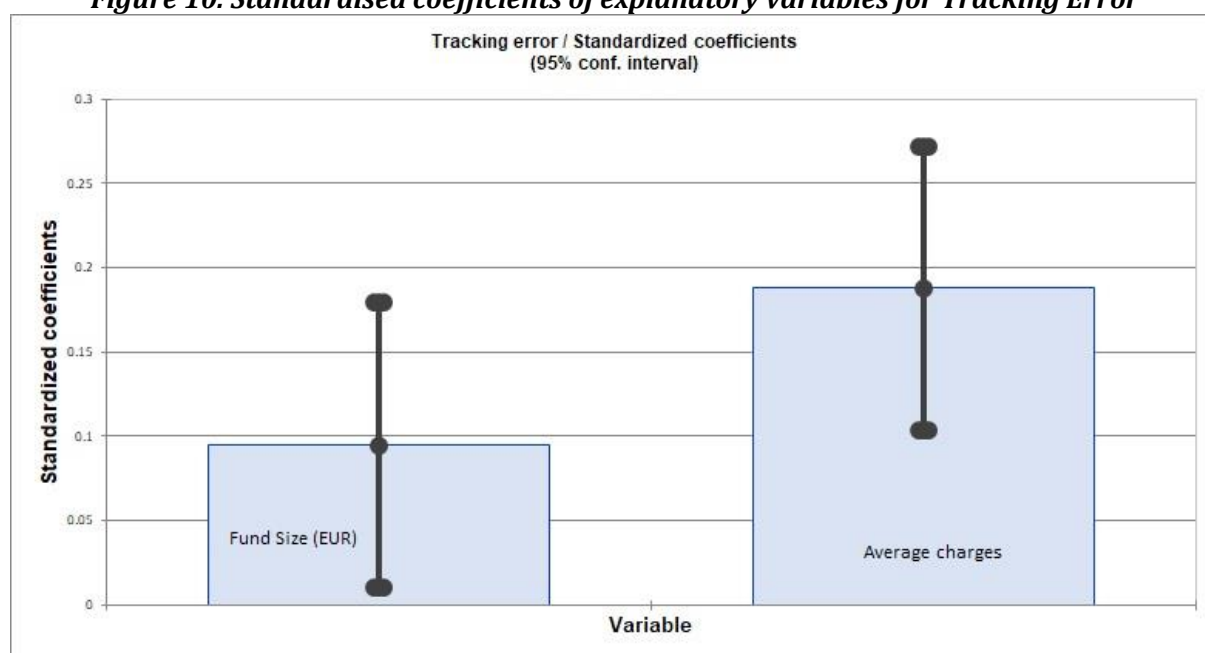
The results can also be presented as standardized coefficients or beta coefficients. Standardized coefficients are the estimates that have been standardized so that the variances of dependent and independent variables are 1. Therefore, standardized coefficients refer to how many standard deviations a dependent variable will change per standard deviation increase in the explanatory variable. The results for the standardized coefficient estimations are presented in the table, as well as graph below.

Table 24. Standardised coefficients of fund size and charges

Source	Value	Standard error	t	Pr > t	Lower bound (95%)	Upper bound (95%)
Fund Size (EUR)	0.095	0.043	2.203	0.028	0.010	0.179
Average charges	0.188	0.043	4.373	< 0.0001	0.103	0.272

Source: own computations

Figure 10. Standardised coefficients of explanatory variables for Tracking Error



Source: Own calculations, 2018

The interpretation of a standardized coefficient follows: one standard deviation change in the fund size would cause a 9.5% increase in the standard deviation of the tracking error. This could be as low as 1% (lower bound) and as high as 17.9% (upper bound). The effect of the average charges tracking error would have been even higher. One standard deviation increase in the charged fees would increase the tracking error by 18.8% of its standard deviation. Again, this could be as low as 10.3% and as high as 27.2%.

We can conclude the answer to the question presented at the beginning of this section as follows:

An investor should pay attention to the fees paid as they indicate a significant impact on increased tracking error the fund may record compared to the respective benchmark.

However, answering this question by an investor is not quite easy as he/she needs not only to know charged fees, but also needs to analyse the past performance of the fund as well as the respective benchmark, and this data is not publicly available to be easily found.

IV.E. Final findings on the fund performance

Inspecting the fund performance and excess return piece-by-piece or factor-by-factor and presented in the previous sections has led to the main finding of the study. We can reasonably assume that there are three main factors that drive the fund performance over the long term:

- benchmark return
- tracking error
- charges

When putting the puzzle together, one must analysed the cumulative influence of these three factors at one place. Let us start with the presentation of observations.

Table 25. Overview of explanatory and response observations for the multiple linear regression

Variable	Observations	Minimum	Maximum	Mean	Std. deviation
Fund Return	479	-0.061	0.239	0.106	0.059
Tracking error	479	0.002	0.253	0.074	0.047
Benchmark return	479	-0.026	0.276	0.115	0.053
Average charges	479	0.001	0.05	0.02	0.007

In total, we obtained 479 observations with no missing data on all 4 variables.

The variable we would like to have explained is the “Fund Return”. We calculated the average annual net of fees fund return for the analysed holding period of 5-years (from 2013Q1 until 2017Q4). On average, the analysed funds returned 10.6% annually with the standard deviation of 5.9%. The lowest annual return recorded was -6.1% and the highest stood at 23.9%.

For the tracking error over the whole 5-year holding period the average deviation of the fund return from the benchmark return was 7.4%, with a standard deviation of 4.7%. The minimum value recorded was 0.2% (almost perfect tracker), while the maximum value of tracking error was 25.3%.

Each of the analysed fund had a corresponding benchmark. For each of the benchmarks assigned to the analysed funds, we have computed the average annual return over the 5-year holding period. On average, the benchmark return was at 11.5% annually with the standard deviation of 5.3%. The minimum return for the benchmark was recorded at the value of -2.6%, while the maximum was at 27.6%.

Next, we employed the Multiple Linear Regression (MLR) method. The Multiple Linear Regression is a statistical technique that uses several explanatory variables to predict the outcome of a dependent (response) variable. The goal of MLR is to model the relationship between the explanatory and response variables using the least squares estimates of coefficients. The results of the MLR are presented in the table below:

Table 26. Simple coefficients of explanatory variables

Source	Value	Standard error	t	Pr > t	Lower bound (95%)	Upper bound (95%)
<i>Intercept</i>	0.016	0.007	2.364	0.018	0.003	0.030
Tracking error	0.077	0.037	2.065	0.039	0.004	0.149
Benchmark return	0.852	0.032	26.244	< 0.0001	0.789	0.916
Average charges	-0.681	0.258	-2.639	0.009	-1.189	-0.174

Source: own elaboration

When interpreting the results for the “Intercept”, with other variables unchanged and having no impact, the mean value of the intercept would be at 1.6% (with a lower bound at 0.3% and an upper bound at 3%). In simpler terms, if none of the explanatory variables would have impact on the fund returns, fund return would still be 1.6% annually.

However, we seek to understand the impact of three main (assumed) drivers of fund returns: tracking error, benchmark returns and charges. All of these additional factors do have a significant influence on fund returns.

The first analysed is tracking error, which is significant at given level of 5%. The impact (coefficient / value) of tracking error is estimated at an average value of 0.61 (with a lower bound at 0.004 and an upper bound at 0.149). If the other factors are unchanged, a one-unit change in tracking error would increase the fund return by a magnitude of 0.077.

The most influential factor on inspected funds’ returns is the benchmark return. If other factors are unchanged, one-unit change in the benchmark return would change the fund return at the magnitude of 0.852 (lower bound at 0.789 and upper bound at 0.916). In other words, if the benchmark return would increase by 10 p.p., it influences the fund return by the magnitude of 0.852, which means that the fund would only because of the benchmark influence return by 8.52 p.p.

Interesting results can be drawn when interpreting the influence of charges. If other explanatory variables do not change, the one unit increase in charges would decrease the fund return by 0.681. Simply said, if the charges are increased by 100 basis points, the

fund return would decrease by 68 basis points only due to the charges. This magnitude could be as low as -0.174 (lower bound) and as high as -1.189 (upper bound).

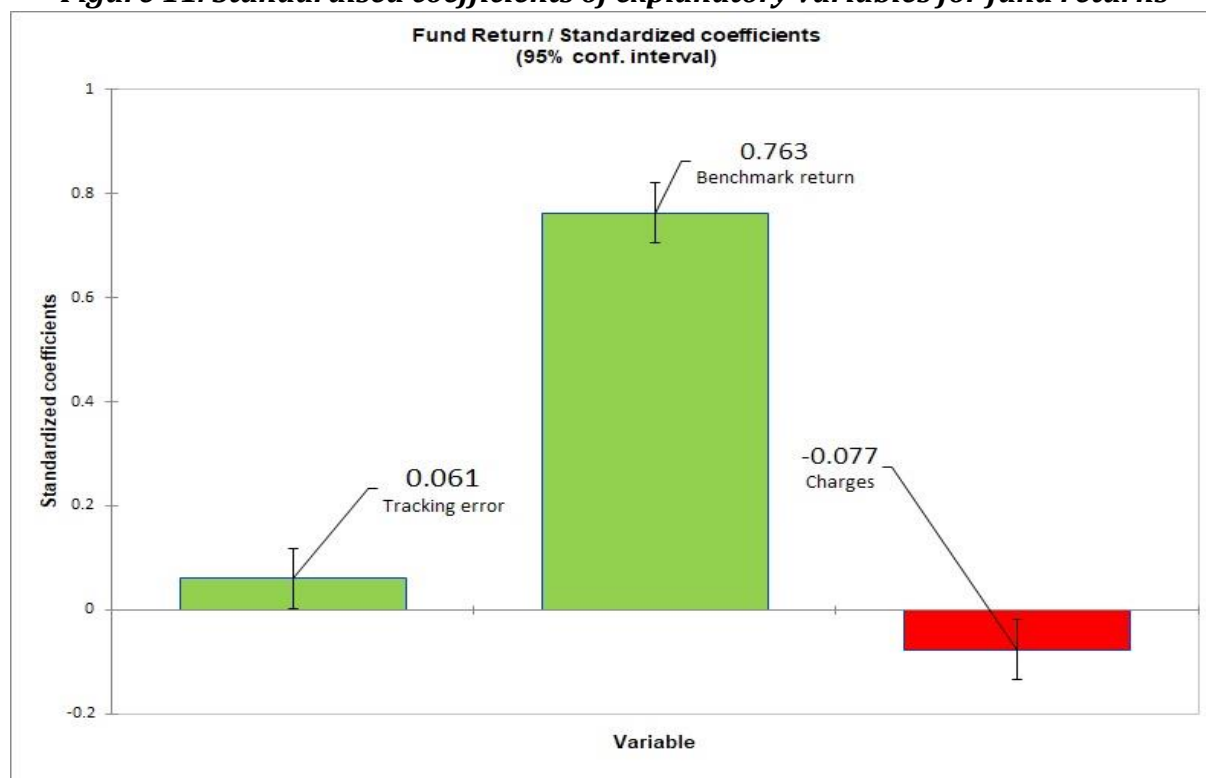
The impact of three dominant factor can also be presented in the form of standardized coefficients. Standardized coefficients refer to how many standard deviations a dependent variable will change, per standard deviation increase in the explanatory variable. The results for the standardized coefficient estimations are presented in the table as well as graph below.

Table 27. Standardized regression coefficients of explanatory variables

Source	Value	Standard error	t	Pr > t	Lower bound (95%)	Upper bound (95%)
Tracking error	0.061	0.029	2.065	0.039	0.003	0.118
Benchmark return	0.763	0.029	26.244	< 0.0001	0.706	0.821
Average Charges	-0.077	0.029	-2.639	0.009	-0.135	-0.020

Source: own elaboration

Figure 11. Standardised coefficients of explanatory variables for fund returns



Source: Own calculations, 2018

Let us first interpret the standardized coefficient in more technical way:

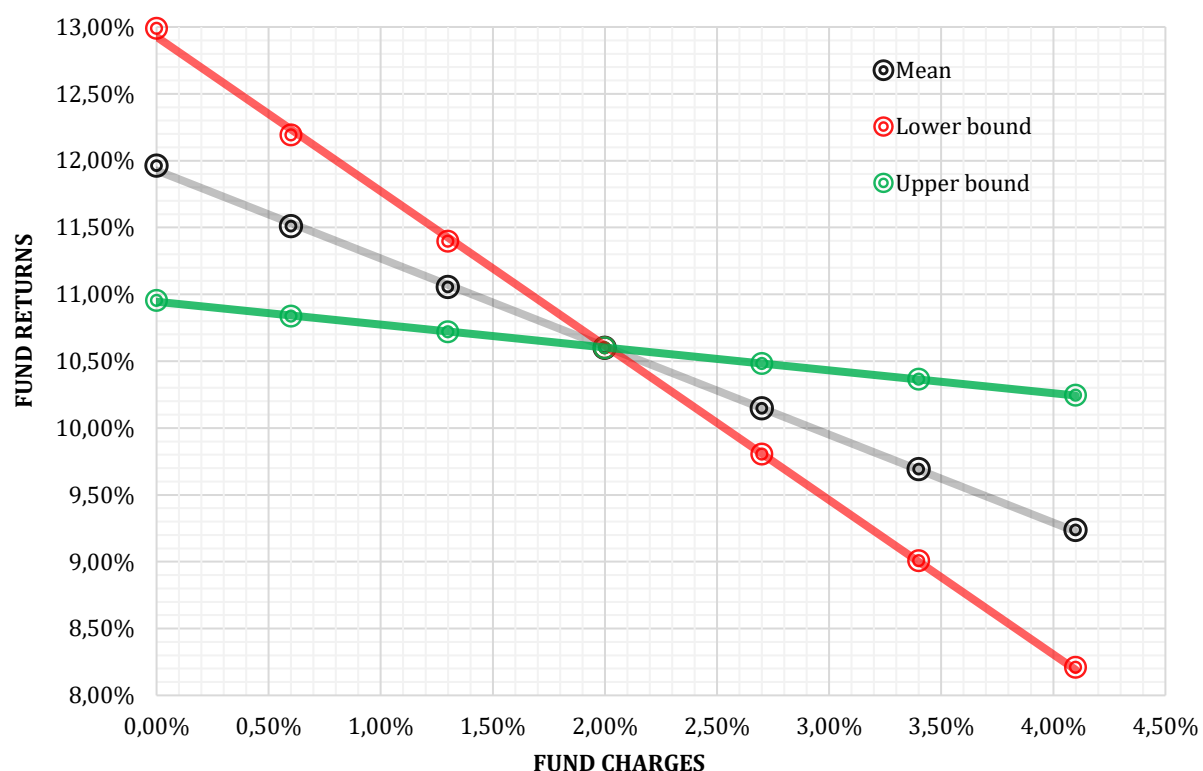
- 1) Tracking error: One standard deviation increase in the tracking error would cause a 6.1% increase in the standard deviation of the fund return. This could be as low as 0.3% (lower bound) and as high as 11.8% (upper bound).

2) Benchmark return: One standard deviation increase in the benchmark return would cause a 76.3% increase in the standard deviation of the fund return. This could be as low as 70.6% (lower bound) and as high as 82.1% (upper bound).

3) Charges: One standard deviation increase in the charges would cause a 7.7% decrease in the standard deviation of the fund return. This could be as low as 13.5% (lower bound) and as high as 2% (upper bound).

Secondly, there is more convenient way of explaining the standardized coefficients. Standardized coefficient of charges could be presented in a visual way, which allows for easy understanding of the impact of charges on fund returns. Below, we present the impact of charges on fund returns using standardized coefficients graphically. The “x”-axis demonstrates the charges, which change by its standard deviations (0.7%) from the mean on both sides. The “y”-axis reflects the changes in fund returns due to the changes in charges. The magnitude of such change is given by the standard deviation of fund returns multiplied by the standardized coefficient of charges.

Figure 12. Relationship between charges and returns (2013-2017) using standardized coefficients



Source: own calculations, 2018

The mean line (gray line) can be interpreted straightforward. If the charges increase from mean value (2.00%) by its standard deviation (0.7%) to 2.7%, then the fund return decreases from 10.60% to 10.15% (under the condition of other variables unchanged). And opposite way, if the charges decrease by its standard deviation (from 2.00% to 1.30%), then the fund return increases from 10.6% to 11.05% (under the condition of

other variables unchanged). Changing charges by its standard deviation allow us to estimate expected fund returns and display the line (gray line).

However, we can plot additional two lines, that represents upper (green line) and lower (red line) bounds of standardized coefficient estimates. If we focus on the lower bound, the line would be steeper. This suggests that there exist some funds on the lower end of the sample, for which the increase in fees has more severe impact on fund returns. Again, we can see that the middle point represents the mean for fund charges (2.00%) and fund returns (10.6%). If the charges would increase by its standard deviation from 2.00% to 2.70%, the fund return would decrease from 10.60% to 9.80%. In other words, the lower bound of standardized coefficient for charges suggests that the fees have higher magnitude on fund returns. The upper bound line is flatter, which suggest that in some cases the charge increase would not have such a significant negative impact on fund return.

Only the last parameter (charges) is available in the PRIIPs KID (UCITS KIID). The remaining two parameters are forgotten in the past. In order to make an informed decision on selecting a good investment fund for the long-term investing, retail investors need to be given back the information on past performance supported by the information on the performance of relevant benchmark and tracking error a fund manager recorded for a recommended holding period. Only then will these three indicators be able to satisfactory answer the key investor question: ***“How to choose a good performing fund?”***

Conclusions

The research team draws several conclusions following this study. The hypothesis is that the average investor has two choices: either invest indirectly, through funds, or directly, by buying and holding securities, such as shares in companies. Both have advantages, but the question is which outweighed the other in the past? Moreover, when examining indirect (packaged) investments, there are two active debates: one revolving around active vs. passive management, where the first is more expensive, riskier, but higher likelihood of overperformance than the latter, which is cheaper and tracks the performance of the market. The second concerns purely active management and the value for money, or whether higher ongoing charges (either due to management fees or trading costs) are warranted by better results?

The main focus of this study was on the last question, albeit all other are involved in the demonstration, to higher or lesser degrees. The purpose is to examine whether the quite fee-laded equity funds sold to the retail sector did overperform their indices on 1, 5 or 10 years. In addition, the most important aspect was to determine whether an even higher fee level would have brought higher excess return.

In connection to these fundamental questions the paper poses, the research team puts forward four findings.

First, this study confirms once more that, at least in the field of equity funds, active management underperforms its market, regardless of whether it's the broad (all caps) or narrow (large caps) index. This could be explained by a lack of skills (stock picking,

market timing, business arrangements) of active asset managers, or it may be due market conditions, higher trading costs (turnover rate) or simply a very high level of charges.

Second, our analysis shows a persistent negative correlation between the level of fees and excess return of funds. This does not mean that the funds reporting a negative alpha have recorded negative returns, just that the market performed better during a certain observation period. What is more, funds may actually record *gross returns* higher than the market, but the very high level of fees of European-domiciled UCITS and AIFs will offset it in 6 out of 10 cases. Previous BETTER FINANCE reports have shown that, at least for 2017 data, the average EU investment fund is 4 times more expensive than a U.S. one.

As such, we see that fees tend to explain bad performances of investment funds. Considering that there is no possible way to determine which factors will determine overperformance of the market in the future, we instead looked at the past and estimated which would have made a positive or negative difference.

Thus, we observed that the four main drivers of performance can be divided in two categories:

- the “positive” drivers: those that would have increased the excess return of the fund, i.e. Assets under Management (AuM), tracking error and benchmark returns;
- the “negative” drivers: those that would have decreased excess return, i.e. and fees.

Therefore, the best effect on fund performance would have been generated by an increase in the actual market performance, whilst the worst impact would have been given by an increase in fees. In other words, fees are the most detrimental element in the explanation of what an investor’s fund has achieved and what it may have achieved.

In addition, tracking error played a significant role in explaining the alpha of a fund. Our study confirms other academic publications that a higher tracking error may have generated an increase of the alpha. However, concerning the turnover rate of the fund’s portfolio, the regression analysis employed herein showed that there was no correlation, nor relationship, between the trading activity of the fund manager and an estimate of excess return. In other words, whether the fund manager constantly bought and sold to replace the components of the fund, it showed no impact on the average returns of the funds in the regression sample.

Last, put all together, the negative effect of fees can only be offset by very good market returns coupled with a capital injection of at least €1 billion. None of the latter are related to asset management skills or justify higher or lower management fees. In simpler terms, if a retail investor’s fund heavily underperformed the benchmark in our reference period, only an increase in AuM and a better benchmark return may have reduced its underperformance.

Retail investors have been driven more and more into complex, fee laden investment products, packaged and wrapped with multiple layers of fees, making them less transparent, more expensive and less performant than traditional direct investments.

This study shows that the retail investor should be more careful on the cost structure of his investment product and whether the fund manager achieved its stated purposes in the past by looking at the track record of a fund.

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Glossary of Terms

Active Management - refers to the attempt by a fund manager to deliberately pick and choose specific investments that will perform better or be less risky than other investments. Most mutual funds, other than index funds, use active management, though different managers use different methods to pick their investments. Active management is the opposite of passive management, or indexing.

Active share - it is a measure coined by academic literature to express the percentage of a portfolio holdings that differ to that of another portfolio; the term is always used in relation to a benchmark, to highlight how different is the composition of the fund's holdings to that of the index.

Alpha (excess return) - this represents the positive or negative difference between the fund return over a given period and the benchmark (market index) return over the same period; we define excess return in the same manner, so the two terms are used alternatively.

AIFs - stands for Alternative Investment Funds and are defined as mutual investment funds that are not regulated or authorized as UCITS.

Equity share class - the funds selected as investing in equities are defined as per the Morningstar Global Category™ Classifications⁶⁰ - for geographic and sectorial allocation - and the Morningstar Investing Glossary⁶¹, for the definition of the security in question.

Intercept - the value at which the regression value intersects the ordinates axis (oY) at a value of 0 for the abscissa axis (oX).

Linear regression - represents a method of statistical probability (predictive analysis) to determine the value of a dependent (response) variable in the hypothesis that the independent (explanatory) changes, either positively or negatively; this method can be used either as an ex-post (contrafactual) instrument - as is the case in this report - or on an ex-ante basis (for future performances, for instance).

Money Market (MM) - a financial market segment for short-term (up to 12 months) securities trading, such as sovereign and corporate debt securities.

Multiple linear regression - represents the same method of statistical probability as the simple linear regression, with the difference that the behaviour of the dependent (response) variable is examined in light of two or more independent (explanatory) variable.

Survivorship bias - bias is the tendency to view the fund performance of existing funds in the market as a representative comprehensive sample. Survivorship bias can result in the overestimation of historical performance and general attributes of a fund as the ceased funds not included in the sample could have influenced the variables in an opposite way.

Total return - According to the Morningstar Direct's database methodology, the definition for total return is: *Expressed in percentage terms, Morningstar's calculation of total return is determined each month by taking the change in monthly net asset value, reinvesting all income and capital-gains distributions during that month, and dividing by the starting NAV. Reinvestments are made using the actual reinvestment NAV, and daily payoffs are reinvested monthly. Unless otherwise noted, Morningstar does not adjust total returns for sales charges (such as front-end loads, deferred*

⁶⁰ <https://www.morningstar.com/content/dam/marketing/shared/research/methodology/860250-GlobalCategoryClassifications.pdf>.

⁶¹ https://www.morningstar.com/InvGlossary/equity_definition_what_is.aspx.

loads and redemption fees), preferring to give a clearer picture of a fund's performance. The total returns do account for management, administrative, 12b-1 fees and other costs taken out of fund assets. Total returns for periods longer than one year are expressed in terms of compounded average annual returns (also known as geometric total returns), affording a more meaningful picture of fund performance than non-annualized figures".

UCITS – stands for Undertakings for Collective Investment in Transferable Securities – according to the EU framework, this is the most common legal form for a mutual investment fund.



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