

ERASMUS UNIVERSITY ROTTERDAM

Erasmus School of Economics

Bachelor Thesis Finance

Mutual fund performance and fees in Europe

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Date: July 17, 2018

Abstract

This thesis tests the correlation between mutual funds and fees, within as well as between countries in Europe between 2014 and 2017. It is found that on average mutual funds underperform when compared to the market. It is also found, contrary to the results found in most of the literature regarding mutual funds returns and fees, that there is a positive correlation between mutual funds abnormal returns and their fees within countries. It is also found that there is a non-linear relation between mutual funds abnormal returns and their fees between countries. Countries with average fees, experience higher returns than countries with lower and higher average fees. Another conclusion that is drawn is that fees have a larger impact on mutual funds returns in countries where average fees are higher.

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1. Introduction

Mutual funds play an enormous role in the financial market. As of May 2018, the total amount of net assets managed by regulated open end funds add up to \$49.3 trillion. Which is almost double the \$26 trillion assets managed in 2007. And more than 8 times the \$6 trillion of assets managed in 1996. This shows that the Mutual fund market is still growing. European funds alone are holding \$17.7 trillion in assets (Investment Company Institute, 2018).

Due to the sheer size of the market and the amount of money circulating in mutual funds, this market has generated a lot of attention not only from investors, but also from academia. A lot of research has been done regarding mutual fund performance and its determinants. Most of this research has been done in the US, although some research has been done for Europe as well as Asian countries.

This thesis provides a closer look into mutual fund performance and its correlation with fees in Europe. The first question that needs answering is how mutual funds are performing compared to certain benchmarks, index funds for example. The research conducted in this thesis suggests that mutual funds are underperforming compared to these benchmarks.

After answering this first question the focus shifts more towards the correlation between fees and returns. The correlation between fees and returns is first researched within certain countries, where it is found that there is a positive correlation between fees and returns. Meaning that higher fees lead to higher returns. Then the correlation is researched on a group level where the conclusion is drawn that countries where fees are low don't necessarily have higher or lower average returns than countries where average fees are high. The last question this thesis proposes is about the different correlation between fees and returns in these certain groups. It is concluded that fees have a larger impact in countries where fees are high on average, than in countries where fees are low on average.

The rest of the thesis is as follows: in section 2 a more detailed literature review regarding mutual funds is given. In section 3 the data is presented. Section 4 provides a description of the methodology used followed by the results which are presented in section 5. In section 6 a conclusion is formed and the thesis ends with a discussion in section 7.

2. Literature review

This section provides an in-depth theoretical literature study and review of academic research on the performance of mutual funds. This will identify potential determinants of mutual fund performance which will be subject to research in the following sections.

2.1 *What is a mutual fund*

A mutual fund is an investment fund which brings capital from investors together to buy securities. Subsequently the fund sells its own securities which are priced on the basis of the total net asset value divided by the number of securities available. There are different types of mutual funds, open-end and closed-end for example. The key difference between these types of funds is the way they issue their own securities. Open-end funds are obliged to buy or sell its own participations at any time. As a result, the price of these participations is always equal (or very close to) the Net Asset Value of the fund divided by the number of outstanding participations (intrinsic value of a participation). The number of issued participations by a closed-end fund on the other hand is fixed. Next to the underlying assets, the price of a closed-end fund participation depends on supply and demand. This often leads to a premium or discount on the price on top of the intrinsic value of the participation. Closed-end funds also rarely issue or redeem their own securities. (Brauer, 1984).

2.2 *Research regarding mutual funds*

This subsection provides a summary of some of the academic literature on mutual funds.

2.2.1 *Jensen's Alpha*

Jensen (1968) introduced Jensen's alpha, as a performance measure of mutual funds. He used the CAPM model (Sharpe, 1964):

$$R_{i,t} - R_{F,t} = \alpha_i + \beta_i[R_{Mt} - R_{Ft}] + e_i$$

Where $R_{i,t} - R_{F,t}$ is the return of fund j minus the risk-free rate (the interest on a US treasury bill) in time t. β_i is the systematic risk of the fund's portfolio. $R_{Mt} - R_{Ft}$ is the return of the market minus the risk-free rate in time t. And α_i is a constant. From here he derived the metric known as Jensen's alpha:

$$\alpha_i = R_i - R_f - \beta_i[R_m - R_f]$$

Where a positive alpha is a positive abnormal return compared to the market. Jensen found a negative α_j for mutual funds in the US which means that the mutual funds were not able to predict security prices well enough to outperform a market index (Jensen, 1968).

2.2.2 *The Fama & French three-factor model*

The CAPM model was extended by Fama & French (1993), who included two market factors. The first one being small minus big (SMB), which is a size factor. It is calculated by taking the average return of three small portfolios minus the average of three big portfolios. The portfolios are constructed on the basis of the size of all stocks on the New York Stock exchange, the Nasdaq and the Amex. The median size splits the stocks in two groups: small and big. They also split these groups in three book-to-market equity groups based on the breakpoints: the lowest 30% (growth stocks), the medium 40% (neutral stocks) and the top 30% (value stocks). By doing this they have six groups of stocks for which they calculate the monthly returns. The SMB factor is calculated with the formula:

$$SMB = \frac{1}{3}(Small\ Value + Small\ Neutral + Small\ Growth) - \frac{1}{3}(Big\ Value + Big\ Natural + Big\ Growth)$$

They also introduced the high minus low factor (HML). Which is a book to market factor. The HML factor is calculated, using the same division into six groups of stocks, with the formula:

$$HML = \frac{1}{2}(Small\ Value + Big\ Value) - \frac{1}{2}(Small\ Growth + Big\ Growth)$$

The portfolio's they use to calculate the SMB and HML factors are rebalanced every month. With these market factors they constructed the Fama & French three-factor model:

$$R_i - R_f = \alpha_i + \beta_1[R_m - R_f] + \beta_2SMB + \beta_3HML + e_i$$

This model provides a basis to explain portfolio returns (Fama & French, 1993).

2.2.3 *Momentum strategies*

Jegadeesh and Titman (1993) found that stocks which performed well over the last six months, kept performing well over the next six months. They also found that stocks which had a poor performance, kept performing poor in the following timeframe. They found that constructing a strategy that involved buying past winners and selling past losers can generate abnormal returns (Jegadeesh & Titman, 1993).

Hendricks, Patel & Zeckhauser (1993) found this effect in mutual funds. The recent winning mutual funds kept on winning. They named this phenomenon as managers having “hot hands” (Hendricks, Patel, & Zeckhauser, 1993).

2.2.4. *The Cahart four-factor model*

In his paper in 1997, Cahart claims that the “hot hand” phenomenon found by Hendricks et al. (1993) is due to the momentum effects as explained in Jegadeesh & Titman (1993). Therefore, he constructed a new model combining the Fama & French three-factor model and a momentum factor, to create what is known as the Cahart four-factor model (Cahart, 1997):

$$R_{i,t} - R_{F,t} = \alpha_{i,t} + b_{i,t}RMRF_t + s_{i,t}SMB_t + h_{i,t}HML_t + p_{i,t}PR1YR_t + e_{it}$$

The momentum factor (*PR1YR*) is calculated using the following procedure. The stocks are divided in two groups (big and small) on the basis of Size, just as in the SMB and HML factors. The difference for this factor is that these groups are now split up in the 30% lowest returns, the 40% medium returns and the 30% highest returns over the last 10 months (10 months is standard in calculating momentum effects). Then the factor is calculated using the following formula (Fama & French, 2012):

$$PR1YR = \frac{1}{2}(Small\ High + Big\ High) - \frac{1}{2}(Small\ Low + Big\ Low)$$

2.2.5 *Findings regarding mutual fund performance*

Numerous authors have used the Cahart four-factor model to research mutual funds, using Jensen’s alpha as a performance measure. Most researchers found a negative alpha, implying that mutual funds underperform with regards to certain benchmarks (an index fund for example). This in term implies that professional asset managers are not able to show superior stock selecting skills (e.g. Daniel et al., 1997; Cahart, 1997; Cuthbertson et al., 2008).

2.2.6 *Determinants of mutual fund performance*

A lot of research has been done on determinants of the performance of mutual funds, e.g. size, age and fees. There have been some contradicting results. For example, Malhotra & McLeod (1997) and Chen et al. (2004) find that there are negative size-effects for mutual funds in the U.S. Which implies that a bigger mutual fund in terms of dollar value, generates less abnormal returns. However, Ferreira et al. (2013) report that this is not a universal truth since they can’t find diminishing returns for scale on funds outside of the U.S.

Malhotra & McLeod (1997) find a negative correlation between fund age and return in the U.S. This implies that younger firms generate more return.

Ferreira et al. (2013) also find a negative correlation between fund age and return, but this relation is statistically insignificant in their sample of US funds. They did find a significant negative relation for non-US funds.

Two specific potential determinants of mutual fund performance that have gathered a lot of academic attention are fees and expenses, which in the empirical part of this thesis will be taken together as the variable fees. How the fees are calculated will be discussed in the Data section. As the correlation between fees and mutual fund performance in Europe will be addressed in the empirical part of this thesis, a more detailed literature study on fees will be discussed in the next subsection.

2.3 A more in-depth look into fees.

The correlation between fees and returns has been well researched ever since the beginning of mutual funds research. When researching the performance differences of 34 mutual funds between 1954 and 1963, Sharpe concluded that differences in mutual fund performance can to a large extent be explained by differences in fees and expenses (Sharpe, 1966).

Since Sharpe, numerous authors have tried to explain the relation between fees and returns. In a well-functioning mutual-fund market this correlation should be positive (Gil-Bazo & Ruiz-Verdú, 2009), i.e. higher fees are positively correlated with higher gross returns. The reason is that a fund that performs well will charge more for its services. However, this correlation is not found to be significant. In a test on U.S. mutual funds between 1961 and 2005, Gil-Bazo & Ruiz-Verdú (2009) found a negative correlation between fees and mutual funds. They also subjected their results to a series of robustness tests and found that it survived all of them. Meaning they had found an anomaly.

Ferreira et al. (2013) also researched the determinants of mutual fund performance. One of their findings was the negative correlation between fees and returns for U.S. as well as non U.S. funds. Meaning not only that this anomaly had continued to persist over the years but also that the anomaly is observable worldwide and not only in the U.S.

Because a negative correlation between fees and returns is at odds with economic intuition, it is interesting to test this correlation again within a new timeframe. Especially since Morningstar, a source for data on mutual funds, wrote in their 2017 report on global fund investor experience study that their calculations showed continued downward pressure on fees

in many global markets. Implying that the median fees in major asset classes have been declining for years. They state that different reasons such as bans on sales loads or commissions have led to a great many investors paying less for mutual funds than ever before (Morningstar, 2017).

Morningstar researches mutual funds in different countries and scores them relative to each other on the basis of regulation, taxation, disclosure, fees and expenses, sales and their overall grades. For the empirical research in this thesis, the scorecard for fees and expenses is of major interest.

Table 1: the score of mutual funds within 25 countries, based on fees and expenses

This table is derived from the Morningstar global fund investor experience study 2017 where 25 countries are derived into 5 categories on the basis of fees. Top being the category with the lowest fees. Bottom being the category with the highest fees.

Top	Above Average	Average	Below Average	Bottom
Australia	South Africa	Denmark	China	Belgium
Netherlands	Thailand	Japan	Finland	Canada
New Zealand	United Kingdom	Korea	France	Taiwan
Sweden		Norway	Germany	
United States		Switzerland	Hong Kong	
			India	
			Italy	
			Singapore	
			Spain	

The table is derived from the Morningstar global fund investor experience study 2017. It shows 25 countries divided into 5 categories. Top, above average, average, below average and bottom.

2.4 Research Objectives

The empirical part of this thesis will take a closer look in to the correlation between fees and returns between European countries in the Top, Average and Bottom categories of the Morningstar investor experience study. The timeframe for this research is between 2014 and 2017, the reason for this timeframe is that sufficient time has passed since the economic crisis in 2008, in which the difference between mutual fund returns and the market return could deviate from the difference between mutual funds and market returns than under “normal” conditions. The timeframe runs until the end of 2017 because the interest lies in the most recent timeframe. For this thesis, the following research question is asked:

“Are higher fees within as well as between countries related to higher abnormal returns between 2014 and 2017?”

To answer this research question, a total four hypotheses are introduced.

H1: mutual funds on average underperform relative to their benchmark

Although fees and expenses keep decreasing over the years, there is still no reason to assume that the average mutual fund will outperform the market. The reason for this assumption is the overwhelming number of studies that support this claim.

H2: lower fees lead to higher abnormal returns within counties.

This hypothesis is derived from the vast literature written about the negative correlation between mutual fund performance and fees. If fees are lower, abnormal returns are higher.

H3: countries with lower average fees experience higher abnormal returns than countries with higher average fees

Following the assumption of hypothesis two. If lower fees are related to higher returns, it seems reasonable to assume that countries where fees are lower experience higher returns than countries where fees are higher.

H4: in countries with lower average fees, the fees play has a less significant impact on returns than in countries with higher average fees.

The basis for this assumption is the following: If the average fees in a country are already low, other factors will become more significant drivers of return since funds can't differentiate themselves on the basis of lower fees.

The remainder of this thesis is as follows: the data section will explain the data used and where this data is found. Then the methodology will explain how the data is used to answer the research question. Following is the results section in which the results of the research are given. This leads to the conclusion in which the hypotheses are tested and the

research questions are answered. Lastly there is a discussion in which the problems of this research are addressed and recommendations on further research regarding this topic is presented.

3. Data

The data for this research is retrieved from Morningstar, which is a large database for mutual funds worldwide. In search for data the sample is narrowed down to mutual funds which have stated their monthly returns from 2011-2017. Other search filters were the inception date, equity funds and domestic investing funds only. This gives a sample of the six European countries: the Netherlands, Sweden, Denmark, Norway, Switzerland and Belgium. The reason for using this time frame is as follows: the goal is to research the 2014-2017 period, but as will be discussed in the methodology section, 3 years prior data is needed to find the desired results.

The ongoing annual charge is a metric made by Morningstar. It gives a representation of the fees that an investor can reasonably expect to pay from one year to another. The charge encompasses the fund's professional fees, management fees, audit fees and custody fees. It isn't the perfect representation of fees and expenses but it gives the most accurate fee of fund ownership available in the Morningstar database (Morningstar Glossary). Only a small number of firms has their annual ongoing charge metric stated in the Morningstar database. For this reason, the monthly difference between gross and net returns will be used as the fee metric. When summing the monthly fee in this manner from January until December, it gives roughly the same percentage as the annual ongoing fee for funds that have this metric registered.

In this sample multiple share classes are listed as separate funds. The same procedure will be followed as in Ferreira et al. (2013). Funds which are under the same family and have nearly identical returns in the researched timeframe are being eliminated from the dataset. In this process the main fund is kept in the dataset, the main fund is identified as the fund with the biggest size. The complementary funds which are currently (mostly) investing in the same assets, and thus have (nearly) identical returns are excluded from the data set.

From this database, a random sample consisting of 10 funds for each country is derived. The exception is the Netherlands for which there were only 7 separate funds available from the Morningstar database. The returns and firm size are all converted to US dollars. A summary of the data is given in table 2.

Table 2: summary of data on country level

This table presents the average values of the mutual fund characteristics fees, fund size and age for five different countries between 2014 and 2017. As well as the number of observations for each country. The bottom line consists of the average values of the mutual fund characteristics fees, fund size and age as well as the number of observations for the whole sample

Country	Morningstar category	number of funds	N	avg. monthly fees (%)	avg. firmsize (million \$)	avg. age (years)
The Netherlands	Top	7	336	0,072	313	22,5
Sweden	Top	10	480	0,088	711	17,0
Denmark	Average	10	480	0,117	248	20,5
Norway	Average	10	480	0,093	536	18,8
Switzerland	Average	10	480	0,100	292	17,4
Belgium	Bottom	10	480	0,134	98	21,8
Sample		57	2736	0,102	367	19,5

N is the number of observations for the time period that is examined. From 2014-2017 gives four years and thus 48 months per firm.

Because this thesis will also have a more in-depth look into the different Morningstar categories, table 3 will provide a summary of the data on category level.

Table 3: summary of data on category level

This table presents the average values of the mutual fund characteristics fees, fund size and age, as well as the number of observations, for five countries divided into three categories, between 2014 and 2017. The top category consists of The Netherlands and Sweden. The Average category consists of Denmark, Norway and Switzerland.

Morningstar category	number of funds	N	avg. monthly fees (%)	avg. firmsize (million \$)	avg. age (years)
Top	17	816	0,0820	552	19,3
Average	30	1440	0,104	359	18,9
Bottom	10	480	0,134	98	21,8

To give an answer to the research question, other data is needed. The data on the one-month US T-bill returns from 2011-2017 is retrieved from the website of the federal reserve bank of St. louis. Also needed are the monthly RMRF, HML and SMB factors (Fama & French, 1993) as well as the monthly one-year momentum factor (Jegadeesh & Titman, 1993). Due to the limitations of time and the hefty progress of constructing these four factors, they will be retrieved from Kenneth French's database on his website. This database only provides the factors for the European market. Not the factors for each country separately. This can lead to results being less accurate. The domestic factor models generally lead to lower alpha's in the 3-factor model (Griffin, 2002). The findings of Griffin, who showed his results for the U.S., the U.K., Canada and Japan, imply that also for the 4-factor models, the domestic factors would be

better. A paper by Moerman (2005) states that domestic factors are also better in the very integrated euro area. He mentions however that the relative performance of the euro area wide model is increasing. This leads to the belief that the European factors can be used for this research even though it will not be as accurate as domestic factors for every separate country.

4. Methodology

To research the first hypothesis, the same methodology will be used as in Cahart (1997). Where the author combines the Fama and French 3-factor model (1993) and the one-year momentum effect of Jegadeesh and Titman (1993) to create the 4-factor model:

$$R_{it} - R_{Ft} = \alpha_{it} + b_{1it}RMRF_t + s_{it}SMB_t + h_{it}HML_t + p_{it}PR1YR_t + e_{it} \quad (1)$$

$$t = 1, 2, \dots, T$$

Where $R_{it} - R_{Ft}$ is the before fee (gross) return of fund minus the return on the one-month US T-Bill in month t . α_{it} is the under/outperformance of the mutual fund. $RMRF_t$ is the market factor: the excess return of the European market minus the one-month US T-Bill. SMB_t , HML_t and $PR1YR_t$ are the returns on value weighted, zero-investment, factor-mimicking portfolios for size, book to market equity and one-year momentum in stock returns (Cahart, 1997). The α_{it} will be researched for each country separately.

To research the second hypothesis a different model will be used. This model is also retrieved from Cahart (1997) and will be used to study the relation between different determinants and returns. In each month the following cross section regression will be estimated

$$\alpha_{it} = a_t + b_t x_{jt} + \varepsilon_t \quad (2)$$

$$i = 1, \dots, N \quad t = 1, 2, \dots, T$$

Where α_{it} again is the under/overperformance of the mutual fund i in time period t . x_{jt} is a fund characteristic in time t . To use this model, the α_{it} for each individual fund in each month needs to be estimated. This is done by using the prior three years of return data and the four-factor model:

$$\alpha_{it} = R_{it} - R_{Ft} + \hat{b}_{it-1}RMRF_t + \hat{s}_{it-1}SMB_t + \hat{h}_{it-1}HML_t + \hat{p}_{it}PR1YR_{t-1} \quad (3)$$

The fund characteristics in this regression are fees, firm size and age. So that the regression, to test the second hypothesis, looks like this:

$$\alpha_{it} = a_t + b_{1t}cost_{jt} + b_{2t}Firmsize_{jt} + b_{3t}age_{jt} + \varepsilon_t \quad (4)$$

For the above regression's, Cahart (1997) will be followed and the Fama-MacBeth (1973) two stage estimator will be used. In the first stage it will estimate the cross-sectional correlation for each month and in the second stage the coefficient estimates across the complete sample period will be averaged. For the second hypothesis each country will be tested separately.

For the third hypothesis, two dummy variables for the Morningstar categories will be added to (4). The adjusted model now looks like this:

$$\alpha_{it} = a_t + b_{1t}Fees_{jt} + b_{2t}Firmsize_{jt} + b_{3t}age_{jt} + b_{4t}av_{jt} + b_{5t}bt_{jt} \quad (5)$$

Where *av* is the average category and *bt* is the bottom category. A significant b_4 or b_5 will indicate a difference in returns between these categories.

For the fourth and final hypothesis, interaction variables for the fees and the Morningstar categories will be added to regression (5). Making the model look like this:

$$\alpha_{it} = a_t + b_{1t}Fees_{jt} + b_{2t}Firmsize_{jt} + b_{3t}age_{jt} + b_{4t}av_{jt} + b_{5t}bt_{jt} + b_{6t}(Fees * av_{jt}) + b_{7t}(Fees * bt_{jt}) + \varepsilon_t \quad (6)$$

$Fees * av_{jt}$ and $Fees * bt_{jt}$ are the interaction variables between the fees and returns for the average and bottom category. A significant positive b_6 or b_7 for these variables implies that fees have a bigger impact on returns in these categories, compared to the top category. Again, the Fama-MacBeth estimator will be used in (5) and (6), this time without dividing the sample into countries or categories.

5. Results

First the Carhart four factor model is used to research the performance of mutual funds in each country. The results are shown in table 4.

As can be seen in the table, all countries except for Denmark give a negative alpha, all of these significant expect for the Netherlands. Furthermore, note that Denmark's positive alpha is also not significant. When examining the whole sample, a significant negative alpha is found.

The R^2 , representing the proportion of returns explained by the four factors, varies between 0.573 – 0.821, which is much less than in Cahart (1997) where R^2 varies between 0.782-0.968. This difference can most likely be attributed to the difference in the four factors that are used. Cahart uses the US factors for his US sample. Here the European market factors and momentum factor are used for different European countries. These European factors are likely to explain a smaller portion of the returns compared to domestic factors. This is most likely the reason that

the R^2 statistics in table (4) are lower than in Cahart (1997). The results reported in table 4 could be different if the domestic market factors and momentum factor were used.

table 4: results from the Cahart four factor model regression

This table reports the regression results of mutual fund returns between 2014 and 2017 in The Netherlands, Sweden, Denmark, Norway, Switzerland and Belgium. The dependent variable is the gross return minus the risk-free return. The explanatory variables are the market factor, the SMB factor, the HML factor and the momentum factor (PR1YR)

Country	α	RMRF	SMB	HML	PR1YR	R2
The Netherlands	-0,430 (-0,35)	1,082 (30,18)	0,216 (2,99)	0,0787 (1,15)	-0,0983 (-1,57)	0,792
Sweden	-0,326 (-3,81)	1,019 (40,43)	0,366 (7,16)	-0,316 (-6,62)	-0,115 (-2,62)	0,812
Denmark	0,00629 (0,06)	0.895 (30.30)	0.604 (10.08)	-0.128 (-2.28)	0,219 (4,25)	0,687
Norway	-0,319 (-2,11)	0,912 (20,52)	0,150 (1,66)	0,614 (7,29)	0,0806 (1,04)	0,573
Switzerland	-0,217 (-2,85)	0,901 (40,17)	-0,0193 (-0,43)	-0,199 (-4,69)	0,148 (3,80)	0,791
Belgium	-0,268 (-3,61)	0,984 (45,06)	0,165 (3,73)	-0,6355 (-1,53)	0,228 (6,01)	0,821
Sample	-0,201 (-4,38)	0,960 (71,33)	0,248 (9,11)	-0,00575 (-0,22)	0,0875 (3,73)	0,688

Because the focus of this thesis is on fees and returns, six separate t-tests will be executed to see if the means for returns and fees are statistically different between the top, average and bottom categories of table 1. The results for the t-tests on returns can be found in table 5. The results for the t-tests on fees can be found in table 6. In the column return difference, for category mean top – average, the value is -0.105. This means that the mean return for the average category is 0.105 lower than the mean return of the top category.

Table 5: the results of the t-tests for returns

This table presents the results of three separate t-test between the mean returns of the top and average, the top and bottom and the average and bottom categories

Category mean	return difference	t	p (two-sided)
top - average	-0,105	-0,5994	0,549
top - bottom	-0,108	-0,477	0,624
average - bottom	-0,0037	-0,0184	0,985

As can be seen in table 5, there is no statistically significant difference between the categories in terms of returns. Note that these tests are performed using the return of the mutual funds and not the abnormal returns α_{it} .

Table 6: the results of the t-tests for fees

This table presents the results of three separate t-test between the mean fees of the top and average, the top and bottom and the average and bottom categories

Category mean	fee difference	t	p (two-sided)
top - average	-0,215	-12,58	0,000
top - bottom	-0,0515	-26,702	0,000
average - bottom	-0,0300	-15,2122	0,000

In table 6 it is shown that there is a statistically significant difference in fees between the categories. With the top category having the lowest fees, followed by the average category, as expected.

To regress the explanatory variables on the excess returns α_{it} , first the excess return needs to be estimated for each fund in each time period. This is done using regression (3). After the estimation of α_{it} , regression (4) is executed. The results can be found in table 7. As can be seen in the table, every country, except for Denmark has a significant positive coefficient for fees, meaning that there is a positive correlation between fees and returns: when fees increase, abnormal returns increase. The negative correlation found in Denmark is not statistically significant.

Table 7: the results of regression (4) for countries

This table reports the regression results of mutual fund returns in five countries between 2014 and 2017. The dependent variable is the monthly Cahart model alpha. The explanatory variables are fees, firm size and age of the fund. t-statistics are in parenthesis

	The Netherlands	Sweden	Denmark	Norway	Switzerland	Belgium
fee	2,567 (10,28)	2,008 (15,47)	-0,466 (-0,97)	0,261 (2,13)	0,860 (3,15)	1,950 (5,85)
firmsize	-0,00159 (-14,52)	0,000075 (12,84)	0,000359 (8,75)	-0,000223 (-9,10)	-0,0000934 (-3,67)	-0,000718 (-10,46)
age	0,0178 (6,55)	-0,00156 (-2,27)	-0,00895 (-15,75)	0,00804 (7,90)	-0,00234 (-2,51)	0,00521 (6,12)
R ²	0,6713	0,3362	0,3811	0,4019	0,2993	0,2282

Table 8 presents the same regression but for the different Morningstar categories. Notice that although the Netherlands and Sweden, which make up the top category, both have a positive fee coefficient in the regression on countries, the top category has a negative coefficient for

fees. Meaning that within this category abnormal returns increase as fees decrease. The average and bottom categories both have a positive fee coefficient

Table 8: the results of regression (4) for categories

This table reports the regression results of mutual fund returns in five countries divided into three categories, between 2014 and 2017. The top category consists of The Netherlands and Sweden. The Average category consists of Denmark, Norway and Switzerland. And the bottom category consists of Belgium. The dependent variable is the monthly Cahart model alpha. The explanatory variables are fees, firm size and age of the fund. t-statistics are in parenthesis

	Top	Average	Bottom
fee	-0,992 (-5,31)	2,350 (7,82)	1,950 (5,85)
firmsize	-0,000113 (-8,79)	-0,000339 (-7,97)	-0,000718 (-10,46)
age	0,0161 (11,16)	-0,00277 (-6,75)	0,00521 (6,12)
R ²	0,2168	0,1928	0,2282

Note that in regression (4) there were only three variables included in the regression, fees fund size and age. This could lead to omitted variable bias, where there is some variable correlated with fees as well as returns that is not included in the regression. Some examples could be share turnover or the number of countries where the fund is sold. Therefore, results could differ when using more variables.

Also, this data set contains domestic funds only, meaning that a fund in country i only buys stocks from the market in country i . The results could be different when internationally diversified funds are included in the sample.

The results for regressions (5) and (6) are presented in table 9. It is deducted from table 9 that the average category has significant higher returns than the top and bottom category. From additional, non-disclosed tests, it becomes clear that the average category also has significantly higher returns than the bottom category. There is no significant difference between the top and bottom categories. Implying that there is a non-linear correlation between fees and returns between countries.

The results from table 9 also indicate that fees have a significantly bigger impact on returns in the average and bottom categories than in the high category. From additional, non-disclosed tests it is determent that there is no statistical significant difference between the interaction variables for the average and bottom categories. This implies that this effect is only

present to a certain height of fees. Note that the bottom category only consists of one country. The results could be different if more countries are added to the sample.

Table 9: the results of regressions (5) and (6)

This table reports the regression results of mutual fund returns between 2014 and 2017 in The Netherlands, Sweden, Denmark, Norway, Switzerland and Belgium. The dependent variable is the monthly Cahart model alpha. The explanatory variables are fees, firm size, age and dummy variables for the average Morningstar Category (av) and bottom category (bt) and interaction variables between the fees and the Morningstar categories (av*fees) for the average category and (fees*bt) for the bottom category. t-statistics are in parenthesis

	Regression 5	Regression 6
fee	1,044 (6,85)	-1,191 (-8,51)
firmsize	-0,000197 (-10,54)	-0,000225 (-11,59)
age	0,00472 (6,98)	0,00391 (6,11)
av	0,115 (3,62)	-0,176 (-3,60)
bt	-0,0175 (-0,50)	-0,296 (-4,26)
av*fees		3,230 (9,56)
bt*fees		2,823 (8,62)
R2	0,2408	0,2688

6. Conclusion

After generating the results of the different regressions executed, the research question:

“Are lower fees within as well as between countries related to higher abnormal returns between 2014 and 2017?”

Can be answered. First, the four hypotheses of this thesis are evaluated. To evaluate the first hypothesis:

H1: mutual funds on average underperform relative to their benchmark

The result of regression (1) is used. Finding a significant negative alpha for four out the six countries as well as for the whole sample clearly indicates that this hypothesis cannot be rejected. The results are in line with a lot of earlier research (e.g. Daniel et al., 1997; Cahart, 1997; Cuthbertson et al., 2008). The results should however be treated with care since the European market factors as well as the European momentum factors were used. Results could be different if the domestic market factors are used for each country separately.

The second hypothesis can be evaluated using the results of regression (4).

H2: lower fees lead to higher abnormal returns within countries.

When looking at the results in table 7, it is clear that there is a positive correlation between fees and returns within the countries examined. This correlation is significant in five of the six countries. This gives enough reason to reject the second hypothesis. Again, this conclusion should be treated with great care. As stated before, only having three explanatory variables in regression (4) could lead to omitted variable bias. Results could be different if more variables are added. Also results could be different if internationally diversified mutual funds are added to the sample.

The third hypothesis can be evaluated using the results of regression (5).

H3: countries with lower average fees experience higher abnormal returns than countries with higher average fees

When looking at the results from regression (5) it can be seen that the average category has a significantly higher return than the top category. In addition, non-disclosed tests, it becomes clear that the average category also has significantly higher returns than the bottom category. here is no significant difference between the top and bottom category. Given these results, the third hypothesis cannot be rejected. Again, some caution as the bottom category of mutual funds consists only of one country. Results could be different if there were more countries within each category.

The fourth hypothesis can be re-examined using the results of regression (6).

H4: in countries with lower average fees, the fees play a less significant role on returns than in countries with higher average fees.

From the results it becomes clear that fees play a significantly bigger role in countries with higher average fees as the interaction variables $fee*av$ and $fee*bt$ both have a positive significant coefficient. This hypothesis is also not rejected. The fact that there is no significant difference between the average and the bottom category, could indicate that this effect is only present to a certain height of fees. The same caution should be applied when evaluating this hypothesis. Results could be different if there were more countries within each category.

After re-examining the four hypotheses stated in this thesis, the research question can be answered.

“Are lower fees within as well as between countries related to higher abnormal returns between 2014 and 2017?”

A negative correlation is found between mutual funds abnormal returns and their fees. This is in line with economic intuition. For between countries, or in this research set up, between categories, there seems to be a non-linear correlation. Countries in the average category experience relatively higher returns than countries in top and bottom categories. There is also no significant difference between the returns in the top and bottom category. Results also imply that fees have a bigger impact on returns in countries where the average fees are higher. This positive correlation seems to hold only to a certain extend since there is no statistical difference between the impact of fees in the average category and the impact of fees in the bottom category. In both these categories however, the impact is significantly higher than in the top category.

7. Discussion

This research thesis has plenty of shortcomings which will be discussed in this section. These points discussed could improve future research, regarding this subject, when implemented.

First is the sample size which is fairly small. Due to time limitations and limited availability of data, the choice in this thesis was made to include ten mutual funds for five countries and seven mutual funds for one country. One could re-do this research with more mutual funds from the countries examined. Perhaps a different data base offers more

information on these funds for the time period examined. Also, the other categories “above average” and “below average” from table 1 could be researched. The research could also be expanded to all the countries mentioned in the Morningstar study instead of only the European countries.

Second is the time-frame which is only four years long. A longer time-frame could give more robust results, the problem here is that the financial crisis of 2008 might present an economically distorted landscape which could give biased results when, for example, the results between 2000-2017 are examined. Then again, the recent timeframe for this research is chosen in light of the remarks of the Morningstar study saying that fees over the last years showed continued downward pressure.

Third is the market factors and momentum factor used. As mentioned before, domestic factors could produce different results.

Fourth the Morningstar data base had a limited availability of historic variables for each fund. A more complete regression with more variables could lead to a different correlation between fees and abnormal returns.

And final, the research method. Different results can be generated when using a pooled OLS for example.

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