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Bachelor Thesis Financial Economics

Do Actively Managed Mutual Funds Beat Their Benchmarks?
An Evaluation of Mutual Fund Performance in Eight Countries

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ABSTRACT

Mutual funds continue to be one of the main investment tools for individual investors around the world. By the end of 2017, the global value of total assets under management by the open-ended mutual funds reached 49.3 trillion US dollars. The literature covered in this research reports the underperformance of active mutual funds compared to their passive benchmarks starting from 1945 until 2007. With using survivor-bias free data, this research evaluates the performances of the actively managed mutual funds across 8 countries for the period 2003-2018. Moreover, this thesis assesses the relationship between mutual fund performances and mutual fund characteristics in 3 of the sample countries. The results show the outperformance of actively managed mutual funds in 7 of the sample countries and a significantly negative relationship between fund size and performance in all 3 of the sample countries.

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1. Introduction

A mutual fund is a professionally managed financial vehicle that pools money from many investors to invest in various securities. Mutual funds are known for their various benefits such as low transaction costs and diversification and, can be separated into actively managed funds or passive funds depending on the professional expertise (Gruber, 1996). Additionally, different types of mutual funds are available including funds that invest in equities, bonds, stocks, real estate, money market instruments, and funds that invest in than two or more asset classes. Mutual funds are structured as open-end and closed-end funds, while the open-end funds can issue an unlimited number of shares and are traded by their net asset values; closed-end funds issue non-redeemable shares by IPOs. These issued shares are then traded in the stock exchanges while their prices are set by demand and supply.

From 2011 to 2017 under the management of regulated open-end mutual funds, total net assets grew by 74.2 percent and reached a total value of 49.3 trillion US dollars. This amount was approximately 2.5 times higher than the GDP of United States of America (US)[1]. At the end of 2017, the share of the equity mutual funds amounted to 44.3 percent of all regulated open-end funds, making them the most popular mutual fund type. Today, with their value amounting to 21.8 trillion dollars, the performance of equity mutual funds affects the wealth of a vast number of people all around the world. Therefore, the main motivation of this thesis is to evaluate the performance of mutual funds while asking the following question:

"How do actively managed domestic equity mutual funds in Australia, France, India, Japan, Norway, Switzerland, the UK, and the US perform compared to their benchmarks between the years 2003 and 2018?"

By comparing active mutual funds and their passive benchmarks, this thesis can be used as a guideline for small and individual equity investors. Accordingly, this research can help investors to analyze the performance of active mutual funds in more detail and might assist them during their investment decisions'.

Mutual funds' performance was studied in detail in the last 50 years. Jensen (1968) was the first among many to find that on average equity mutual funds underperformed their

[1] (Statista: Global Assets Under Management 2002-2017, 2018), (IMF: World Economic Outlook (April, 2019) - GDP, Current Prices, 2019)

benchmarks. Nearly 30 years later, Malkiel (1995) supports the findings of Jensen on equity mutual fund performances when evaluating the years between 1971 and 1991. Malkiel found that on average equity mutual funds underperformed their benchmarks gross of annual fees. This was contradicting Ippolito's (1989) findings, indicating that mutual funds outperform their benchmarks net of all fees, excluding load charges.

Later, Carhart (1997) studied the performance of the equity mutual funds with his four-factor model. Like prior research of Malkiel and Jensen, Carhart's findings showed that actively managed mutual funds were underperforming their passive benchmarks.

Ferreira et al., 2013 recently studied the performance of mutual funds by comparing mutual funds across 27 countries including the years between 1997 and 2007. Their paper is considered as one of the largest cross-country evaluation of mutual fund performance and the research consist of various evaluation models. Likewise, Ferreira and colleagues also report that mutual funds during these selected years were underperforming both in the US and across the globe.

The first focus of this thesis is to evaluate the equity mutual funds' performance in 8 countries, including Australia, France, India, Japan, Norway, Switzerland, the United Kingdom (UK) and the US between the years of 2003 and 2018. Three separate models are used for the performance assessment. These models are CAPM developed by Sharpe (1964), Lintner (1965) and Jensen (1968), the three-factor model of Fama and French (1993) and four-factor model of Carhart (1997). These models are explained in depth in section 2.1 Performance Evaluation Methods.

The second focus of this thesis is to evaluate the characteristics of US, Norwegian and Indian equity mutual funds. The evaluation period for the US and the Norwegian mutual funds is between the years of 2006 and 2018, while the evaluation period for the Indian funds is between the years of 2009 and 2018. The relationship between fund characteristics and fund performance was only carried out for the three aforementioned countries since only these countries contain meaningful information on mutual fund characteristics. Morningstar database was used to collect survivor-bias free mutual fund data and the factor models were gathered from Kenneth R. French's database and the Indian Institutes of Management.

By evaluating the performance and characteristics of actively managed equity mutual funds, this thesis presents up to date information on the field of finance over these selected countries.

The rest of this research is as the following. Section 2 jointly discusses the theoretical framework and methodology. Section 3 describes the data and, the data gathering and clearing procedures. Section 4 presents the results. Section 5 discusses the results, the limitations and the suggestions for future research. Section 6 concludes the research.

2. Theoretical Framework and Methodology

2.1 Performance Evaluation Methods

Jensen (1968) was one of the first economists to test the mutual fund performance and in order to achieve that, he developed the "Jensen's Alpha" method. Jensen extended the Capital Asset Pricing Model (CAPM) of Sharpe (1964) and Lintner (1965) by adding a new variable "α". In Jensen's (1968) CAPM, alpha indicates the performance of the mutual fund manager. A positive alpha shows that the manager was able to outperform the market.

The full model is shown below:

$$R_{jt} - R_{ft} = \alpha_j + \beta_j\left[R_{Mt} - R_{ft}\right] + \upsilon_{jt} \quad (1)$$

Where (R_{jt}) is the return of the fund, (j) at the time (t). (R_{ft}) is the risk-free interest rate at time (t); (α_j) is the return due to the ability of the fund manager; (β_j) is the exposure to systematic risk by portfolio (j); (R_{Mt}) is the market return at time (t) and (υ_{jt}) is the error term $E(\upsilon_{jt}) = 0$.

Jensen observed that the mutual funds in his research were remarkably more successful regarding diversification. However, these mutual funds could not able to outperform their benchmarks even when considering gross of fees.

Similarly, Fama and French (1992) found that "Beta" in the Capital Asset Pricing Model had limitations due to the lack of information on the average return. They demonstrated that besides the market excess return, book-to-market ratio and the size of the stocks had significant explanatory power over returns on the cross-section. Fama and French (1993) then constructed the three-factor model by adding two additional factors to the original CAPM. Their model is shown below:

$$R_{it} - R_{ft} = \alpha_i + \beta_1\left(R_{Mt} - R_{ft}\right) + \beta_2(SMB_t) + \beta_3(HML_t) + \varepsilon_t \quad (2)$$

Where (SMB_t) is the size premium and measures the difference between the return of small-sized and big-sized portfolios at the time (t) and (HML_t) is the premium due to the difference in high book-to-market and low book to market value portfolios at the time (t). Value and size portfolios are created with the following procedure:

SMB = 1/3 (Small Value+Small Blend+Small Growth) – 1/3 (Big Value +Big Blend+Big Growth)

HML = 1/2 (Small Value + Big Value) – 1/2 (Small Growth + Big Growth)

"Small" and "big" on the aforementioned equations represents the market capitalizations of the stocks in the portfolios. Stocks that have relatively high book-to-market ratios are considered as value stocks while the low book-to-market stocks represent the growth stocks and neutral portfolios consist of value and growth stocks.

Hendricks, Patel, and Zeckhauser (1993) found that mutual funds that performed well also continued to perform better in the following year, whereas mutual funds that performed relatively poorer, continued to perform poorly. He named this phenomenon as '*hot hands'*. Later, Carhart (1997) linked this phenomenon to Jegadeesh and Titman's (1993) price momentum effect. According to Jegadeesh and Titman (1993), stocks that performed well in the past 3 to 12 months continued to perform relatively well in the following 3 to 12 months. Hot hands were also observed for the stocks that performed poorly.

Since equity mutual funds are holding stocks that are affected by the momentum funds, they are also likely to be affected by this phenomenon. According to Jagadeesh and Titman (1993), there are two possible explanations of the momentum effect. These could be summarized as the underreaction and the overreaction of investors to the newly released information. Later, Carhart (1997) expanded the Fama and French three-factor model by introducing an additional variable to account for this one-year momentum effect:

$$R_{it} - R_{ft} = \alpha_i + b_{it}(RMRF_t) + s_{it}(SMB_t) + h_{it}(HML_t) + m_{it}(MOM_t) + \varepsilon_t \quad (3)$$

Where (MOM) is constructed by taking the difference of firms with 30 percent highest returns and 30 percent lowest returns on prior eleven months.

Moreover, the performance evaluation of the European mutual funds between the years of 1991 and 1998 was performed by Otten and Bams in 2002. Their sample size consisted of

506 open-ended domestic equity mutual funds from France, Germany, Italy, the Netherlands, and the UK. They showed that on average, the mutual funds in four of the five countries were able to show a positive performance when compared to their benchmarks. However, only the results in the UK were significant.

2.2 Value and Growth Stocks

Lakonishok, Shleifer and Vishny (1994) define value stocks as stocks with relatively low price to earnings ratios, relatively poor past performance in terms of returns. Value stocks are also defined as low expected growth and as stocks that are contrary to naïve strategies. With their 21 years of US stock data, Lakonishok et al. (1994) found that value stocks outperformed growth stocks by 10.5 percent per year. Furthermore, their findings show that when value and growth portfolios are held for 5 years, the outperformance of value stocks reach 90 percent. Lakonishok et al. (1994) describe the main reason for the undervaluation of these stocks according to lies in the mispricing of market participants; however, Fama and French offer a risk-based explanation. According to Fama and French (1992 and 1993), value stocks are riskier than the growth stock and the value premium is the compensation for that higher risk. The value premium is the difference between the monetary return of value stocks and growth stocks.

To summarize, the monetary return on the US value stocks was higher than the growth stocks. And the reason is due to the mispricing of the value stocks by the market or because of the higher risk carried by the value stocks compared to growth stocks. Therefore, one would expect a better performance on average from value funds than growth funds.

Yet, the research of Chan, Chen and Lakonishok (2004) on 3336 funds for 22 years indicates the opposite. Their results show that yearly on average, growth managers performed 1.2 percent better than value managers. According to Chan and colleagues, one of the reasons for the return differences amongst value managers and growth depends on the agency or behavioral considerations. They argue that value managers that perform poorly are more likely to shift into growth strategies since growth strategies are easier to justify than value strategies. At the same time, growth managers that perform poorly stick to growth strategies in the upcoming periods.

2.3 Fund Performance Characteristics

Carhart (1997) found a negative correlation between fund expense ratios, turnover ratios, and fund performance. Expenses of mutual funds include management fees, administrative fees, operating costs and 12b-1 fees. 12b-1 fees consist of annual marketing and distribution costs. Expense ratio is calculated by dividing these expenses to the funds' total net assets. Turnover ratios represent the trading activities of mutual funds and are calculated by taking the difference between the fund purchases and sales divided by total net assets.

The findings of Chen, Hong, Ming and Kubik (2004) report diseconomies of scale for US mutual funds. According to the paper, the underlying reason for the negative effect of size on performance lies in the role of liquidity. Correspondingly, Ferreria et al., 2013 found a negative relationship between fund size and performance for US mutual funds and a positive relationship between non-us funds. Additionally, their findings show an insignificant effect of age fund on fund performance.

Tests performed in this paper include the evaluation of the relationship between mutual fund performance and mutual fund characteristics. The characteristics that are evaluated in this research are mutual fund expense ratios, mutual fund sizes, mutual fund ages, share turnover ratios and the investment style of the mutual funds. To test the relationship between fund characteristics and the mutual fund performance the Fama-MacBeth (1973) method was employed.

The Fama-MacBeth (1973) method consists of two-steps. In the first step, time-series regressions are run to find the factor betas. In this research, betas denote the four-factor model loadings. Then cross-sectional regressions are run on actual returns against the factor loadings at each period to derive the risk premiums and risk premiums correspond to abnormal returns. After the cross-sectional regressions, the averages of the risk premiums are taken. The first model used for the estimation of abnormal return estimation is read as the following:

$$a_{it} = R_{it} - R_{ft} - \hat{\beta}_{1it-1}RMRF - \hat{\beta}_{2it-1}SMB - \hat{\beta}_{3it-1}HML + \hat{\beta}_{4it-1}MOM \qquad (4)$$

Where ($a_{it)}$ is the monthly abnormal return from the mutual fund at the time (t) of the estimated four-factor model. ($R_{it)}$ is the return of a mutual fund at the time (t). ($R_{ft)}$ is the return on a risk-free portfolio at the time (t). And, ($\widehat{\beta)}$s' are the 4-factor model loadings. The second model

which was used for the relationship between characteristics and the abnormal return is read as the following:

$$a_{it} = a_t + b_i x_{it} + \varepsilon_{it} \quad (5)$$

Where (a_{it}) denotes the estimated performance variable alpha for the fund (i) at the time (t) and (x_{it}) denotes a firm characteristic for the fund (i) at the time (t). Additionally, in line with Carhart (1997), factor loadings were estimated over prior three year returns in order to lessen the effect of the look-ahead bias and the fund size was lagged 12 months to deal with possibly causality. Moreover, to observe the differences in performances between mutual funds that invest in different investment styles, three investment style dummies namely, Blend, Growth, and Value were created.

2.4 Model Selection

For each of the selected countries, CAPM, Fama and French three-factor model and Carhart four-factor models were employed and their Bayesian Information Criterion (BIC) values were gathered. Then, the BIC values of the models were compared to determine the model that carries the highest explanatory power. BIC values of Schwarz (1978) are based on the likelihood function and serve as a criterion for model selection. Thus, it is possible to observe if the new model with an added variable, such as Fama and French three-factor model compared to CAPM, adds significant explanatory power or if a simpler model fits the data better. BIC value increases with the increasing number of explanatory variables and with the variation in the dependent variable that is not explained but decreases with a better fit. Accordingly, the models with the lowest BIC values were chosen to explain the mutual fund performances. BIC model is read as the following:

$$-2 \cdot \ln p\,(x|k) \;\approx\; BIC = -2\ln(L) + k \cdot \ln(n))$$

Where (x) is the data, which is being observed, (n) is the number of observations, (k) is the number of independent variables in case a linear regression model is employed, $p(x|k)$ is the likelihood given the dataset and (L) represents the maximum value of the likelihood function for the estimated model.

The research on explanatory power comparison among models was performed by Otten and Bams in 2004 for the US for 38 years. They compared CAPM, the Fama, and French three-factor model and the Carhart four-factor model and found a higher explanatory power for Carhart four-factor model.

3. Data

Data for the mutual funds were gathered from the Morningstar database, which was founded in 1984 and contains information on various types of investments such as fixed income, equity and markets, exchange-traded funds and mutual funds. Mutual fund data contains performance measures as well as firm characteristic values.

Funds that perform poorly are likely to disappear or merge with other funds which creates a survivor bias. Using a database that contains only surviving firms results in the overestimation of performance, which according to Malkiel (1995) amounts to approximately 150 basis points. One of the major benefits of the Morningstar database is that it includes non-surviving, as well as surviving funds in its scope which makes the database survivor bias-free.

During the data gathering process, a number of filters were employed. Initially, the domicile and the global broad category group was filtered out. Since the thesis aims to evaluate the performance of equity mutual funds, domicile and the country of investment were taken as identical and the global broad category group was chosen as equity. Closed-end funds, index funds, exchange-traded funds, funds of funds, were excluded from the search results. Moreover, funds with oldest share classes were gathered. Morningstar determines funds with the oldest shares to offer funds with the most appropriate performance comparison. For mutual fund performance evaluation, monthly returns were collected. To test the relationship between fund performance and fund characteristics monthly total net assets, expense ratios and the turnover ratios of the funds were gathered. Total net assets represent the size of the fund and it is equal to total assets minus the liabilities of the fund. Expense ratios and turnover ratios are reported annually, however, Morningstar did not contain complete information on these variables for all of the sample countries.

3.2 - Summary Statistics

Table 1. Mutual Fund Data Overview

Country	Number of Funds	Average Funds	Average Monthly Return	Average TNA	Average Fund Age	Average Management Fee	Expense Ratio	Turnover Ratio
Australia	252	206	1.05	308.61	16.5	0.97	1.47	52.22
France	110	103	0.72	256.37	12.3	1.64	2.22	61.56
India	267	189	1.63	171.08	12.8	1.09	2.50	177.23
Japan	602	387	0.66	126.48	11.7	0.95	1.70	73.79
Norway	31	25	1.19	220.21	18	1.02	1.30	62.93
Switzerland	105	72	1.27	307.60	13.8	0.78	1.18	39.12
UK	291	220	0.74	703.69	18.1	0.98	1.30	83.23
US	1081	1057	0.82	2,246.12	25.2	0.70	1.08	68.12

Table 1 reports summary statistics for the sample countries. The number of funds represents the total number of funds in the dataset for a specific country between the years of 2003 and 2018. Average funds show the number of active funds among the total number of funds between 2003 and 2018. Average monthly return is reported in percentage and gross of fees. Average TNA is the total net assets and is in millions of US dollars. Average management fee, expense ratio and, turnover ratio is in percentages and reported annually. Average fund age is in years. Expenses contain 12b-1 fees, management, and administrative fees, operating costs and all other asset-based costs made by the fund. Expense ratio equals to expenses divided by TNA.

Table 1 reports the summary statistics of the finalized data. Finalized filtering resulted in a total of 2726 funds. The US has the highest number of funds and the largest average fund size. Average monthly returns are the highest in India whereas Japan has the highest difference between the total number of funds and the average number of funds in the dataset.

Morningstar provides information on investment styles of equity mutual funds under the section equity styles. These indicate whether the funds are invested in large, middle or small-sized equities and if these equities are categorized with growth, value styles, value or a blend of growth. Table 2 shows the distribution of the funds across the investment styles between the years of 2003 and 2018.

Table 2. Number of Funds per Investment Style

Name	Large Blend	Large Growth	Large Value	Mid Blend	Mid Growth	Mid Value	Small Blend	Small Growth	Small Value
Australia	68	48	45	16	12	12	8	26	17
France	33	19	9	6	13	4	8	17	1
India	37	173	5	9	32	2	3	6	0
Japan	114	144	74	49	106	26	9	70	10
Norway	0	0	0	25	0	1	3	1	1
Switzerland	31	37	0	2	24	2	4	3	0
UK	48	16	71	22	32	20	16	46	7
US	133	257	195	47	143	63	81	97	65

Table 2 reports the distribution of funds relative to their investment styles. Large, mid and small represents the averages sizes of stocks held by the mutual funds. Growth, Value, and Blend represent the characteristics of the stocks held by the mutual funds.

Furthermore, Fama and French's three factors and the momentum factor of Carhart were gathered from Kenneth R. French data library. The data library contains information on the factors starting from 1927 to the present. These factors are reported as country-specific and territory-specific. The country-specific factors are formed only for Japan and the US. The territory-specific factors are formed for European and Asia-Pacific countries. Europe factors include France, Norway, Switzerland, and the UK while Asia-Pacific factors include Australia but exclude Japan and India. European factors are used as a proxy for the evaluation of European countries mentioned above and Asia factors are used as a proxy for the evaluation of Australian returns. Factors for the evaluation of Indian mutual funds were taken from the Indian Institutes of Management, Ahmedabad and it was first used in the work of Agarwalla and Varma (2013). The data library consists of the 4 factors in the Indian equity markets starting from 1993 to date.

Table 3 reports the summary statistics and cross-correlations for the factor portfolio variables. Low correlation among the factor variables indicates that the multicollinearity among these variables is not significant. To ensure the multicollinearity did not possess any issues, multicollinearity among the factors was tested with collinearity diagnostics tests. These tests across panel sets showed that the factors did not pose any significant collinearity problem.

Furthermore, a high standard deviation of the factors returns were observed. The high standard deviation of the factor variables and the low correlation across them indicates that the substantial variation of time-series data can be explained by the factor variables. Corresponding variance inflation factors for multicollinearity tests can be found in table 6 of the appendix.

Table 3: Summary Statistics of the factor portfolios

Panel A: US

	Mean	Std	t-stat for	Cross-Correlations			
Factors	Return	Dev	Mean = 0	RMRF	SMB	HML	MOM
RMRF	0.74	3.99	2.55	1.00			
SMB	0.17	2.32	1.02	0.37	1.00		
HML	-0.01	2.44	-0.03	0.25	0.11	1.00	
MOM	0.02	4.36	0.06	-0.32	-0.07	-0.39	1.00

Panel B: Europe

	Mean	Std	t-stat for	Cross-Correlations			
Factors	Return	Dev	Mean = 0	RMRF	SMB	HML	MOM
RMRF	0.67	5.19	1.78	1.00			
SMB	0.19	1.79	1.50	-0.02	1.00		
HML	0.11	2.12	0.71	0.49	-0.03	1.00	
MOM	0.69	3.70	2.59	-0.42	-0.02	-0.44	1.00

Panel C: India

	Mean	Std	t-stat for	Cross-Correlations			
Factors	Return	Dev	Mean = 0	RMRF	SMB	HML	MOM
RMRF	1.15	7.26	2.19	1.0000			
SMB	0.49	4.67	1.44	0.1520	1.000		
HML	0.88	6.31	1.83	0.4125	0.4845	1.000	
MOM	1.51	5.94	3.51	-0.2615	-0.1246	-0.2077	1.000

Panel D: Asia

	Mean	Std	t-stat for	Cross-Correlations			
Factors	Return	Dev	Mean = 0	RMRF	SMB	HML	MOM
RMRF	0.91	5.59	2.26	1.0000			
SMB	-0.17	2.67	-0.88	0.2026	1.000		
HML	0.44	2.43	2.51	-0.1100	-0.0489	1.000	
MOM	0.80	3.44	3.22	-0.0529	-0.0467	-0.0166	1.000

Panel E: Japan

	Mean	Std	t-stat for	Cross-Correlations			
Factors	Return	Dev	Mean = 0	RMRF	SMB	HML	MOM
RMRF	0.39	4.20	1.70	1.0000			
SMB	0.28	2.52	2.05	0.0021	1.000		
HML	0.20	2.49	1.51	-0.1493	-0.3732	1.000	
MOM	0.06	3.57	0.30	-0.0731	-0.0842	-0.0337	1.000

RMRF is the market return minus one-month US Treasury Bill. SMB and HML are the returns from the Fama and French size and book to market equity portfolios. MOM is the one-year return from Fama and French momentum portfolios.

4. Results

4.1 Model Selection

Comparison of reported BIC values is shown in table 6 of the appendix. Carhart four-factor model is indeed the superior explanatory model in all 8 of the countries. BIC values indicate that inclusion of Fama and French size and value factors increase the explanatory power of CAPM greatly. On the other hand, BIC values showed that the Carhart four-factor model adds smaller explanatory power to Fama and French three-factor model than the Fama and French three-actor model adds to the CAPM.

4.2 Performance Measurement

Table 4 reports the ordinary least squares regression (OLS) results for mutual fund alphas as well as the factor coefficients. White-test for heteroskedasticity was performed for each of the 8 countries of the dataset and the null hypothesis was rejected for all of the countries. The null hypothesis of white-test indicates homoskedasticity while the alternative hypothesis indicates an unrestricted heteroskedasticity. In order to deal with heteroskedasticity, robust OLS regressions were used.

OLS results reveal, on average, an overperformance of mutual funds relative to their benchmarks. Mutual fund alphas of France are not statistically significantly different from zero. Thus, on average, French mutual funds of the dataset were not able to beat their benchmarks. Indian fund managers appear to beat their benchmarks by 50 basis points on average. Furthermore, the effects of Fama and French three factors and Carhart momentum factor on mutual fund returns are statistically significantly different than zero in all of the countries except for India.

The effect of the size portfolios, with 60 and 54 basis points, appear significantly positive in Norway and the UK. Additionally, the effect of value portfolios on returns is significantly negative for Australia. Moreover, high R^2 values are observed in all of the countries except for Japan, Norway, and Switzerland.

Table 4: Ordinary Least Squares (OLS) Regression Results and Alphas for the sample countries

			Carhart 4 Factor Model OLS Estimates					
Country	Mean Return	Std Dev	alpha	RMRF	SMB	HML	MOM	Adj R2
Australia	1.05	6.15	0.27	1.03	-0.11	-0.50	-0.02	0.83
			(17.36)	(32.08)	(-17.47)	(-7.81)	(3.97)	
France	0.72	5.83	-0.02	1.03	0.19	0.10	0.01	0.88
			(-1.39)	(38.11)	(19.32)	(11.87)	(2.13)	
India	1.63	8.11	0.50	1.05	-0.01	0.01	-0.07	0.82
			(24.41)	(41.56)	(-1.58)	(0.66)	(-14.71)	
Japan	0.66	4.83	0.07	1.00	0.18	-0.10	0.01	0.75
			(8.35)	(36.59)	(5.81)	(-22.70)	(3.09)	
Norway	1.19	7.53	0.22	1.31	0.59	-0.04	0.07	0.78
			(4.07)	(52.15	(17.39)	(-1.21)	(4.93)	
Switzerland	1.27	4.73	0.26	0.87	0.13	-0.17	5.22	0.78
			(12.22)	(27.47)	(10.39)	(-16.39)	(7.94)	
UK	0.64	5.21	0.10	0.91	0.54	-0.21	-0.07	0.81
			(6.85)	(32.85)	(12.74)	(-7.24)	(-4.53)	
US	0.83	4.58	0.05	1.00	0.25	-0.02	-0.01	0.86
			(11.60)	(72.26)	(21.18)	(-8.03)	(-1.85)	

Table 4 reports the Ordinary Least Squares (OLS) regression robust results for the sample countries between the years 2003 and 2018. The dependent variable is the monthly fund return. Mean return is the average mutual fund return for the underlying country. Alpha is the fund return gross of management fees. An alpha significantly greater than 0 is an indicator that relative countries mutual funds on average beat the market. RMRF is the factor mimicking portfolio for the excess market return. SMB is the average return from the difference between three small and three large-sized portfolios. HML is the average return from the difference between two high book-to-market and two low book-to-market portfolios. MOM is the average return between the prior year's winning and losing stocks. Numbers in the brackets represent the t-statistics values.

4.3 Fund Characteristics

The relationship between fund characteristics and fund performance was investigated using Fama-MacBeth (1973) cross-sectional regressions. Regressions were run only for the countries with feasible information on mutual fund characteristics. These countries were the US, Norway, and India. Feasibility of the data is further discussed in section 5.2 Limitations and Further Research.

Mutual fund performance corresponds to one-month mutual fund alpha. On average, for the US, a one percent increase in the fund size on prior 12 months results in a 3.13 basis points decrease in the mutual fund performance. Likewise, on average a one percent increase in the expense ratio decreases the fund performance by 7.6 basis points. Furthermore, a one percent increase in the turnover ratio decreases the fund performance by 0.06 basis points. The results show that the effect of value strategies on fund performance is not significantly different from zero while the effect of growth strategies results in an increase in mutual fund performance by 15 basis points.

Information on fund characteristic variables was not available for every mutual fund in the Indian sample. These funds with missing or inconsistent information on characteristic variables were dropped from the sample prior to the Fama-Macbeth (1973) regressions. Additionally, the information on expense ratios and turnover ratios for India are presented for 2006 and onwards. Thus, the test period for India was set between 2009 and 2018.

Results for India show a significantly negative relationship between fund size and fund performance. On average a one percent increase in an Indian fund size corresponds to a 4.2 basis points decrease on performance. Additionally, on average, a one percent increase in the expense ratio corresponds to 32 basis points of increase in fund performance. And, a one percent increase in turnover ratio corresponds to 0.2 basis points of decrease in fund performance. Similar to the US, and Norway, the effect of age on mutual fund performance is not significantly different from zero in India.

Table 5: Cross-Sectional Regressions on Mutual Fund Characteristics

Variable	US	India	Norway
TNA (Log) (t-1)	-0.0313	-0.0421	-0.1534
	(-5.66)	(-1.77)	(-1.99)
Expense Ratio (t-1)	-0.0805	0.3192	-0.2774
	(-3.08)	(3.22)	(-1.29)
Turnover Ratio (t-1)	0.0003	-0.0002	0.0013
	(2.18)	(-3.46)	(0.81)
Age	0.0009	0.0091	0.0124
	(1.24)	(1.37)	(0.84)
Blend	0.0607	-0.2016	-
	(2.47)	(-1.11)	
Growth	0.1748	-0.1057	-
	(8.34)	(-1.21)	
Value	0.0017	-0.4811	-
	(0.45)	(-1.64)	
Observations	153,096	22,110	2,564
Adjusted R^2	0.0908	0.0066	0.0145

Table 5 reports the relationship between equity mutual fund performances and their characteristics for the US, India, and Norway. The evaluation period for the US and Norway is between the years 2006 and 2018. The evaluation period for India is between the years 2009-2018. The dependent variable is one-month mutual fund alpha. TNA is in natural logarithm and lagged 12 months. TNA is the total net assets. Expense ratio and turnover ratio is in percentages and lagged 12 months. Expenses contain 12b-1 fees, management, and administrative fees, operating costs and all other asset-based costs made by the funds. Expense ratio equals to expenses divided by TNA. Age is in years. Blend, growth, and value are mutual fund investment style, dummies.

For Norway, investment styles were not compared due to the lack of distribution of investment styles across Norwegian mutual funds. Results for Norway show a significantly negative relationship between size and mutual fund performance. On average a one percent increase in mutual fund size corresponds to a 15.3 basis points decrease on monthly mutual

fund alpha. The effects of the expense ratio, turnover ratio and age on fund performance are not statistically different from zero.

5. Discussion, Limitations and Further Research

5.1 Discussion

The adjusted R^2 values for the European countries in this research are relatively lower than the R^2 values observed in the research of Otten and Bams (2002). One of the reasons for this difference is the employment of proxy factor mimicking portfolios in this research. In the research of Otten and Bams (2002), factor mimicking portfolios were constructed for each country. Moreover, the observed R^2 values for the US and Australia, which are 0.86 and 0.83 respectively, are very similar to those observed in Ferreira et al. (2013), which were 0.86 and 0.85 respectively.

The significantly positive mutual fund alphas in the UK are in line with the findings of Otten and Bams (2002) and Ferreira et (2013). Prior research showed that on average the mutual funds underperform. However, the remaining findings of this research on mutual fund alphas are contrary to the prior research of Jensen (1968), Malkiel (1995) and Carhat (1997).

With the exception of Switzerland, high mutual funds' alphas are observed in the countries with high standard deviations. Thus, the alphas are likely to correspond to the risk compensation, which is observed by the high volatility in these countries. On the other hand, Switzerland has the second-lowest standard deviation which does not indicate a risk-return relationship for the mutual fund performances. Accordingly, it is possible that the high alphas in Switzerland corresponds to stock-picking abilities of the mutual fund managers or just to pure luck. Carhart (1997) supported in his paper that the US equity fund managers did not possess the stock-picking abilities and that luck was the major force in mutual funds that beat their benchmarks.

Results regarding the effects of size and age on American fund performance in literature are in line with the results of this research. Carhart (1997) found the effect of an increase in size as negative 6 basis points on mutual fund performance while results of Chen et al (2004) and Ferreira et al. (2013) show the effect of the same increase as negative 2.8 and 6.8 basis points respectively. Furthermore, neither Chen et al. (2004) nor Ferreira et al. (2013) found a significant effect of expense ratio on mutual fund performance. Moreover, this research displays a significantly negative relationship between turnover ratio and mutual fund whereas

the aforementioned researchers do not observe a significant relationship. Additionally, the findings for the difference between value and growth funds are in the same direction but lower in scale than the findings of Chan et al. (2004), where their findings show a 1.5 percent difference between growth and value funds.

Ferreira et al. (2013) compare the mutual fund characteristics of the US mutual funds versus the non-US mutual funds while the non-US mutual funds are aggregated and taken as one category. For the non-US mutual funds, they found the effects of mutual fund size, age and expense ratio on mutual fund performance as significantly negative. Additionally, they report a significantly positive relationship between turnover ratio and mutual fund performance. In this regard, the findings of this paper on the relationship between mutual fund characteristics and mutual fund performance for Norway is only consistent regarding the effect of the expense ratio.

It should be noted that the data for expense and turnover ratio in India suffers from inconsistencies and contains missing information for the first 3 years of the sample period. Thus, the results of Indian mutual funds are not statistically reliable.

5.2 Limitations and Further Research

Limitations faced in this research were mainly due to time constraints and data restrictions. In order to evaluate the fund performances in additional countries that lie outside the proxies of Kenneth French's database such as China and Brazil, factor portfolio holdings need to be constructed. However, it is not plausible to construct the factor mimicking portfolios in a short research period. This limits the evaluation and the comparison of mutual fund performances across countries. In the future, this limitation can be solved by increasing the number of researchers or the time frame of the research.

Additionally, the data on the variables expense and turnover ratio in five of the eight countries was not feasible to test the relationship between mutual fund characteristics and mutual fund performance. The infeasibility of the data is due to missing or inconsistent information on these variables presented by the Morningstar database. Mostly, the funds in the sample countries contain 2 to 3 years of information on their expense and turnover ratios. Gathering information for fund characteristic variable from additional databases would enable further researchers to describe the mutual fund performances in the selected countries as well as enable them to compare the effects of mutual fund characteristics across countries.

Regrettably, the most comprehensive mutual fund database that could be reached for this research was Morningstar.

6. Conclusion

The 45 trillion US dollars mutual fund industry has grown more than 10 percent annually for the past 7 years and the performance of equity mutual funds continues to receive attention in the field of finance. While the research on mutual fund performance first started with Jensen (1968) more than half a century ago, the main findings showed an underperformance of actively managed equity mutual funds relative to their benchmarks.

In this research, 2726 equity mutual fund performances across 8 countries between the years 2003 and 2018 were tested using a survivor bias-free data. These countries were Australia, France, India, Japan, Norway Switzerland, the United Kingdom, and the United States. Findings showed that on average mutual funds outperformed their benchmarks in seven of the countries with the exception of France.

Secondly, the relationship between equity mutual fund characteristics and mutual fund performance was tested for the mutual funds in the US, India, and Norway. The results showed a negative relationship between fund size and fund performance in the US and Norway, and conversely a positive relationship in India. The relationship between expense ratio and fund performance was significantly negative for the US and significantly positive for India. Subsequently, the effect of turnover ratio on the fund performance was significantly positive for the US and significantly negative for India. The effect of the expense and the turnover ratio in Norway was not significantly different from zero. Consequently, the age of mutual funds did not have a significant effect on the performance of mutual funds in all of the three sample countries.

This research showed that the US funds investing in portfolios with value stocks did not experience any increase or decrease in their performances whereas, the funds that invested in growth and blend weighted portfolios were able to experience on average a 15 and 5 basis points increase in their performances. And the blend, growth and value strategies did not carry any significant effect on mutual fund performance for Indian mutual funds.

To conclude, this research provides a benchmark comparison to investors who are interested in investing in active or passive equity mutual funds in either of the eight selected countries. This research also presents up to date results to the field of finance on cross-country

equity mutual fund performance as well as an evaluation on American, Indian and Norwegian equity mutual fund characteristics.

Appendix

Table 6: Variance Influence Factors for the four factors

Factors	VIF US	VIF Europe	VIF India	VIF ASIA	VIF Japan
RMRF	1.31	1.42	1.26	1.08	1.04
SMB	1.17	1.00	1.31	1.04	1.28
HML	1.21	1.43	1.55	1.04	1.21
MOM	1.27	1.33	1.09	1.04	1.14

Table 6 reports the results of collinearity diagnostics tests. Variance inflation factors (VIF) of the four factors are displayed. Variables with VIF value of 10 and higher are considered to be a combination of another independent variable thus indicate multicollinearity. RMRF is the market return minus one-month US Treasury Bill. SMB and HML are the returns from the Fama and French size and book to market equity portfolios. MOM is the one-year return from Fama and French momentum portfolios.

Table 7: Information Criterion Values of the Performance Evaluation Models

Country	CAPM BIC Value	Fama and French 3 Factor Model BIC Value	Carhart 4 Factor Model BIC Value
Australia	196.56	189.39	189.37
France	833.09	826.63	826.62
India	192.85	193.86	192.35
Japan	343.77	339.44	338.42
Norway	27.747	25.357	25.350
Switzerland	618.42	612.65	611.67
UK	153.82	147.79	147.46
US	811.85	793.82	792.82

Table 7 reports the Bayesian Information Criterion (BIC) values of the performance evaluation models. Smaller BIC values indicate a better fit for the data. BIC values reported in thousands.

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