

6. Appendices

6.1 Summary tables of the previous studies

Table 1: Summary of studies on fund performance – manager's education relationship

Summary of studies on fund performance - manager's education relationship.*

Abbreviations: 3SLS: Three-stage least square, OLS: Ordinary least square, MDMF: Morningstar Direct Mutual Fund, TEJ: Taiwan Economic Journal, MOFD: Mutual Funds On Disk, TR: Thomson Reuters, CRSP: Center for Research in Security Prices Survivor-Bias-Free US Mutual Fund Database, MFSV I: Mutual Fund Sourcebook Volume I, NAV: Net Asset Value, MP: Morningstar Inc. Principia, UI: Undergraduate Institution

Study	Educational variables used	Results
Golec (1996)	MBA, Years of education	MBA positively correlated to risk-adjusted performance
Chevalier & Ellison (1999)	UI SAT score, MBA	UI SAT score positively correlated to risk-adjusted excess returns
Friiss & Smit (2004)	CA/CFA, MBA	Better risk-adjusted performance for CA/CFA managers compared to MBAs
Philpot & Peterson (2006)	Certification (CPA/CFA/CFP)	Certification effect is insignificant
Huang (2006)	CFA/MBA	CFA positively correlated, MBA insignificant
Gottesman & Morey (2006)	CFA, MBA, UI SAT Score, GMAT, Program rankings	Top MBA programs positively correlated
Karagiannidis (2007)	MBA, CFA, UI SAT Score	UI SAT score positively correlated to performance
Masood & Sergi (2009)	Master/Business degree, UK/US/Turkish degree	Master's degree positively related to portfolio size, number of clients and number of funds under responsibility
Hu, Yu and Wang (2012)	MBA, Domestic academic degree	Both insignificant
Kaur (2017)	CA/CFA, MBA	Positively correlated to risk-adjusted returns
Hwang, Titman and Wang (2018)	Institution SAT Score	Positively correlated to risk-adjusted returns
Tan & Sen (2019)	Diversity in the highest degree obtained, diversity in specialization field chosen	Positively correlated to risk-adjusted returns
Li, Zhang & Zhao (2011)	UI SAT score	Positively related to risk-adjusted returns

*Non-exhaustive list.

Table 2: Summary of studies on fund performance – expense ratio relationship

Summary of main studies on fund performance - expense ratio relationship.*

Abbreviations: ER: Expense ratio, IF: Incentive fee, MF: Mutual Funds when no investment objective specified, FF: Fama and French's (1993), G: Growth funds, AG: Aggressive growth funds, B: Balanced funds, EI: Equity-Income funds, GI: Growth and Income funds, SC: Small Company funds, SPM: Specialty Precious Metals funds; MPR: Mean Performance Rank, PPWM: Positive Period Weighting Measure, DE: Domestic Equity, FB: Foreign bond, MB: Municipal bond, FE: Foreign Equity, Id: Index fund; Inc: Income funds, SSD: Second degree Stochastic Dominance, SDDR: Second degree Stochastic Dominance with Risk-free rate, REMF: Real Estate Mutual Fund, MIPR: Minimum initial purchase requirement.

Study	Region	Sample Period	Type of fund	Performance measure	Results
Grinblatt & Titman (1994)	U.S.	1974-1984	MF	Jensen's α , Treynor-Mazuy, PPWM	Insignificant effect of expense ratio, MF negatively correlated
Volkman & Wohar (1995)	U.S.	1980-1989	MF	Zero-cost, value-weighted model	MF negatively correlated to performance persistence
Gruber (1996)	U.S.	1985-1994	Open/Closed-end	Monthly Four Index Alpha, Monthly return	Nonsignificant / Negatively related
Carhart (1997)	U.S.	1962-1993	Diversified Equity	Carhart's 4-factor model	Negative relation with fund performance
Porter & Trifts (1998)	U.S.	1986-1995	G, AG, B, EI, GI, SC, SPM	Annual returns, MPR	High ER positively correlated with inferior perf. persist.
Indro et al. (1999)	U.S.	1993-1995	Active equity MF	Average returns	Negative correlation with fund returns
Bers & Madura (2000)	U.S.	1976-1996	Closed-end (B, DE, FB, I	Multi-index model α	Negatively related to performance persistence
Droms & Walker (2001)	U.S.	1971-1990	Equity MF	Jensen's equation (1968)	Nonsignificant effect on fund performance
Elton, Gruber & Blake (2001)	U.S.	1990-1999	MF	Multi-index model α	IF negatively related to ER, IF funds outperforms non-IF funds
Otten & Bams (2002)	EU	1991-1998	G, Id, SC, Inc	Carhart's 4-factor model	Negative correlation with risk-adjusted performance
Jan & Hung (2003)	U.S.	1961-2000	24 categories**	SSD, SDDR	Relation depends on fund's investment objective. Globally, low expenses funds outperform high expenses funds
Nguyen (2004)	U.S.	1995-2003	Active equity MF	One-year return	Negative correlation with fund returns
Philpot & Peterson (2006)	U.S.	2001-2003	REMF	CAPM	Management fee positively related to fund returns
Haslem, Baker and Smith (2007)	U.S.	As of 12/03	DE MF	Morningstar ranking, Sharpe ratio, Jensen	Negative relation/ Nonsignificant
Sing (2007)	SG	1999-2004	DE MF	Average returns	Insignificant effect of expense ratio on returns and size
Gil-Bazo & Ruiz-Verdu (2009)	U.S.	1961-2005	Diversified DE MF	Carhart's 4-factor model α	Fund fees negatively related to funds' before fee performance
Nanigian (2012)	U.S.	As of 09/28/11	Open-end equity	Carhart's 4-factor model α	Negatively related to performance / Nonsignificant in the case of MIPR > \$100,000
Ferreira et al. (2013)	US/EU/Asi	1997-2007	Open-end active equity	Carhart's 4-factor model α	Negatively related to after-fees performance
Chou & Hardin (2014)	U.S.	1994-2006	REMF	CAPM, Carhart's 4-factor α , 8-factor model α	Insignificant effect of expenses on fund performance
Berkowitz, Schorno & Shapiro (2011)	U.S.	1999-2011	All mutual funds	Propensity score matching technique (PSM)	Expense ratio negatively related to performance persistence
Ahmad, Sun & Khan (2018)	Pakistan	2011-2016	Open-ended equity	CAPM, FF 3-factors, Carhart's 4-factors α	ER negatively strong effect on performance, MF positively weak effect on performance
Kaur (2018)	India	2004-2013	Diversified GE	Gross returns, Sharpe ratio, Carhart's 4-factors α	Mixed results, the effect depends on the performance measure used

*Non-exhaustive list.

** The 24 categories include AG, GI, BQ (high-quality bonds), BY (high-yield bonds), GB (global bonds), GE (global equity), GI, GM (Ginnie Mae funds), GS (government securities), IE (international equities), Inc, LG (long-term growth), TMF (tax-free money market fund), MG (government securities money market fund), MQ (high-quality municipal bond fund), MS (single-state municipal bond fund), MT (taxable money market fund), MY (high-yield money market fund), OI (option income), PM (precious metals), SF (sector funds), SP (special funds), TR (total return), UT (utility funds).

Table 3: Summary of studies on fund performance – past performance relationship

Summary of studies on fund performance - past performance relationship.*

Abbreviations: U.S: United-States, FR: France, DE: Germany, IT: Italy, NL: Netherlands, UK: United-Kingdom, PT: Portugal, ES: Spain, SD: Stochastic Dominance approach, PSM: Propensity score matching technique

Study	Sample period	Country	Methodology	Results
Hendrick et al. (1993)	1974-1988	U.S.	Regressions, portfolio rankings	Short-term performance persistence
Goetzmann & Ibbotson (1994)	1976-1988	U.S.	Contingency table	Short-term performance persistence (up to two years)
Carhart (1997)	1962-1993	U.S.	Portfolio rankings	Short-term performance persistence
Porter & Trifts (1998)	1986-1995	U.S.	Managers performance rankings	Underperformance persistence
Otten & Bams (2002)	1991-1998	FR, DE, IT, NL, UK	Regression, portfolio rankings	No performance persistence except for UK
Jan & Hung (2003)	1961-2000	U.S.	Stochastic dominance	Performance persistence among equity funds
Jan & Hung (2004)	1961-2000	U.S.	Contingency table, regressions	Past short-run and past long-run (prior three-years) predictive of future performance
Lin & Yung (2004)	1993-2001	U.S.	Regressions	Short-run performance persistence
Silva, Cortez & Armada (2005)	1994-2000	FR, DE, IT, UK, PT, ES	Contingency table, regressions	Performance persistence up to three years among bond funds
Xu (2005)	1990-2003	U.S.	Regressions, portfolio rankings	Performance persistence up to three years among high-quality/high-yield bond funds
Droms & Walker (2006)	1990-1999	U.S.	Contingency table	Strong performance persistence (up to four years) among fixed income funds
Eser (2007)	1962-1992	U.S.	Regressions, portfolio rankings	Short-term underperformance persistence for end of year investments, no persistence otherwise
Deb et al. (2008)	2000-2005	India	Contingency table, regressions	Short-term performance persistence
Chou & Hardin (2014)	1994-2006	U.S.	Regressions	Short-term performance persistence
Kaushik et al. (2014)	2000-2011	U.S.	Regressions, portfolio rankings	No performance persistence among healthcare funds
Kanuri et al. (2016)	1956-2012**	U.S.	Regressions	Negative performance persistence among commodity funds
Berkowitz et al. (2017)	1999-2011	U.S.	PSM, regressions	Hot-hand (icy-hand) funds are associated with higher (lower) alpha
Bosmans (2018)	2010-2016	Belgium	Contingency table, regressions	Past performance is not predictive of future performance
Gopalakrishnan & Ramakrishna (2018)	2007-2017	India	Regressions	No performance persistence

*Non-exhaustive list and complementary to Droms (2006) and Stafylas et al. (2016) summaries.

** In Kanuri et al. (2016) the sample data covers funds from their inception date until 2012. As each fund as a different inception date, we reported the inception date of the oldest fund in the sample.

Table 4: Summary of studies on fund performance – size relationship

Summary of studies on fund performance - size relationship.*

Abbreviations: BCH: Bodson, Cavenaile & Hubner (2010), PSM: Propensity Score Matching, MMF: Money market funds, PTS: Performance of trading strategies funds

Study	Sample period	Performance measure	Size-performance relationship
Gorman (1991)	1974-1985	CAPM α	Negative
Grinblatt & Titman (1994)	1974-1984	8-factor and 10-factor model α	Not statistically significant
Volkman & Wohar (1995)	1980-1989	Zero-cost value-weighted model	Medium funds outperform large and small funds
Indro et al. (1999)	1993-1995	Returns	Positive / Marginal returns decrease with size
Dahlquist et al. (2000)	1992-1997	Conditional and unconditional**	Negative except for MMF and PTS
Otten & Bams (2002)	1991-1998	Carhart's 4-factor model α	Positive
Chen et al. (2004)	1962-1999	CAPM, Carhart's 4-factor model α	Negative
Nguyen (2004)	1995-2003	Returns	Mixed results
Philpot & Peterson (2006)	2001-2003	CAPM α	Not statistically significant effect
Sing (2007)	1999-2004	Returns	Not statistically significant/Positive
Pollet & Wilson (2008)	1976-2001	Carhart's 4-factor model α	Negative
Yan (2008)	1993-2002	Carhart's 4-factor model α	Negative
Chan et al. (2009)	1998-2001	Fama-MacBeth (1973)	Negative
Reuter & Zitzewitz (2010)	1996-2009	Morningstar ratings, Returns	Not statistically significant
Bodson et al. (2011)	2000-2010	Sharpe, Treynor, single-factor α , multi-factor α , BCH ratio	Quadratic - concave
Ferreira et al. (2013)	1997-2007	Carhart's 4-factor model α	Negative for U.S. funds / Not statistically significant for non-U.S. funds
Chou & Hardin (2014)	1994-2006	CAPM, Carhart's 4-factor model, 8-factor model α	Negative
Kaushik et al. (2014)	2000-2011	FF 3-factor, Carhart's 4-factor model α	Not statistically significant
Berkowitz et al. (2017)	1999-2011	PSM	AUM positively related to start of hot-hand streaks but also to icy-hand streaks persistence
Ahmad et al. (2018)	2011-2016	Jensen α , CAPM α , FF3-factor α , Carhart's 4-factor α , Sharpe ratio, Information ratio, Sortino ratio	Not statistically significant / Negative
Kaur (2018)	2004-2013	Returns, Sharpe ratio, Carhart's 4-factor model α	Negative

*Non-exhaustive list and complementary to the summaries provided by Bodson et al. (2011) and Stafylas et al. (2016).

** Ferson and Schadt (1996).

6.2 Summary tables of studies on fund attributes – fund performance relationship by previous authors

Table 5: Stafylas et al. (2016) summary of performance persistence studies

Table 1

Performance persistence

This table presents the main characteristics and results of the studies on hedge fund performance persistence. Abbreviations: CISDM: Centre for International and Securities Markets, GMM: Generalized Method of Moments, GR: Generalized Runs Tests, HFR: Hedge Fund Research, Lipper/TASS: Tremont Advisory Shareholders Services, MSCI: Morgan Stanley Capital International, and SDI: Strategy Distinctiveness Index. Some databases (e.g. Lipper and TASS) have been merged.

Study	Sample	Methodology	Results
Agarwal and Naik (2000a)	HFR, 1982–1998	Regression, chi square, cross product ratio, Kolmogorov Smirnov	Persistence at quarterly horizon
Agarwal and Naik (2000b)	HFR, 1995–1998	Regression, cross product ratio	Persistence at quarterly horizon
Ammann et al. (2013)	Lipper/TASS and CISDM, 1994–2008	Panel probit regression	Persistence up to three years
Bae and Yi (2012)	TASS, 1994–2008	Probit regression, comparison of rankings	Persistence at least yearly
Bares et al. (2003)	FRM, 1992–2000	Regression, binomial representation, comparison of rankings	Persistence up to three months
Brown and Goetzmann (2003)	TASS, 1989–1999	Regression	Persistence at less than a year
Capocci (2009)	HFR, MAR, TASS, Barclays, 1995–2002	Regression, comparison of rankings	Persistence at less than a year
Capocci and Hubner (2004)	HFR and MAR, 1984–2000	Regression, comparison of rankings	Persistence at less than a year
Eling (2009)	CISDM, 1996–2005	Regression, chi square, cross product ratio, Spearman, Kolmogorov Smirnov	Persistence up to six months
Harri and Brorsen (2004)	LaPorte Asset Allocation, 1977–1998	Regression, Spearman	Persistence up to four months
Hentati-Kafell and Peretti (2015)	HFR, 2000–2012	Regression, GR tests	Persistence less than a year
Jagannathan et al. (2010)	HFR, 1996–2005	Regression-GMM	Persistence over three years
Joenvaara, Kosowski, and Tolonen (2012)	BarclayHedge, EurekaHedge, HFR, Morningstar and TASS, 1994–2011	Contingency table, regressions, comparison of rankings	Persistence up to one year
Koh, Koh, and Teo (2003)	EurekaHedge and AsiaHedge, 1999–2003	Cross product ratio, chi square, Kolmogorov Smirnov	Persistence up to quarter
Kosowski et al. (2007)	TASS, HFR, CISDM and MSCI, 1990–2002	Bayesian approach, bootstrap approach, regression	Persistence over a year
Park, J., Staum, J. (1998)	TASS, 1986–1997	Chi square, Spearman	Persistence at yearly horizon
Wang and Zheng (2008)	TASS, 1994–2007	Regression, SDI	Persistence up to five years

Source: Stafylas, D., Anderson, K., Uddin, M. (2016). Recent advances in hedge funds' performance attribution: Performance persistence and fundamental factors. *International Review of Financial Analysis*. 43. p. 52

Table 6: Summary of Droms (2006) on performance persistence studies

Table 1: Summary of Persistence Studies				
Authors(s) and Date	Type of Test	Number of Funds	Time Period	Results
Grinblatt and Titman (1992)	Alpha persistence; multiple benchmarks	279 U.S. equity funds	1974–1984	Performance persists
Hendricks, Patel, and Zeckhauser (1993)	Alpha persistence; multiple benchmarks	165 growth-oriented, no-load, U.S. equity funds	1974–1988	Short-term persists; strong "cold hands" persistence
Goetzmann and Ibbotson (1994)	Winner/loser; raw returns, alpha, style subgroups	276 U.S. and international equity funds	1976–1988	Winners and losers likely to repeat
Brown and Goetzmann (1995)	Alpha persistence	All U.S. equity [372 (1976) to 829 (1988)]	1976–1988	Persistent poor performance; Strong relative performance
Malkiel (1995)	Alpha persistence; investing in winners	All diversified U.S. equity [210 (1971) to 684 (1994)]	1971–1994	Funds lag benchmarks; Strong 1970s, weak 1980s
Elton, Gruber, and Blake (1996)	Alpha persistence; investing in winners	188 U.S. equity funds	1977–1993	Performance persists; past winners outperform
Carhart (1997)	Alpha persistence; investing in winners	All diversified U.S. equity funds (1,892)	1962–1993	Persistence due to common factors in stock returns and expenses
Blake and Morey (2000)	Morningstar ratings as predictors	Five U.S. equity style groups of open funds (635)	1992–1997	Low ratings predict poor performance
Droms and Walker (2001)	Raw returns; turnover; expense ratios	151 U.S. equity in continuous operation	1971–1990	Short-term performance persists
Droms and Walker (2001)	Alpha persistence; investing in winners	All int'l equity [11 (1977) to 473 (1996)]	1977–1996	Short-term performance persists
Carhart, Carpenter, Lynch, and Musto (2002)	Alpha persistence	All diversified U.S. equity funds [Total 2,071 funds: 465 (1972) to 1,370 (1995)]	1962–1995	Persistence exists but mainly due to expenses. Survivor bias weakens result
Jan and Hung (2004)	Alpha persistence	CRSP survivor-bias free data: total 3,316 over 40 years	1961–2000	Both short-run and long-run performance persists
Bollen and Busse (2004)	Alpha persistence	All U.S. equity "max cap gain," "growth" and "gr and inc" funds extant in 1985 (230 funds)	1985–1995 (new funds after 1985 not added)	Short-term performance persists, but may not be economically significant

Source: Droms, W. (2006). Hot Hands , Cold Hands : Does Past Performance Predict Future Returns ?, *Journal of Financial Planning*; 19,5: p.61

Table 7: Stafylas et al. (2016) summary of studies on performance and hedge fund size

Table 3
Performance and size factors
This table presents the main characteristics and results of the studies on performance and the size factors. Abbreviations: CAPCO: Financial Institution, CISDM: Centre for International and Securities Markets, FAV: Favorable Positioning Metric, HFR: Hedge Fund Research, Lipper/TASS: Tremont Advisory Shareholders Services, and ZCM/MAR: Zurich Capital Markets.

Study	Sample	Methodology	Results
Agarwal, Daniel, and Naik (2004)	HFR, TASS and ZCM/MAR, 1994–2000	Regression, comparison of rankings	Small funds outperform large funds
Amenc and Martellini (2003)	CISDM, 1996–2002	Regression, comparison of rankings	Large funds outperform small funds
Ammann and Moerth (2005)	TASS, 1994–2005	Regression, comparison of rankings	Small funds outperform large funds
Getmansky (2004)	TASS, 1994–2002	Regression, Monte Carlo simulations, comparison of rankings, FAV	Large funds outperform small funds
Gregoriou and Rouah (2002)	Zurich Hedge Fund and LaPorte, 1994–1999	Correlations, descriptive comparisons	No relationship
Harri and Brorsen (2004)	LaPorte Asset Allocation, 1977–1998	Regression	Small funds outperform large funds
Hedges (2003)	CAPCO, 1995–2002	Descriptive comparison of rankings	Small funds outperform large funds, but mid-size funds perform worst
Joenvaara et al. (2012)	BarclayHedge, EurekaHedge, HFR, Morningstar and TASS, 1994–2011	Cross-sectional regression, comparison of rankings	Small funds outperform large funds
Koh et al. (2003)	Eurekahedge and AsiaHedge, 1999–2003	Cross-sectional regressions	Large funds outperform small funds
Meredith (2007)	HFR, HedgeFund.net, Altvest and Barclays Global HedgeSource, 1996–2006	Comparison of rankings, Monte Carlo simulations	Small funds outperform large funds
Pertrac Corporation (2012)	BarclayHedge, Channel Capital Group, Cogent Investment Research, Eurekahedge, HFR, Lipper, MondoHedge and Morningstar, 1996–2011	Descriptive comparison of rankings	Small funds outperform large funds
Schneeweis, Kazemi, and Martin (2002)	HFR, 1996–2000	Regression, comparison of rankings	Small funds outperform large funds

Source: Stafylas, D., Anderson, K., Uddin, M. (2016). Recent advances in hedge funds' performance attribution: Performance persistence and fundamental factors. *International Review of Financial Analysis*. 43. p. 56

Table 8: Bodson et al. (2011) summary on size-performance relationship studies

Table 1: Summary of the existing literature on size-performance relationship

Authors	Period	Fund universe	Size-performance relationship	Performance measures
Agarwal et al (2004)	1994–2000	Hedge funds	Linear-negative	Returns
Cheng et al (2004)	1962–1999	Mutual funds	Linear-negative	Performance measures based on factor models
Fuss et al (2009)	2005–2006	Hedge funds	Linear-negative	Returns
Herzberg, Mozes (2003)	1990–2001	Hedge funds	Linear-negative	Returns, Sharpe ratio
Yan (2008)	1993–2002	Mutual funds	Linear-negative	α
Amenc et al (2004)	1996–2002	Hedge funds	Linear-positive	α
Liang (1999)	1992–1996	Hedge funds	Linear-positive	Returns
Ding et al (2009)	1994–2005	Hedge funds	Linear-negative (returns) Linear-positive (Sharpe ratio)	Returns, Sharpe ratio
Ammann, Moerth (2005)	1994–2002	Hedge funds	Quadratic-concave	Returns, α , Sharpe ratio
Getmansky (2004)	1994–2002	Hedge funds	Quadratic-concave	Returns
Hedges (2003)	1995–2001	Funds of Hedge funds	Quadratic-concave	α
Indro et al (1999)	1993–1995	Mutual funds	Quadratic-concave	Returns
Xiong et al (2009)	1995–2006	Hedge funds	Quadratic-concave	Returns, α , Sharpe ratio
Clark (2003)	1991–2001	Mutual funds	No correlation	Returns, risk-adjusted returns
Gregoriou and Rouah (2003)	1994–1999	Hedge funds	No correlation	Returns, Sharpe ratio, Treynor ratio
Guidotti (2009)	2003–2008	Funds of Hedge funds	No clear relation	α

Source: Bodson, L., Cavenaile, L., & Sougné, D. (2011). Does size affect mutual fund performance? A general approach. *Journal of Asset Management*, 12(3), p. 164

6.3 Summaries of Shapiro-Wilk normality tests

Table 9: Summary of Shapiro-Wilk normality tests for High and Low fund groups

		Shapiro-Wilk tests		
		2016	2017	2018
<i>High</i>				
α		RH0	FRH0	FRH0
Sharpe Ratio		RH0	FRH0	FRH0
Sortino Ratio		FRH0	FRH0	FRH0
<i>Low</i>				
α		FRH0	FRH0	RH0
Sharpe Ratio		FRH0	FRH0	RH0
Sortino Ratio		FRH0	FRH0	FRH0

Abbreviations: FRH0: Failed to reject the null hypothesis, RH0; rejected the null hypothesis.

Table 10: Summary of Shapiro-Wilk normality tests for Small and Large fund groups

		Shapiro-Wilk tests		
		2016	2017	2018
<i>Small</i>				
α		FRH0	FRH0	FRH0
Sharpe Ratio		RH0	FRH0	FRH0
Sortino Ratio		FRH0	FRH0	FRH0
<i>Large</i>				
α		FRH0	FRH0	FRH0
Sharpe Ratio		RH0	FRH0	FRH0
Sortino Ratio		FRH0	FRH0	FRH0

Abbreviations: FRH0: Failed to reject the null hypothesis, RH0; rejected the null hypothesis.

6.4 Summaries of Fisher tests

Table 11: Summary of Fisher tests for High and Low fund groups

		F-score for High-Low funds		
		2016	2017	2018
α		FRH0	FRH0	FRH0
Sharpe Ratio		RH0	FRH0	FRH0
Sortino Ratio		FRH0	RH0	FRH0

Abbreviations: FRH0: Failed to reject the null hypothesis; RH0: rejected the null hypothesis.

Table 12: Summary of Fisher tests for Small and Large fund groups

		F-score for Large-Small funds		
		2016	2017	2018
α		FRHO	FRHO	FRHO
Sharpe Ratio		FRHO	FRHO	FRHO
Sortino Ratio		RHO	FRHO	FRHO

Abbreviations: FRHO: Failed to reject the null hypothesis; RHO: rejected the null hypothesis.

6.5 Pearson's correlation matrices

Table 13: Pearson's correlation matrix for year 2016

	Expense Ratio	Size
Expense Ratio	1	-0,221
Size	-0,221	1

Table 14: Pearson's correlation matrix for year 2017

	Expense Ratio	Size
Expense Ratio	1	-0,249
Size	-0,249	1

Table 15: Pearson's correlation matrix for year 2018

	Expense Ratio	Size
Expense Ratio	1	-0,188
Size	-0,188	1

6.6 Plots of the linear regression residuals

Figure 2: Residuals vs Fitted plot and Q-Q plot of model 1 for 2016

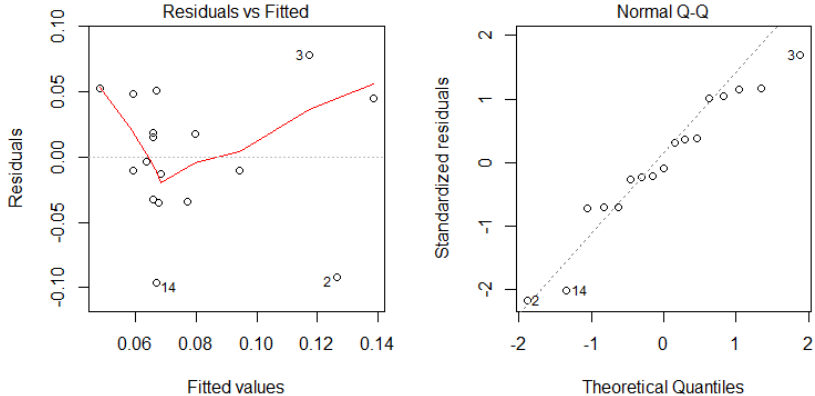


Figure 3: Residuals vs Fitted plot and Q-Q plot of model 1 for 2017

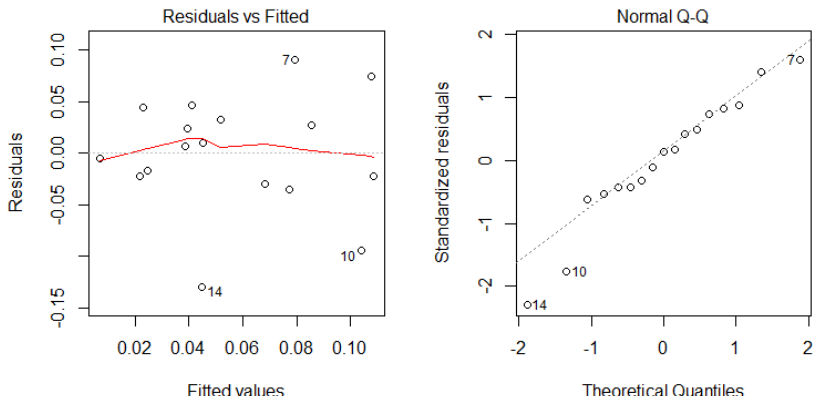


Figure 4: Residuals vs Fitted plot and Q-Q plot of model 1 for 2018

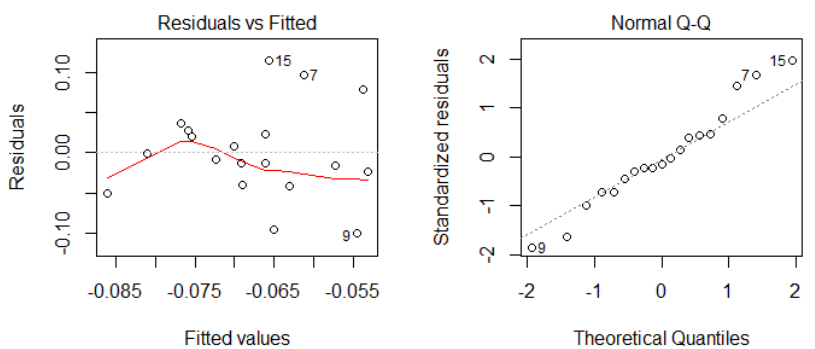


Figure 5: Residuals vs Fitted plot and Q-Q plot of model 2 for 2016

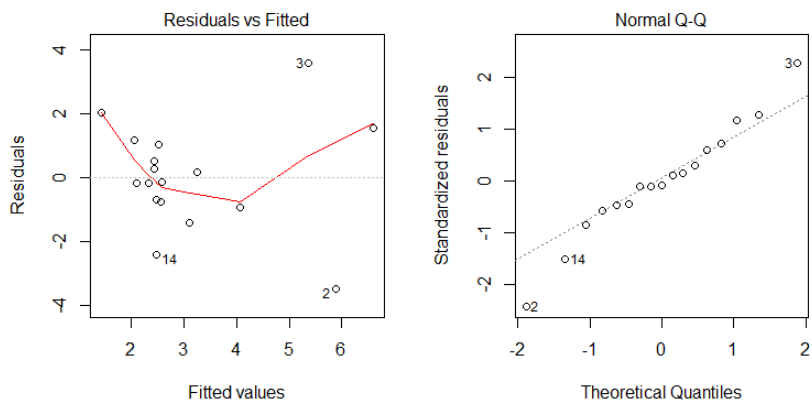


Figure 6: Residuals vs Fitted plot and Q-Q plot of model 2 for 2017

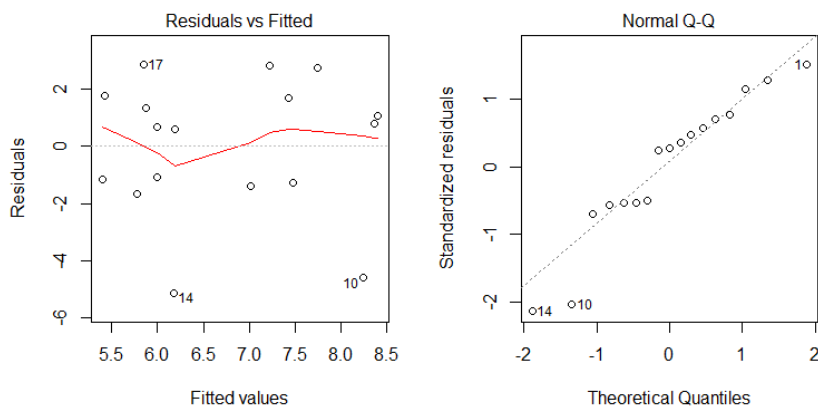


Figure 7: Residuals vs Fitted plot and Q-Q plot of model 2 for 2018

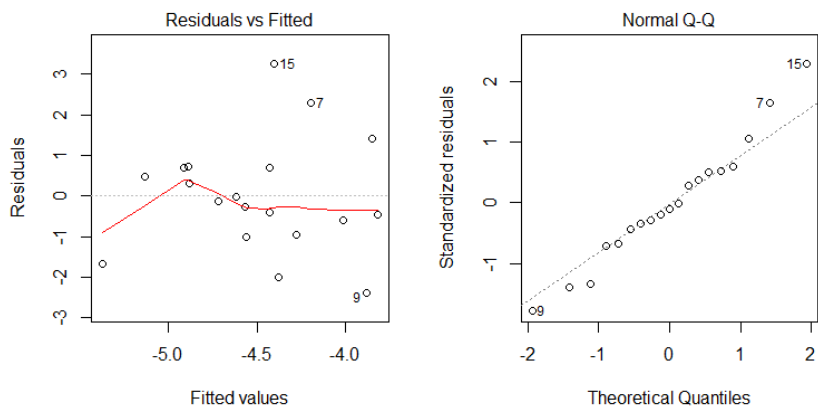


Figure 8: Residuals vs Fitted plot and Q-Q plot of model 3 for 2016

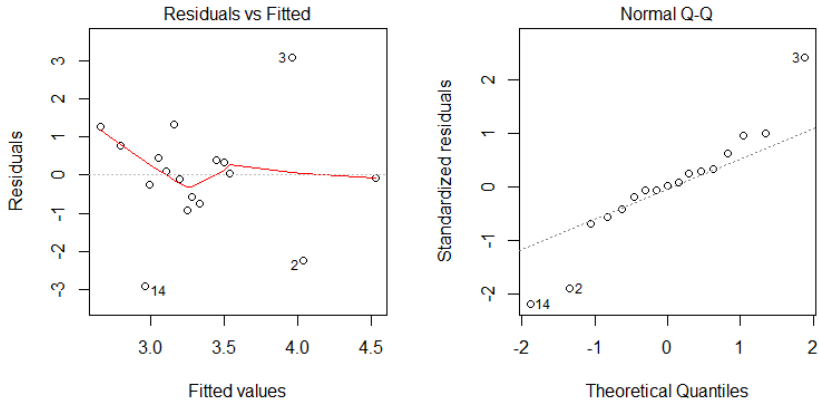


Figure 9: Residuals vs Fitted plot and Q-Q plot of model 3 for 2017

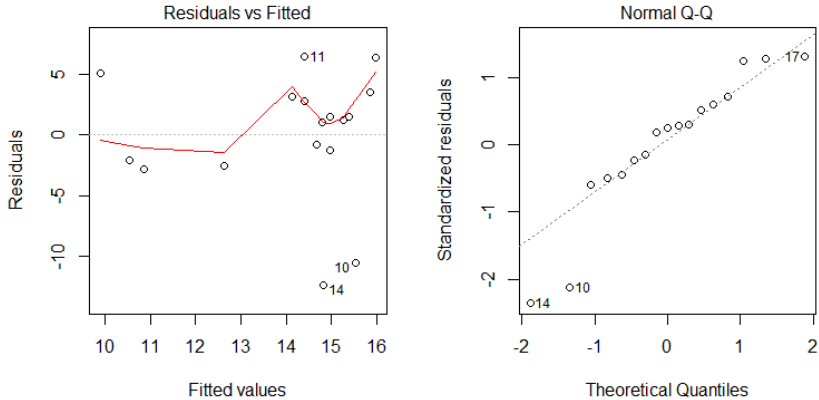


Figure 10: Residuals vs Fitted plot and Q-Q plot of model 3 for 2018

