INSTITUTO SUPERIOR DE CIÊNCIAS DO TRABALHO E DA EMPRESA

THE TIME AGGREGATION
OF SHARPE RATIO

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Abstract

More than four decades have passed and the Sharpe Ratio (SR) continues to be one of the most popular portfolio risk adjusted performance measures. We comment on Lo's (2002) results for the time aggregation of SR considering a different approach to deal with the conditional heteroskedasticity of returns. Based on a theorem proposed by Diebold (1986, 1988) we verify, for the series of financial returns with no serial correlation, that the most common method for time aggregation, the product of the higher-frequency SR by the square root of the number of periods contained in the lower-frequency holding period, can still be used in the presence of heteroskedasticity, when higher-frequency returns have been generated by a GARCH process and aggregated returns converge to the normal distribution. In an empirical application based on 65 investment funds, the convergence to normality is illustrated, showing that in 70% of the cases the convergence is held at least when daily returns are aggregated into annual frequency. Moreover, we show that serial correlation tends to disappear when the number of periods in the aggregation process tends to infinity and the most common method of SR time aggregation should not be disregarded as a valid method. The results are in accordance with Lo (2002) who roughly states that when serial correlation is not significant, the time aggregation of SR should be performed with the most common method of time aggregation.

JEL Classification: C22, C15

Keywords: Sharpe ratio, time aggregation, GARCH model, theorem of Diebold

Resumo

Mais de quatro décadas passaram e o Índice de Sharpe (IS) continua a ser uma das medidas mais populares para avaliar a relação entre o risco e a rendibilidade de carteiras de títulos. Neste artigo analisamos a distribuição não condicional do IS já deduzida por Lo (2002) e consideramos uma abordagem alternativa para lidar com a heteroscedasticidade condicional que vulgarmente caracteriza as taxas de rendibilidade dos activos financeiros. Com base num teorema proposto por Diebold (1986, 1988), e assumindo a inexistência de autocorrelação, verificamos que o método mais comum de agregação temporal, que consiste no produto entre o valor do índice resultante da frequência mais elevada (dados diários, por exemplo) e a raiz quadrada do número de períodos considerados na agregação, é ainda adequado na presença de heteroscedasticidade quando as taxas de rendibilidade de maior frequência seguem um processo GARCH e a distribuição das taxas de rendibilidade agregada convergem para a distribuição normal. Numa aplicação empírica, composta por 65 fundos de investimento, ilustramos a convergência para a normalidade, demonstrando que, em pelo menos 70% dos casos, essa convergência ocorre quando se considera a agregação anual a partir de dados diários. Adicionalmente, demonstramos que a autocorrelação tende a desaparecer quando o período de agregação tende para infinito e que, nesses casos, o método mais comum de agregação temporal do IS não deve ser desconsiderado como um método válido de agregação temporal. Os resultados estão de acordo com Lo (2002) que, resumidamente, defende a utilização do método mais comum de agregação temporal do IS quando a autocorrelação das séries de taxas de rendibilidade não é significativa.

Classificação JEL: C22, C15

Palavras-chave: índice de Sharpe, agregação temporal, modelos GARCH, teorema de Diebold

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Abbreviations

ADF	Augmented Dickey-Fuller
AR	Autoregressive
ARCH	Autoregressive Conditional Heteroskedasticity
BLUE	Best Linear Unbiased Estimators
GARCH	Generalized Autoregressive Conditional Heteroskedasticity
GBM	Geometric Brownian Motion
GMM	Generalized Method of Moment
ICI	Investment Company Institute
IGARCH	Integrated Generalized Autoregressive Conditional Heteroskedasticity
i.i.d.	Independent and Identically Distributed
LR	Likelihood Ratio
MA	Moving Average
OLS	Ordinary Least Squares
SR	Sharpe Ratio
TI	Treynor Index
US	United States of America

Commonly use Notations

P_t	Market price of a financial asset at period *t*
r_f	Risk-free rate
y_{Ft}	Return at period *t* of fund F
D	Differential return between the return on a fund and the return on a benchmark portfolio or security
$Den(0,1)$	Density with mean zero and variance one
m	Order of aggregation
$y_t(m)$	Non-overlapping *m*-period temporal aggregate of y_t
z	White noise variable
σ_t^2	Conditional variance at period *t*
σ^2	Unconditional variance
σ / s	Standard deviation
μ_t	Conditional mean of y at period *t*
μ	Unconditional mean of y
∞	Infinity
E()	Expected value
$\overset{a}{\sim} N$	Asymptotic normal distribution
ρ_k	Autocorrelation of order *k*
α, β	Parameters of GARCH model
[ ]	Vector

1. Introduction

"The performance of mutual, trust and pension funds can be quantitatively compared despite market fluctuations and different risk policies"

Treynor (1965, p. 63)

Fund performance evaluation has been the subject of debate in the academic world since studies on portfolio selection emerged in the mid of the 20th century[1]. From the portfolio analyst's view of the world, portfolio selection relies simply on a preferred combination of expected return and risk. The perception that fund performance is affected not only by expected returns but also by general market fluctuations, as well as by fluctuations in the particular securities held by a fund, led academics to conclude that risk had to be taken into account when measuring fund performance.

The question became how to choose between investment A, which has a high expected return and a relatively high risk, and investment B, which has a low expected return but is relatively safe. The answer was given by a measure of risk adjustment. First of all, the measure gave a metric that enables investors to choose between investment opportunities with different returns and associated risks and to compare the performance of portfolios with different returns and levels of risk incurred. Moreover, it can be used within organizations as a guide to management in allocating internal resources, setting compensation rules or developing strategic plans.

The first author to introduce a quantitative measure for fund performance evaluation that contemplates investment risk was Treynor in 1965. The measure, now named Treynor Index (TI), computes the excess expected fund return relatively to the return of a fixed-income fund by unit of risk, given by the volatility of the fund we want to evaluate. In his study, Treynor assumed a perfect capital market, where all securities were correctly priced and all diversified portfolios move with the market. In this context, the Treynor's concept of volatility represents the extent to which changes in the market rate of return impact the changes in the fund's rate of return, or, in other words, the systematic risk of the fund.

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[1] See, for example, the work of Markowitz on portfolio selection and of Litner and Sharpe on the Capital Asset Pricing Model.

In 1966, Sharpe (1966) took Treynor studies further and proposed the reward-to-variability ratio, later named Sharpe Ratio (SR), as a measure of fund performance. The measure gained considerable popularity and, even nowadays, is still one of the most popular portfolio performance measures. The SR is conceptually simple, easy to calculate, and considers, in contrast to the TI, the total risk in a portfolio.

Sharpe (1966), as Treynor (1965) and Mossin (1966), builds on the Markowitz mean-variance paradigm, used to build the Sharpe-Lintner Capital Asset Pricing Model, to assume that the predicted performance of a portfolio is described by the mean and variance of the rate of return. The SR, as defined in equation (1), captures both measures on a risk-adjusted excess ratio with the numerator representing the reward provided to an investor for bearing risk and the denominator representing the amount of risk actually borne by the investor.

$$SR \equiv \frac{\overline{D}}{s_D} \qquad (1)$$

where $\overline{D}$ is the average differential return between the return on fund F (y_F) and the return on a benchmark portfolio or security (y_B) between periods *t* and *T*,

$$\overline{D} = \frac{1}{T}\sum_{t=1}^{T} D_t = \frac{1}{T}\sum_{t=1}^{T}\left(y_{Ft} - y_{Bt}\right) \qquad (2)$$

and s_D is the standard deviation of D over the period[1].

This is the formulation for the *ex post* SR, which can be used for evaluating actual investment performance after the event, when decisions have been made and the results are apparent. The *ex ante* SR, defined as the expected differential return per associated unit of risk, is used to adjust expected returns, before investors take the relevant risk. While the preferences of individual investors and their choice among funds are based on expectations regarding future performance patterns, most practical implementations of SR use historical or *ex post* results to infer for the future. The assumption is that historical patterns have at least some predictive ability.

[1] Described on p. 50 in Sharpe (1994).

Whether measured *ex ante* or *ex post*, the important is to compute the SR as a differential return representing the result of a zero-investment strategy, that is, a strategy that involves a zero outlay of money in the present and that returns a positive, negative, or zero income in the future. In the particular case of funds, the differential return can be obtained by taking a long position in the fund and financing the purchase by a short position on the benchmark. In the original paper on SR, Sharpe (1966) defined the benchmark as a riskless security (equation 3). In such case, the differential return represents the payoff from a unit of investment in the fund financed by borrowing, and equals the excess return of the fund over the risk-free rate (r_f):

$$SR \equiv \frac{\bar{y}_F - r_f}{s_D} \qquad (3)$$

where $\bar{y}_F = \frac{1}{T}\sum_{t=1}^{T} y_{Ft}$.

Equation (3) is a particular case of equation (1) with y_B equal to the risk-free-rate. It is normally assumed that r_f is a constant; even if that is not the case, as Opdyke (2005) states, its variance is so small when compared to that of a typical fund that its arithmetic mean is often treated as a constant value.

Whatever formulation is used, the precision of SR estimators depends on the mean and variance of fund returns, quantities generally not observable *ex ante* and that can vary substantially over time, among portfolios and strategies. As the expected return and the variance are quantities generally not observable, if they are the population parameters of the distribution of returns, they have to be estimated using historical data and the result is an estimator for the parameter *SR*. In spite of the widespread use of this statistic, just a few authors have paid attention to the statistical properties of the SR. From those we refer Lo (2002), Vinod and Morey (2000) and Jobson and Korbie (1981). We will concentrate on the former's results.

Jobson and Korbie (1981) determine the asymptotic distribution of empirical SR and develop a statistic to test whether two SR are statistically different under the assumption of independent and identically normally distributed (i.i.d.) returns. Vinod and Morey (2000) use the various forms of the bootstrap methodology including the single, studentized and double bootstrap to construct confidence intervals and conduct hypothesis testing on Sharpe and Treynor measures. Lo (2002) derives the statistical distribution of the SR estimator using standard econometric methods under several different assumptions for the statistical behavior of the returns on which the SR is based, namely the i.i.d. and non-i.i.d. returns' assumptions.

Given the widespread use of the ratio and its dependence from returns characteristics, the thesis will briefly describe in section 2 the stylized facts of financial asset returns. These statistical properties lay the foundations for the academic debate on volatility models and are at the center of the time aggregation subject. In this framework we introduce the ARMA-GARCH model as a suitable structure to forecast and to capture the dynamics of asset returns.

Section 3 is dedicated entirely to the time aggregation subject, specially focusing on the well known theorem of Diebold that broadly states that leptokurtic densities of GARCH processes approach normality as the number of observations in the aggregated process increases, in spite of the fact that successive returns are not independent. We begin by surveying the existing literature on time aggregation of volatility models in section 3.1. Section 3.2 details the theorem of Diebold first introduced in 1986 and section 3.3 finishes the main theoretical part of the thesis by analyzing the impact of conditional heteroskedasticity on the SR time aggregation. The purpose of the research is to confirm Lo's (2002) results who broadly state that the rule of thumb, consisting in multiplying the more frequent SR by $\sqrt{m}$, where m represents the number of periods in the aggregation process, should be used when there is no significant correlation in return series. Thus, we expect to demonstrate that conditional heteroskedasticity, when higher-frequency returns follow a GARCH process and the aggregation period tends to infinity, does not affect the time aggregation of SR. Under these particular circumstances and if returns are uncorrelated, the m frequency SR should be aggregated using the rule of thumb.

Section 4 constitutes the empirical part of the thesis and intents to illustrate the order of aggregation at which it is more certain that aggregated returns converge to normality. For that purpose we will consider a sample of 65 investment funds' returns that we aggregate to different time frequencies. We will also test the accuracy of the rule of thumb for the time aggregation of SR by comparing aggregated SR with effective annual SR. We should conclude, as Lo (2002), that the rule of thumb is more accurate to aggregate SR when serial correlation of the return series is not significant.

Section 5 comments on the impact of returns stationarity assumption on time aggregation methods. Once the existence of infinitive variances in financial data appears to be a restriction to our study, we will research on the existence of unit roots and on the probability of the sample funds returns to follow an IGARCH model.

Section 6 concludes, exposes the limitations of the study and suggests topics for future research.

2. Stylized Facts of Financial Asset Returns

The accuracy of SR estimators depends on the statistical properties of returns that ultimately determine the uncertainty surrounding the estimators for the mean and variance of its distribution. This section intends to explore the main properties of asset returns and to set the pace for the later analysis on temporal aggregation of volatility models and SR estimators.

In the simplest set of assumptions that can be specified, returns are i.i.d.. This means that the probability distribution of y_s, where y_s is the asset return at date s, is identical of that of y_t, for any dates s and t, and that y_s and y_t are statistically independent for all $t \neq s$. Furthermore, the variance of returns over a long period can be derived as a simple multiple of single period variance. In this case the distribution mean and variance are constant.

Bachelier (1990) was the first author to state that market prices are unpredictable, evolving in a random order as a Brownian motion. The author, in his doctoral thesis, made the first attempt to model financial market price movement as a random walk, suggesting that the market price of a stock at period t (P_t) could be represented by the following model:

$$P_t = P_{t-1} + z_t \qquad (4)$$

where P_{t-1} is the stock market price at period $t-1$ and z_t is a random i.i.d. variable that follows a normal distribution with $E(z_t) = 0$. In the simplest case, a random walk is essentially a Brownian motion where the change in the value of a variable is unrelated to future or past changes.

Throughout the first half of the 20th century, authors such as Cowles (1933), Working (1934) and Kendall (1953) supported the theory of the market unpredictability, where changes in successive prices tend to be largely random. Cowles (1933) even states that forecasters' investments in the stock market achieve results that are not significantly different from those that would be expected to result from pure chance. The assertion seemed indisputable for apparent theoretical reasons such as theory of rational expectations and the paradigm of the efficient markets' hypothesis.

In 1959, Osborne argues that it is the difference in the logarithmic of prices between two periods, and not the prices itself, that follow a normal distribution and proposes the geometric or log-Brownian motion (GBM) to describe price changes. The assumption that stocks follow a GBM is the foundation for the Black and Scholes option price formula.

While useful, the adequacy of the GBM for deriving practical decision rules has been questioned. Much empirical work has shown that the distributions of financial time series' increments are not i.i.d. and this has been invoked to explain the discrepancies observed between actual pricing of financial options and theoretical predictions that rely on constant estimated parameters. In fact, critiques to the theory of rational expectations led to the discovery of deterministic chaos and other developments in nonlinear dynamics that allow us to question the proposition that financial returns are inherently unforecastable.

Cont (2001) pointed out that there are several universal statistical facts that are common to a wide set of financial assets from different markets. One would assume that different assets are not necessarily influenced by the same events; why should the properties of the EUR/USD exchange rate be any similar to the wheat futures? Nonetheless, from a statistical perspective, the random variations of asset returns do reveal some similar statistical properties. Such properties, common to different data sets from different markets, are called stylized empirical facts.

Regarding the dependence properties of stock returns, Cont (2001) states that there are no significant linear correlations in asset returns and stresses that this fact is often cited as a support for the efficient market hypothesis. Indeed, if linear correlation exists an investor can easily implement a risk free strategy, with positive expected returns, that would tend to reduce correlation[1]. As Cont (2001, p. 229) emphasizes, this property implies that traditional models, such as the ARMA models, "cannot distinguish between asset returns and white noise". As it will become evident in the next paragraphs, even if the distribution of returns has a constant mean, it is certainly not conditional variance independent and thus, not i.i.d..

[1] Except for intraday time scales; according to Cont (2001) the market takes around 20 minutes to react to new information.

However, the property of serial correlation has been the subject of debate in the literature and, for some authors, it is not evident that serial correlation does not exist in financial returns. Serial correlation in returns has, in fact, been modeled and studied by many. The simplest and most widely used model to deal with serial correlation is the *p*-order autoregressive model [AR(p)], that combined with the *q*-order moving average models [MA(q)], can be generalized to autoregressive moving averages [ARMA(p,q)] structures. These models have been traditionally used due to its good specification of the conditional mean and have the following specification:

$$y_t = c + \alpha_1 y_{t-1} + \alpha_2 y_{t-2} + \ldots + \alpha_p y_{p-1} + z_t + z_{t-1} + z_{t-2} + \ldots + z_{t-q} \quad (5)$$

where y_t is the return at period *t* and z_t is a white noise error at period *t*. The return at period *t* is thus a function of the *p* past realized returns (autoregressive component), the *q* past errors (moving average components) and the error of period *t*.

Other stylized facts are well-known since Mandelbrot (1963) and Fama (1965) draw attention to the non-Gaussian character of the empirical distribution of returns, finding evidence of a sharp peaked and heavy-tailed distribution[1], specially pronounced for intraday and daily data. The revealed distribution was more similar to a *t*-student, with small degrees of freedom, than with the standard normal distribution assumed by Bachelier (1900) and by Osborne (1959).

One of the consequences of the heavy-tailed distribution property is the high variability of the financial time series and the relevant probability of occurrence of violent market movements, special in the downward movement that tends to be more pronounced than the upward movements due to the asymmetric property of asset returns[2] volatility. This property, also known as the leverage or risk premium effect, reflects the fact that volatility is negatively related with returns once that when bad news reaches the market, future volatility generally increases, while if good news reaches the market it does not cause a sharp decrease in volatility. This means that bad news have a bigger impact on volatility than god news.

[1] Leptokurtosis, or excess kurtosis, is a recognized feature of asset returns distribution.
[2] Except for exchange rates where there is a higher symmetry in up/down movements.

Mandelbrot (1963) attempted to model the heavy-tailed distribution of stock returns using stable Paretian distributions[1]. However, as Ghose and Kroner (1995) argue, heavy tails in financial data are better described as being caused by temporal clustering of volatility, where large (small) price changes tend to be followed by large (small) changes of either sign. For empirical evidence of volatility clustering, see the plots of an investment fund in appendix A (figure 5).

Engle and Patton (2001) state that the implication of such volatility clustering is that volatility shocks today will influence the expectation of volatility many periods in the future; that is, despite the fact that volatility seems to follow a cyclical pattern, there seems to be a very high degree of persistence. Moreover, volatility clustering implies that volatility comes and goes: a period of high volatility will eventually give way to a more normal volatility and similarly, a period of low volatility will be followed by a rise. Thus, there is a normal level to which volatility will eventually return and long term forecasts of volatility should all converge to this level. This phenomenon is known as mean reversion of volatility. While most academics believe this is a characteristic of volatility, they may differ on the normal level of volatility and whether it is constant over time.

Volatility clustering has been captured through many model specifications, but the true revolution in modeling and forecasting volatility began in academics nearly two decades ago with the autoregressive conditional heteroskedasticity (ARCH) model introduced by Engle's (1982) seminal article. Although not introduced on the context of financial time series, the ARCH concept had pronounced effects in that area[2]. In 1992, in the comprehensive survey article, Bollerslev, Chou and Kroner (1992) cited well over 200 articles developing and applying ARCH techniques to finance. These processes do not make use of sample standard deviations; instead they permit conditional variance to vary over time, allowing p past realized innovations[3] to affect the forecast conditional variance. In different words, ARCH model allows today's variability to linearly depend on yesterday's variability, so that large changes tend to be followed by large changes, and small by small, of either sign.

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[1] Stable distributions are a generalization of the normal (Gaussian) distribution that accommodate heavy tails and skewness.

[2] Engle used the ARCH representation to model the variance of United Kingdom inflation.

[3] The model is, therefore, denoted by ARCH(p).

The ARCH model provides a general approximation to conditional heteroskedasticity of unknown form and appears to correspond reasonably well with time variances of conditional variances of several economic time-series. This dynamics in the conditional variance cause ARCH models to have fatter tails than normal and is one of the reasons of its success.

In 1986, Bollerslev (1986) generalized ARCH model and develop the generalized autoregressive conditional heteroskedasticity (GARCH) model, possibly applying the ARMA model for the conditional mean to the conditional variance. According to Diebold and Lopez (1995, p. 8), "GARCH model provides a flexible and parsimonious approximation to conditional variance dynamics, in exactly the same way ARMA models provide a flexible and parsimonious approximation to conditional mean dynamics". In fact, Bollerslev's model avoids long lag lengths of squared errors on the conditional ARCH variance equation, including lags also on the conditional variance itself.

Hence, GARCH models recognize heteroskedasticity *a priori*, incorporating in its models specifications for the time varying variance of errors. The estimation of GARCH coefficients assumes that the remaining errors are conditional normal distributed, once all heteroskedasticity is treated in the model *per se*[1].

The standard approach to deal with heteroskedasticity before Engle (1982), as Engle (1982) himself states, required the presence of a vector of exogenous variables that explained the variance. In 1980, an alternative method to deal with heteroskedasticity was available. White (1980), and later Newey and West (1987), developed covariance matrices estimates consistent in the presence of heteroskedasticity[2] that correct the ordinary least squares (OLS) standard errors. The approaches of White and Newey-West are procedures that deal with heteroskedasticity (and also serial correlation) *a posterior*; that is, they correct estimated variance of the OLS coefficients but do not interfere in the specification of the model *per se*. The advantage of these procedures is its generality, but has as a drawback its reduce power when the form of both autocorrelation and heteroskedasticity is known or can be well approximated (as with the ARMA-GARCH models).

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[1] For more on volatility models see the survey of Diebold and Lopez (1995), Poon and Granger (2003) review on volatility models and Engle and Patton (2001) requirements for a "good" volatility model.

[2] Newey-West covariance estimator is consistent in the presence not only of heteroskedasticity, but also of autocorrelation of unknown form.

3. Time Aggregation Theory

3.1 Time Aggregation of Conditional Volatility Models

Prices of financial assets are available at many frequencies. The choice of the frequency to model returns will undoubtedly affect the estimation results and will depend on the relevant horizon for risk management or portfolio management. As Christoffersen and Diebold (1997) stress, the relevancy of such a horizon must be given on a case-by-case basis since it depends of different factors such as the position in the firm (e.g., trading desk vs. CFO), motivation (e.g., private vs. regulatory), asset class (e.g., equity vs. fixed income), and industry (e.g., banking vs. insurance). Because the relevant horizon can be altered or because portfolio performance comparisons are needed, the fact is that, when modeling volatility of financial asset returns, issues about time aggregation will certainly arise and an improper use of data to make inferences to a larger time scale can be misleading.

Literature is unanimous to consider two strategies to deal with time aggregation[1]: the model can be specified for the desired frequency (assuming that it is the correct model for the desired frequency), or the model can be specified for a higher frequency and then adjusted to a lower frequency. Typically, models from the ARCH family belong to the first strategy, while models in Drost and Nijman (1993) belong to the second. The discussion of which strategy has the better forecasting capabilities is not consentaneous[2]. In this paper we will only be concerned about the last category of models for time aggregation.

The adjustment of high-frequency models to lower-frequency models, as Silvestrini and Veredas (2005) state, implicitly assume that estimated models for different frequencies should be related. For instance, a monthly model should be related to an annual model, as the latter is an aggregation of the former along the year. Therefore, not only is the annual model a function of the monthly model, but also, the monthly model is a function of the annual model. However, it makes sense to think that the monthly model should be use to infer the annual model since it contains more information, twelve times more observations than the annual model.

[1] See, for example, Diebold *et al* (1997) and Meddahi and Renault (2000).

[2] For a discussion on the subject see Christoffersen and Diebold (1997), Breuer and Jandacka (2006) and Silvistrini and Veredas (2005).

Temporal aggregation, in the context of ARMA-GARCH models, has been studied at least for the last thirty five years. ARMA models were the first to be analyzed, initially by Anemiya and Wu (1972) and then by other authors such as Weiss (1984). Anemiya and Wu (1972) show that if the original variable is generated by an AR model of order *p*, the aggregated variable will follow an AR model of order *p* with MA residuals. Weiss (1984) studies aggregation schemes for ARIMA[1] processes.

More recently, Drost and Nijman (1993) studied the impact of time aggregation upon GARCH processes. The authors show that only weak[2] GARCH processes are closed[3] under temporal aggregation and demonstrate that the classical semi-strong GARCH processes aggregate to a some weak GARCH process that is not a semi-strong GARCH. In this last case, Drost and Nijman (1993) provide temporal aggregation formulae for the GARCH(1,1) process, proving that the aggregated model holds variance parameters that generally depend on the mean, variance and kurtosis of the high frequency model and has an order that is affected by the properties of the high frequency mean equation. Suppose a sample of 1-day returns series that follows a GARCH(1,1) process defined as:

$$\begin{aligned} y_t &= \sigma_t z_t \\ \sigma_t^2 &= \omega + \alpha y_{t-1}^2 + \beta \sigma_{t-1}^2 \\ z &\sim Den(0,1) \end{aligned} \qquad (6)$$

where *Den(0,1)* is any density with mean zero and variance one and $0 < \omega \leq \infty$, $\alpha \geq 0$, $\beta \geq 0$ and $\alpha + \beta < 1$. Drost and Nijman (1993)[4] show that the *m*-day return series also follows a GARCH(1,1) process with:

$$\sigma_{(m)tm}^2 = \omega_{(m)} + \alpha_{(m)} y_{tm-m}^2 + \beta_{(m)} \sigma_{tm-m}^2 \qquad (7)$$

where:

$$\omega_{(m)} = m\omega \frac{1-(\beta+\alpha)^m}{1-(\beta+\alpha)} \qquad (8)$$

1 ARIMA models differ from ARMA models by the integration order term (I). Each integration order corresponds to differencing the series being forecast. For instance, a first-order integrated model means that the forecasting model is designed for the first difference of the original series, and so on.
2 See concept 1 in Appendix B.
3 A class of models is closed under temporal aggregation if it keeps the same structure, with possibly different parameter values, for any frequency.
4 Described on pp. 915 - 916 in Drost and Nijman (1993).

$$\alpha_{(m)} = (\beta + \alpha)^m - \beta_{(m)} \qquad (9)$$

and $|\beta_{(m)}| < 1$ is the solution of the quadratic equation,

$$\frac{\beta_{(m)}}{1+\beta_{(m)}^2} = \frac{a(\beta+\alpha)^m - b}{a\left[1+(\beta+\alpha)^{2m}\right]-2b} \qquad (10)$$

where *a* is a function of *β*, *α*, *m* and κ_y (the kurtosis of y_t) and *b* is a function of *β*, *α* and *m*.

The conclusions of Drost and Nijman (1993) continue to be strongly accepted in the finance literature and the subject continues to be studied[1].

This thesis will also focus on temporal aggregation of GARCH models, building on a well established result first introduced by Diebold in 1986. The author demonstrated that conditional heteroskedasticity disappears when the sampling time interval increases to infinity, which is to say that temporal aggregation produces gradual disappearance of volatility fluctuations and leads GARCH processes to unconditional normality, in spite of the fact that successive observations are not independent. As Diebold *et al*. (1997) underlined, Diebold's (1986, 1988) conclusions are consistent with Drost and Nijman (1993) results. Note that as $m \to \infty$, the formulae reveals that $\alpha_{(m)} \to 0$ and $\beta_{(m)} \to 0$; thus, the conditional variance tends to a constant number ($\sigma^2_{(m)tm} \to \omega_{(m)}$).

3.2 The Theorem of Diebold (1986, 1988)

Lets start by considering a GARCH(*p,q*) process for a financial return *y* at period *t* of the following form:

$$y_t = \sigma_t z_t \qquad (11)$$

where:

[1] For a complete survey on temporal aggregation of univariate time series see Silvestrini and Veredas (2005).

z_t is Gaussian white noise with $E(z_t) = 0$ and $Var(z_t) = 1$, $y_t | \Phi_{t-1} \sim Den(0; \sigma_t^2)$, $\Phi_{t-1} = \{y_{t-1}, y_{t-2}, \ldots\}$ and:

$$\sigma_t^2 = \alpha_0 + \sum_{i=1}^{q} \alpha_i \varepsilon_{t-i}^2 + \sum_{i=1}^{p} \beta_i \sigma_{t-i}^2 \qquad (12)$$

is the conditional variance equation for y_t.

Next, consider also the non-overlapping *m*-period temporal aggregate of y_t [1]:

$$y_t(m) = \sum_{i=0}^{m-1} y_{t-i}, \; t = m, 2m, 3m, \ldots \qquad (13)$$

where *m* is the order of aggregation.

According to Valkanov (2003), the use of overlapping sums of the original series might lead to inconsistent estimators and to a coefficient of determination (R^2) that does not converge to one in probability. Moreover, the use of non-overlapping returns ensures that we need not to account for the dependence that would arise if we use overlapping observations and is in accordance with the general temporal aggregation methods used in the finance theory.

For example, if y_t represents the daily returns of a fund, then the series of weekly returns corresponds to $m = 5$ non-overlapping day aggregate, where:

$$w_t = \sum_{i=0}^{4} y_{t-i} = y_t + y_{t-1} + \ldots + y_{t-4}, \; t = m, 2m, \ldots \qquad (14)$$

We are interested in the properties of aggregates as $m \to \infty$. Does $y_t(m)$ have a limiting distribution as $m \to \infty$? Standard central limit theory does not apply here because the elements of y_t are not independent. However, White (1984, 2001) developed a version of the central limit theorem that allows for dependency in the elements of y_t while guarantees its asymptotic normality. According to White (1984, 2001), greater dependence is allowed at the

[1] As defined in Diebold (1988, p. 12).

expense of imposing more rigid moment requirements: stationarity, ergodicity[1], along with restrictions on the variance and conditions on the memory of the process[2]. If these requirements are followed, Diebold (1986, 1988) showed that:

"*If a time series* y_t *follows a GARCH(p,q) process (about a possibly nonzero mean), then the aggregated series* $y_t(m)$ *has an unconditional normal distribution as* $m \to \infty$"[3].

Diebold (1986, 1988) defined the unconditional normal distribution of the aggregated series to be:

$$\sum_{i=1}^{m} y_t \overset{a}{\sim} N\left(0, m\sigma^2\right) \qquad (15)$$

where σ^2 is unconditional variance of the process:

$$\sigma^2 = \frac{\alpha_0}{\left(1 - \sum_{i=1}^{q} \alpha_i - \sum_{i=1}^{p} \beta_i\right)} \qquad (16)$$

Such theorem can be invoked so long as the process is stationary, requiring, thus, the existence of an unconditional second moment. Mathematically, weak stationarity implies that $\sum_{i=1}^{q} \alpha_i + \sum_{i=1}^{p} \beta_i < 1$, which also guarantees positive conditional (and unconditional) variances. In other words, Diebold (1986, 1988) theorem states that the *m* aggregated conditional variance (σ^2_{tm}) approaches the unconditional one (σ^2) as *m* goes to infinity ($E(\sigma^2_{tm}) \to \sigma^2$ as $m \to \infty$). In the limit, assuming no serial correlation, temporal aggregation of GARCH processes produces independent, identically distributed Gaussian white noise.

Diebold (1988) empirically tests his conclusions with weekly and monthly exchange rate returns and confirms that not only monthly exchange rates are closer to normality than weekly exchange rates, but also that they exhibit weaker ARCH effects. However, the author is not able to achieve convergence in his sample and ARCH effects were present in both cases.

[1] For details see concept 2 in Appendix B or White (2001).
[2] For details see concept 3 in Appendix B.
[3] Adapted.

Drost and Nijman (1993) also refer that convergence to normality is considered in their model of temporal aggregation but do not analyze when such convergence occurs; rather they provide formulae to aggregate GARCH models into lower frequency models.

Andersen *et al*. (1999) examine the temporal aggregation of exchange rates returns, aggregating daily returns into weekly, bi-weekly, tri-weekly and monthly returns horizons. The authors conclude for the existence of significant evidence of volatility clustering even when returns are aggregated to monthly returns.

Ghose and Kroner (1995), through Monte Carlo replications of linear GARCH models, conclude that convergence to normality is attained in the majority of the cases by the fifteenth aggregation period.

None of the cited papers are able to objectively determine the level of aggregation where returns converge to the unconditional normal distribution. Even Ghose and Kroner (1995) conclusions can be subjective; are the authors referring to 15 days, 15 months, 15 hours, or any 15 aggregation time period?

In section 4.3 we study the convergence to normality, and the pace at which volatility clustering decreases, for a sample of 65 mutual funds. The analysis of these particular financial assets will be valuable to conclude about the time aggregation of SR.

3.3 Time Aggregation of the Sharpe Ratio

The choice of the financial returns' frequency is subjective but clearly affects estimation results of the SR. Should portfolio managers sample daily, weekly or monthly returns? How can managers convert the frequency of a given series of SR into a lower frequency series?

In many situations, for purposes of standardization, comparability between strategies or data availability, SR estimates must often be converted from one data frequency to another. For example, a monthly SR cannot be comparable with an annual SR. The common practice to perform time aggregation is to multiply the higher-order SR by the square root of the number of periods contained in the lower-frequency holding period:

$$SR(m) = \sqrt{m}SR \, , \qquad (17)$$

where *m* is the order of aggregation.

According to Lo (2002), this rule of thumb is valid if returns are i.i.d., with a finite mean (μ) and variance (σ^2), and, for the non-i.i.d. returns case, if there is no significant serial correlation in the return series. Thus, from his view, only the conditional mean affects the time aggregation of SR[1] while heteroskedasticity is negligible.

In the i.i.d. assumption for the return series, Lo (2002) applies the central limit theorem[2] and the Taylor's theorem (also named Delta method) in order to obtain the asymptotic distribution of the SR estimator:

$$\sqrt{T}\left(\hat{SR} - SR\right) \overset{a}{\sim} N(0, V_{IID}) \qquad (18)$$

where $V_{IID} = 1 + \frac{1}{2} SR^2$ and $\overset{a}{\sim} N$ denotes an asymptotic normal distribution.

Nevertheless, as discussed previously, the i.i.d. assumption for the returns of financial assets is not realistic. Lo (2002) states that, under the case of non i.i.d. returns, and assuming "stationarity"[3], a version of the central limit theorem can still be applied[4] and derives, using a generalized method of moments (GMM) estimator, based on Hansen (1982) results, to estimate $\hat{\sigma}^2$ and $\hat{\mu}$, the asymptotic distribution of SR estimator that allows for forms of dependence in returns:

$$\sqrt{T}\left(\hat{SR} - SR\right) \overset{a}{\sim} N(0, V_{GMM}) \, , \qquad (19)$$

where:

---

[1] Lo (2002) states that the presence of serial correlation can overstate SR by as much as 65 percent.
[2] See White (2001, 1984) for a rigorous exposure of the Central Limit Theorem.
[3] See concept 6 in Appendix B.
[4] This is the same version of the central limit theorem that Diebold (1986, 1988) uses in his theorem.

$V_{GMM} \equiv \frac{\partial g}{\partial \theta} \Sigma \frac{\partial g}{\partial \theta'}$, $g(\mu, \sigma^2) = \frac{\mu - r_f}{\sigma}$, θ and $\frac{\partial g}{\partial \theta'}$ are vectors defined as: $\theta = \begin{bmatrix} \mu \\ \sigma^2 \end{bmatrix}$ and $\frac{\partial g}{\partial \theta'} = \begin{bmatrix} \frac{1}{\sigma} \\ -\frac{\mu - r_f}{2\sigma^3} \end{bmatrix}$.

Based on this new asymptotic distribution for the SR, the same author derives another aggregation rule:

$$SR(m) = \eta(m) SR , \qquad (20)$$

where $\eta(m) \equiv \frac{m}{\sqrt{m + 2\sum_{k=1}^{m-1}(m-k)\rho_k}}$ and $\rho_k = \frac{Cov(y_t, y_{t-k})}{Var(y_t)}$ is the *k*th-order autocorrelation of y_t[1].

Thus, if correlation is null, $\rho_k = 0$ and equation (20) reduces to equation (17).

This approach employs the Newey and West (1987) procedure to estimate the general covariance matrix (Σ), robust to the presence of both heteroskedasticity and autocorrelation of unknown form. The advantages and disadvantages of this methodology regarding the use of ARMA-GARCH models were already discussed in section 2. It is necessary only to emphasize that although Lo's (2002) estimators for σ^2 and μ allow for both conditional heteroskedasticity and serial correlation, these OLS violations are treated *a posteriori* while, as Hansen (1982) recognized, Engle's ARCH model deals with conditional heteroskedasticity *a priori*.

We adopt Diebold's (1986, 1988) results (in section 3.2), for GARCH (*p,q*) processes, as another method to demonstrate, as Lo (2002) empirically shows, that heteroskedasticity of returns, in the particular case of convergence to normality, does not affect time aggregation of SR. We will not be concerned with the eventual ARMA component of returns because this subject was already examined by Lo (2002). Thus, assuming no serial correlation, we will demonstrate that, when convergence to normality is achieved, SR estimates can be converted, by applying the rule of thumb defined in equation (17). The demonstration is simple because,

[1] The correlation coefficient between y_t and y_{t-k} is defined as the covariance between y_t and y_{t-k} divided by the square root of the product of the variances of y_t and y_{t-k}. According to Lo (2002), due to the assumption of stationarity, the variance of y_t is simply the variance of y_{t-k}.

under those particular circumstances, the distribution of the aggregated returns is the same as the distribution of i.i.d. returns. In fact, note that the *ex ante* SR, with benchmark equal to the risk free rate, is defined as:

$$SR = \frac{E[y_{Ft}(m)] - r_f(m)}{\sqrt{Var[y_{Ft}(m)]}} \qquad (21)$$

Considering equation (15) for the conditional variance[1] and assuming no serial correlation, the SR equation can be rewritten as:

$$SR(m) = \frac{m(\mu - r_f)}{\sqrt{m}\sigma} = \sqrt{m}SR \qquad (22)$$

where μ is the unconditional mean of y_t:

$$\mu = \frac{c}{\left(1 - \sum_{i=1}^{P} \phi_i\right)} \qquad (23)$$

and σ^2 is the unconditional variance defined in (16).

Equation (22) is the rule of thumb of equation (17). The same conclusions are valid when the benchmark is not equal to the risk free rate. In this later situation, the *ex ante* SR is defined as:

$$SR(m) = \frac{E[y_{Ft}(m) - y_{Bt}(m)]}{\sqrt{Var[y_{Ft}(m) - y_{Bt}(m)]}} = \frac{E[D(m)]}{\sqrt{Var[D(m)]}} \qquad (24)$$

Again, equation (24) can be rewritten as:

$$SR(m) = \frac{m[\mu_D]}{\sqrt{Var[y_{Ft}(m) - y_{Bt}(m)]}} = \sqrt{m}SR \qquad (25)$$

Lo's (2002) results (equation 20) has the advantage of allowing serial correlation in the return series that, according to Lo (2002), can overstate annual SR by as much as 65 percent. In section 4.4 we show when the rule of thumb can still be applicable to aggregate the SR into a lower frequency and we compare both aggregation rules through an empirical example.

[1] Diebold (1986, 1988) states that the unconditional mean of the normal distribution, as the aggregation period tends to infinity, approaches zero. However, for notation purposes, we will use the standard formula for the unconditional mean (μ) that, in the long run, should converge to zero.

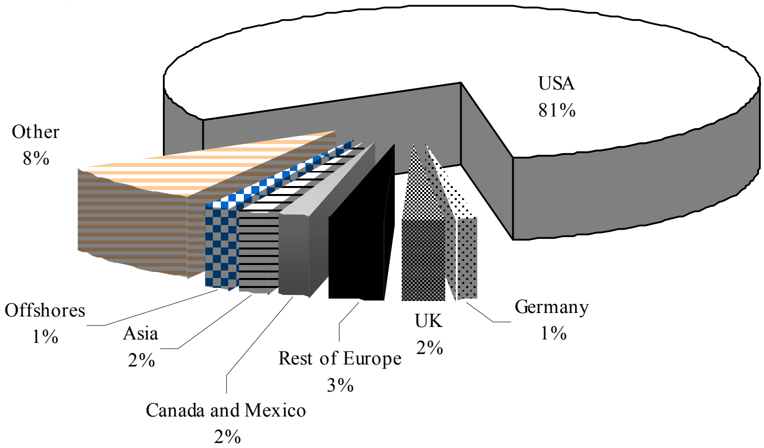
4. Empirical Application

4.1 Sample Description

The data was obtained from Bloomberg and represents all funds, available in that database, with historical daily information of at least 30 years back from 31 December 2006. The resulting sample is thus constituted by 65 of the most common type of investment companies, the open-end mutual fund[1] and one fund of fund. The funds detailed descriptions, as well as its main characteristics at the end of the year of 2006, are exhibited in tables 5 through 9 of appendix A.

In brief, roughly 81% of the total fund assets are allocated in the United States of America (US) market, 6% in the European and 2% in the Asian market; the vast majority of funds (approximately 84%) are incorporated in the US and the remaining in Europe. The apparent high relevance of the US market can be explained by the age of the sample funds: 30 years or more. Although Europe, in particular Great Britain, was the place birth of the mutual fund industry in the 19th century, the first open-end mutual fund, as it is now known, appeared in 1924 in Boston (The Massachusetts Investment Fund) and throughout the 20th century the industry in the US has flourished, specially in the 90s[2].

Figure 1 – Geographical allocation of total fund assets

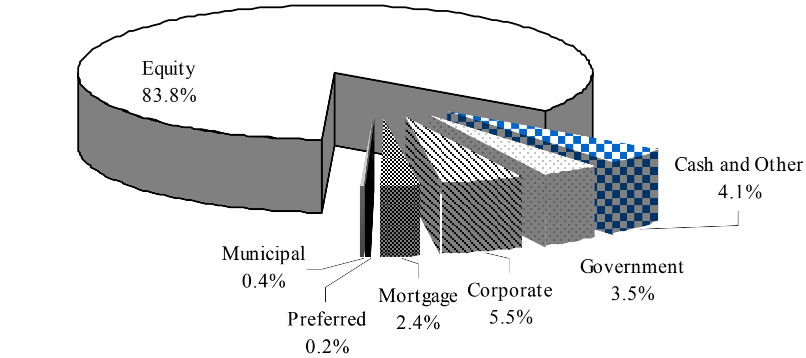


Regarding asset allocation, the funds are mainly interested in equity investments (84%), with bonds representing 12% of investments and cash 4%. This breakdown is not consistent with

[1] See concept 7 in appendix B.
[2] Pozen (1998).

the one presented by the national association of US investment companies, or the Investment Company Institute (ICI) for the beginning of the 21st century. At the end of 2006, ICI reported that 48% of worldwide assets were equity, 18% Bond and 18% were invested in the money market[1]. Again, it must be noted that, in 1970, two years after the average initial date of the sample funds, 94% of funds were equity funds[2] which seems to imply that the sample funds' nature did not evolved over the decades.

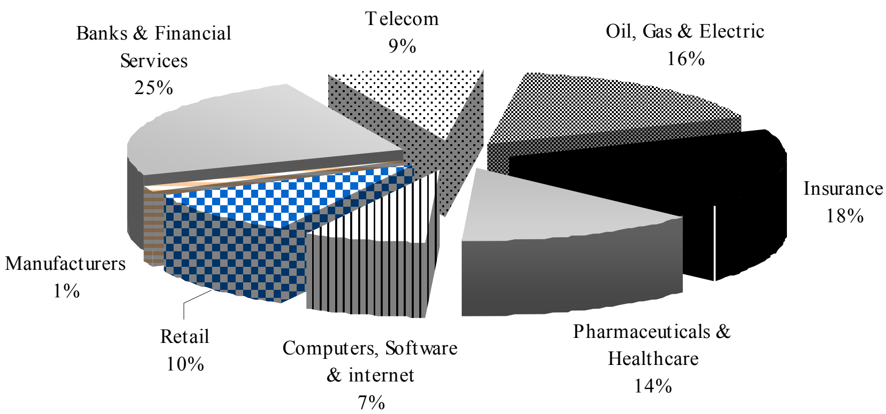
Figure 2 – Asset allocation of total fund assets



The categories "Municipal", "Preferred", "Mortgage", "Corporate" and "Government" represent types of bonds. In total, at the end of 2006, the sample funds invested approximately 12% in bonds.

Figure 3 evidences that investments occur in miscellaneous activity sectors; the sector with the highest investment is the "banks and financial services" (25%), followed by Insurance (18%) and "oil, gas and electric" (16%).

Figure 3 – Sector allocation of total fund assets



The "Other" category, observed in table 8 of appendix A, was excluded from this the analysis. It represents the information not available at Bloomberg regarding sector allocation.

[1] ICI (fourth quarter 2006).
[2] ICI (1996).

From Bloomberg we extracted the closing price of the sample funds with four different frequencies: daily, weekly, monthly and quarterly frequencies. We shall denote by return of a mutual fund the relative variation of its logarithmic closing price between two dates *t* and *t+T*, as defined by Osborne (1959). The return at time horizon *T* is then defined as:

$$y_T = \ln P_{t+T} - \ln P_t \qquad (26)$$

where P_t is the closing price of a sample fund at time *t*.

The resulting return series of the funds were then aggregated into non-overlapping *m*-day returns as presented in equation (14). Daily returns were aggregated into weekly, monthly, quarterly, semi-annual and annual returns for each fund. Similarly, weekly returns were aggregated into monthly, quarterly, semi-annual and annual returns; monthly returns into quarterly, semi-annual and annual returns; and quarterly returns into semi-annual and annual returns. The goal is to infer the optimal frequency to use in order to achieve the convergence to normality of returns.

4.2 Expected Results

According to the conclusions of Diebold (1986, 1988), we would expect that convergence to normality, and the consequent fading of heteroskedasticity, would be evident as returns are aggregated into lower frequency models and that evidence would be emphasized when we use the higher initial frequency for returns, i.e., we expect evidence of normality to be greater for annual aggregated returns series than, for example, for monthly aggregated returns. Also, it is expected that, for the same level of aggregation, annual returns aggregated through daily returns series exhibit higher convergence to normality than annual returns aggregated through quarterly returns series.

Once serial correlation is also likely to exist in the sample return series, the study will also analyze the behavior of serial correlation as returns are aggregated into lower frequency series.

Notice that this study does not intend to replicate everyday knowledge, but has the objective to conclude about the ideal timing for the convergence to normality to occur. It is expected that convergence occurs, at least, when daily returns are aggregated to annual ones; in this particular case the order of aggregation (parameter *m*, in equation 14), is about 252 observations.

4.3 The Pace of the Convergence to Normality

The conclusions of Diebold (1986, 1988) can be very useful in the analysis of temporal aggregation if one could determine the level of aggregation where returns converge to the unconditional normal distribution. The normal distribution has interesting properties that can simplify the analysis of temporal aggregation and resolve some problems that occur when the high frequency model does not fall into the family of models covered by Drost and Nijman. Diebold (1986, 1988) refers that the convergence to normality is attained when the aggregation period tends to infinity. Can we define the infinity? Is normality achieved when we aggregate daily frequency to monthly or quarterly frequency? Or is it impossible to determine when aggregation produces normality distributed returns? This section will attempt to answer these questions.

Table 1 summarizes the basic statistical properties of returns for the different considered series[1]. The average of the means of the sample funds' returns is positive for all series and increases with the frequency of the data and with the temporal aggregation of returns. The distribution of returns is asymmetric, as reflected by the negative skewness[2] estimates in all series, and generally tends to decrease both with the frequency of the data and with the temporal aggregation of returns. An interesting trend is evident from the table: the higher the initial frequency of the data, the lower, in absolute value, is the estimated skewness of the aggregated series. Notice, for instance, in the annual aggregated data, the skewness value is more near zero (symmetric case) for the series that have been generated with daily frequency.

[1] For detailed results see tables 10 through 27 in appendix A.
[2] See concept 4 in Appendix B.

Table 1 – Summary statistics for the returns of the sample funds

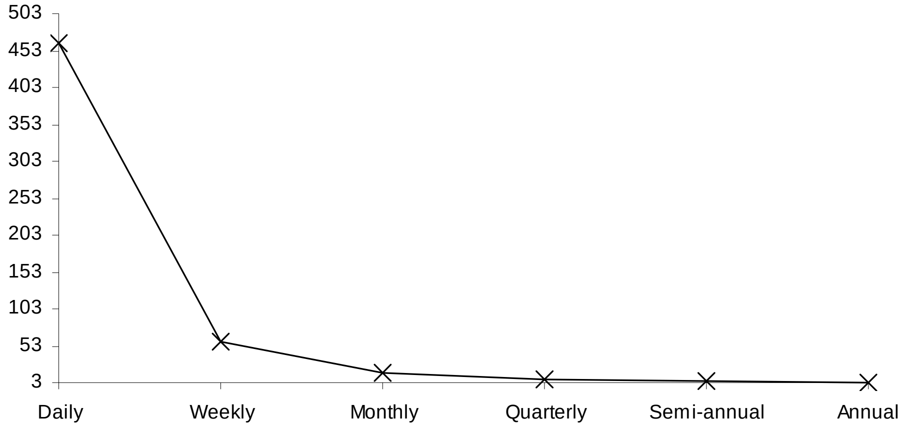
DATA		No aggregation	Weekly aggregation	Monthly aggregation	Quarterly aggregation	Semi-annual aggregation	Annual aggregation
Daily	Average Mean	0.01	0.05	0.23	0.68	1.38	2.76
	Maximum	27.56	13.74	16.34	24.56	33.84	36.14
	Minimum	-41.23	-29.03	-33.75	-38.62	-37.12	-39.54
	Average skewness	-5.25	-2.49	-1.40	-0.88	-0.35	-0.37
	Average kurtosis	462.55	58.17	16.77	7.31	4.90	3.57
Weekly	Average Mean	0.05		0.22	0.67	1.34	2.68
	Maximum	13.22		16.57	24.56	34.33	34.81
	Minimum	-30.82		-32.90	-38.39	-37.49	-39.12
	Average skewness	-2.85		-1.38	-0.84	-0.36	-0.44
	Average kurtosis	67.06		16.80	7.32	5.09	3.69
Monthly	Average Mean	0.23			0.68	1.36	2.72
	Maximum	17.34			22.88	30.48	33.57
	Minimum	-33.43			-39.01	-36.22	-38.74
	Average skewness	-1.41			-0.99	-0.51	-0.58
	Average kurtosis	17.55			7.98	5.04	3.62
Quarterly	Average Mean	0.65				1.29	2.58
	Maximum	24.65				31.57	37.31
	Minimum	-40.90				-45.64	-51.00
	Average skewness	-0.97				-0.75	-0.74
	Average kurtosis	7.80				5.45	4.16

The table summarizes the basic statistics for the return of the sample funds. The lines "Average mean", "Maximum" and "Minimum" are in percentage (i.e, 1 represents 1% return). The skewness is a measure of asymmetry of a distribution around its mean. A negative (positive) skewness implies that the distribution is spread more to the left (right) of the mean and a value of zero implies that the distribution is symmetric. Kurtosis is a measure of the peakedness or flatness of a distribution; the kurtosis of the normal distribution is 3. Distributions with high (low) kurtosis are more peaked (flatter) than the normal distribution.

Similar conclusions can be withdrawn for the kurtosis[1] value. We would expect that the sample time series presented kurtosis higher than 3 (the kurtosis of a normal distribution is 3) and that it would approach 3 as frequency is lowered or the level of aggregation is increased. Figure 4 corroborates the expected results by graphically showing, for the time series created from daily time series aggregation, the monotonically drop of kurtosis as the aggregation level increases until the value of 3.57. Table 1 also shows that kurtosis value is lower when series are aggregated from higher frequency time series; the lowest value is obtained when returns are aggregated through the daily frequency time series.

[1] See concept 5 in Appendix B.

Figure 4 – Average kurtosis of the daily aggregated time series returns



The figure exhibits the downward trend of the kurtosis for the time series returns constructed from daily returns. The *x* axis shows the level of aggregation and the *y* axis the value of kurtosis. The kurtosis of the normal distribution is 3.

Although interesting, these conclusions, *per se*, are not sufficient to conclude for the normality of returns of the annual aggregated daily series. Formal normality tests were computed for each time-series of funds. Table 2 summarizes the performed normality tests results[1], exhibiting the number of funds that, according to the Jarque-Bera, Cramer-von Mises and Anderson-Darling statistics, do not reject the normal distribution with significance levels of 1%, 5% and of 10%.

These tests corroborate the empirical findings of table 1. As expected, the table illustrates that, for a given initial frequency of the series, the higher the level of aggregation, the higher the number of funds that do not reject normality for the 10% significance level[2]. Moreover, in general terms, for the same level of aggregation, the higher the initial frequency of the series, the higher the number of funds that do not reject normality for the 10% significance level. This is true for the majority of the cases when data is aggregated into a semi-annual or annual frequency. In fact, considering the Anderson-Darling test, if data is aggregated into a semi-annual frequency trough an initial daily series, 70.8% (90.8%) of the sample funds do not reject normality for the 10% (1%) level of significance while if the semi-annual series was obtain trough an aggregation of quarterly series only 23.1% (21.5%) of the sample funds do not reject normality for the 10% (1%) level of significance. This represents a 47.7 basis points improvement on results depending on the initial frequency of data; for the annual

[1] For detailed results see tables 10 through 27 in appendix A.
[2] The only exception occurs for the Cramer-von-Mises test when the monthly frequency is aggregated into the annual frequency.

aggregated series the improvement is of 26.2 basis points when using daily frequency instead of quarterly frequency. Similar conclusions can be taken for the Jarque-Bera and the Cramer-von-Mises tests for both aggregation cases.

Table 2 – Summary results for the normality tests performed in the temporal aggregated series of funds returns

	# sig 1%	# sig 5%	# sig 10%	%	# sig 1%	# sig 5%	# sig 10%	%	# sig 1%	# sig 5%	# sig 10%	%	# sig 1%	# sig 5%	# sig 10%	%
	DAILY data				**WEEKLY data**				**MONTHLY data**				**QUARTERLY data**			
No aggregation																
Jarque-Bera	0	0	0	[0]	0	0	0	[0]	0	0	0	[0]	4	4	3	[4.6]
Cramer-von Mises	0	0	0	[0]	0	0	0	[0]	1	0	0	[0]	10	3	2	[3.1]
Anderson - Darling	0	0	0	[0]	0	0	0	[0]	1	0	0	[0]	7	2	2	[3.1]
Weekly aggregation																
Jarque-Bera	0	0	0	[0]												
Cramer-von Mises	0	0	0	[0]												
Anderson - Darling	0	0	0	[0]												
Monthly aggregation																
Jarque-Bera	0	0	0	[0]	0	0	0	[0]								
Cramer-von Mises	0	0	0	[0]	0	0	0	[0]								
Anderson - Darling	0	0	0	[0]	0	0	0	[0]								
Quarterly aggregation																
Jarque-Bera	5	3	1	[1.5]	9	6	2	[3.1]	6	6	5	[7.7]				
Cramer-von Mises	7	2	2	[3.1]	11	4	3	[4.6]	13	7	5	[7.7]				
Anderson - Darling	4	3	2	[3.1]	8	5	3	[4.6]	12	8	5	[7.7]				
Semi-annual aggregation																
Jarque-Bera	37	32	25	[38.5]	39	67	32	[49.2]	40	35	31	[47.7]	28	19	14	[21.5]
Cramer-von Mises	53	41	36	[55.4]	57	82	37	[56.9]	47	37	31	[47.7]	44	30	16	[24.6]
Anderson - Darling	59	48	46	[70.8]	53	75	31	[47.7]	46	36	28	[43.1]	43	25	15	[23.1]
Annual aggregation																
Jarque-Bera	55	52	49	[75.4]	53	94	46	[70.8]	55	52	49	[75.4]	46	41	35	[53.8]
Cramer-von Mises	59	49	44	[67.7]	57	88	43	[66.2]	51	40	27	[41.5]	52	38	28	[43.1]
Anderson - Darling	59	48	46	[70.8]	57	87	41	[63.1]	57	38	31	[47.7]	49	33	29	[44.6]

The table summarizes the normality tests performed for the time-series of fund's returns, exhibiting the number of funds that, according to the Jarque-Bera, Cramer-von Mises and Anderson-Darling statistics, do not reject the normal distribution with significance levels of 1%, 5% and of 10%. The numbers in [ ] represent the number of funds that do not reject the normal distribution, with levels of significance of 10%, in percentage of the total sample funds (i.e, 1 represents 1% of 65 funds).

An additional battery of tests was performed for the several returns series with the intention of analyzing the behavior of ARMA-GARCH effects throughout the aggregation process. The main objective is to confirm the expectations of gradual disappearance of volatility clusters as returns series are aggregated into lower frequency and to analyze the behavior of serial correlation.

Table 3 exhibits the main results of the analysis[1]. The Ljung-Box Q-statistic was performed to test the null hypothesis of no autocorrelation up to the twelfth order. In the cases were autocorrelation was present, an ARMA model was estimated to account for the specific

[1] For detailed results see tables 28 through 45 in appendix A.

autocorrelation of the series. The lag order selection for each specific estimated ARMA model was chosen according to the Akaike and the Schwarz information criterions. Afterwards, the ARCH-LM and the Ljung-Box Q^2-statistics were computed to assess the null hypothesis of no ARCH effect up to the twelfth order in the squared residuals.

Table 3 – Summary results for the tests performed on presence of serial correlation and autoregressive conditional heteroskedasticity in the residuals of the temporal aggregated series of funds returns

	# sig 1%	# sig 5%	# sig 10%	%	# sig 1%	# sig 5%	# sig 10%	%	# sig 1%	# sig 5%	# sig 10%	%	# sig 1%	# sig 5%	# sig 10%	%
	Daily frequency				**Weekly frequency**				**Monthly frequency**				**Quarterly frequency**			
No aggregation																
Ljung-Box Q	7	5	5	[7.7]	39	28	18	[27.7]	47	38	32	[49.2]	60	57	54	[83.1]
ARCH-LM	22	20	20	[30.8]	32	30	28	[43.1]	37	32	31	[47.7]	56	51	50	[76.9]
Ljung-Box Q2	20	20	19	[29.2]	30	25	25	[38.5]	32	32	29	[44.6]	49	45	44	[67.7]
Weekly aggregation																
Ljung-Box Q	39	31	24	[36.9]												
ARCH-LM	26	25	25	[38.5]												
Ljung-Box Q2	24	24	24	[36.9]												
Monthly aggregation																
Ljung-Box Q	49	35	29	[44.6]	45	38	32	[49.2]								
ARCH-LM	40	37	34	[52.3]	36	34	31	[47.7]								
Ljung-Box Q2	39	35	34	[52.3]	36	31	29	[44.6]								
Quarterly aggregation																
Ljung-Box Q	59	54	53	[81.5]	56	55	54	[83.1]	56	50	47	[72.3]				
ARCH-LM	53	51	49	[75.4]	54	52	46	[70.8]	61	59	57	[87.7]				
Ljung-Box Q2	50	46	44	[67.7]	50	47	44	[67.7]	57	56	53	[81.5]				
Semi-annual aggregation																
Ljung-Box Q	58	49	42	[64.6]	53	42	35	[53.8]	58	52	46	[70.8]	61	61	57	[87.7]
ARCH-LM	63	60	59	[90.8]	62	55	55	[84.6]	62	59	56	[86.2]	60	58	56	[86.2]
Ljung-Box Q2	58	58	55	[84.6]	61	56	52	[80.0]	62	57	53	[81.5]	62	59	56	[86.2]
Annual aggregation																
Ljung-Box Q	65	64	63	[96.9]	65	64	64	[98.5]	64	62	60	[92.3]	65	64	61	[93.8]
ARCH-LM	65	65	64	[98.5]	64	64	62	[95.4]	65	64	64	[98.5]	65	63	63	[96.9]
Ljung-Box Q2	65	65	65	[100]	65	65	65	[100]	64	64	64	[98.5]	65	65	64	[98.5]

The table summarizes the tests performed on the presence of serial correlation and autoregressive conditional heteroskedasticity in the residuals**,** exhibiting the number of funds that, according to the Ljung-Box Q, do not reject the null of no serial correlation up to the twelfth lag and that, according to the Ljung-Box Q^2 statistics and the ARCH-LM, after an ARMA model was estimated to account for the specific autocorrelation of the series, do not reject the null of no ARCH effect up to the twelfth lag with significance levels of 1%, 5% and of 10%. The numbers in [ ] represent the number of funds that do not reject the null, with levels of significance of 10%, in percentage of the total sample funds (i.e, 1 represents 1% of 65 funds).

It is clear, from table 3, that the vast majority of the annual aggregated series (more than 92% of total funds for all test statistics) do not reject the hypothesis of absence of serial correlation and of heteroskedasticity at a significance level of 10%. This is true whichever the base frequency of the aggregated series was considered. Notice that, according to the Ljung-Box Q^2 statistic, more than 98% of the series of fund returns demonstrated, with significance levels of 10%, no signs of conditional heteroskedasticity up to the twelfth lag in its square residuals for all the annual aggregated series (the percentage for the ARCH-LM test is of more than 95%). Regarding serial correlation, the results are also conclusive, with the computed Ljung-Box Q statistic showing that more than 92% of the series of fund returns demonstrate, with significance levels of 10%, no evidence of serial correlation up to the twelfth lag in the residuals of all annual aggregated series. The pattern of gradual disappearance of serial correlation and conditional heteroskedasticity in returns series as data is aggregated is also evident in every series.

Considering only the presence of ARMA-GARCH effects in the aggregated series of returns, the formal tests performed indicate that the choice of the initial frequency, from which the returns will be aggregated, does not significant affect the tests results. Moreover, whichever the frequency chosen, the evidence for the non presence of serial correlation and of heteroskedasticity is enormous for the annual aggregated series, with percentages of funds that do not reject the null above the 92% for each test and for a level of significance of 10%.

Although the tests for the presence of ARMA-GARCH effects in the aggregated series of returns conclude for the indifference of the frequency to use in order to attain converge to normality, the test for the normality of the same series, as described above, conclude that daily frequencies should be employed to secure the convergence to normality. Thus, we can conclude with confidence that convergence to normality is attained for the vast majority of the cases (above 70% of the sample funds for each of the three considered test statistics) at least when we employ daily returns to construct annual aggregated returns.

4.4 Time Aggregation of the Sharpe Ratio

We have empirically demonstrated, in the previous section, that returns converge to normality in more than 70% of the cases, when daily returns are aggregated into annual returns. Notice that not only does conditional heteroskedasticity decline over the aggregation period, but also serial correlation. As the serial correlation is not so strong in daily returns (the autocorrelation coefficients in spite of being near zero are statistically significant due to the high dimension of the samples) we are not sure that the time aggregation performed with equation (20) produces better results then equation (17). Our uncertainty does not contradicts Lo's (2002) results, but emphasizes the fact that when serial correlation is not significant the rule of thumb must not be disregarded as a valid method to time aggregate the SR.

In order to verify the accuracy of this conclusion we performed another empirical application. We compute the real annual SR for our sample of 65 funds and compare the results with the aggregated SR series estimated from daily, weekly, monthly and quarterly returns and estimated according with the discussed aggregation methods: Lo (2002) for serial correlation (equation 20) and the rule of thumb (equation 17). We consider r_f to be constant and equal to the average of 3-month treasury bill for the longer period available, from 1954 to 2006[1]. The series were then compared, as exhibit in table 4, with the Mann-Whitney test for the equality of distributions and with the t-test for the equality of means; the correlation between the estimated annual series of SR and the real annual SR was also computed.

Table 4 – Summary results for the comparison of SR aggregation methods with annual SR

	Aggregation Method			
	$\sqrt{m}SR$		$\eta(m)SR$	
	statistic	prob	statistic	prob
Daily frequency				
Mann-Whitney Test	1,895	89.27	1,487	2.97
t-test	-0.39	69.84	-2.57	1.18
correlation	0.89		0.90	
Weekly frequency				
Mann-Whitney Test	1,835	89.61	1,389	1.58
t-test	-0.30	76.28	-2.33	2.16
correlation	0.94		0.94	
Monthly frequency				
Mann-Whitney Test	1,876	81.82	1,873	80.66
t-test	0.11	91.11	-0.07	94.26
correlation	0.96		0.96	
Quarterly frequency				
Mann-Whitney Test	1,579	79.65	1,453	33.11
t-test	0.26	79.88	-0.71	47.67
correlation	0.98		0.96	

Annual SR were computed from daily, weekly, monthly and quarterly returns from two aggregation methods: Lo's (2002) aggregation method for non i.i.d. returns (equation 20) and the aggregation method for i.i.d. returns (equation 17). The table exhibits the results of the tests performed on the equality of means (t-test) and on the equality of distributions (Mann-Whitney test) of both aggregation methods with the real annual SR series computed from annual returns.

The Mann-Whitney test is a nonparametric test that assesses whether two samples of observations come from the same distribution. The null hypothesis assumes that the two samples are drawn from a single population, and therefore that their probability distributions

[1] The use of a time series for the risk free interest rate does not alter the results.

are equal. By selecting a nonparametric test, we avoided assuming that the data was sampled from a Gaussian distribution with the same variance.

The tests show that Lo's (2002) SR series do not reject the hypothesis of equality of means and distributions when monthly or quarterly returns are used to aggregate the SR into an annual frequency and that equation (17) do not reject the hypothesis of SR equality of means and distribution whatever frequency of returns are used to aggregate the SR into an annual frequency. Thus, in these cases, equation (17) seems to be more accurate to aggregate SR into an annual frequency when daily or weekly returns are used; for monthly and quarterly returns the aggregation method seems to be indifferent. Regarding quarterly and monthly returns, this fact can be explained by the non existence of significant serial correlation on the return series. As for daily and weekly frequencies, despite the fact that the original series exhibits serial correlation for the majority of the funds, we showed that aggregated returns exhibits no significant serial correlation, leading to the conclusion that when aggregation produces normal distributed series, the rule of thumb should be used.

5. Special Case of Infinite Variances

"While the general properties of volatility remain elusive, perhaps the most intriguing feature revealed by empirical work on volatility is its long persistence. Such behavior has sparked a search, almost akin to that for the Holy Grail, for the perfect GARCH model …"

Andersen and Bollerslev (1997, p. 976)

In section 2 we presented volatility persistence or long memory as a stylized statistical fact recognized in finance theory. In fact, empirical studies, such as Fama (1965) and Engle and Bollerslev (1986), found evidence of high, if not infinitive, variance in financial data suggesting a long-run dependence in the financial returns' volatility. In these circumstances standard ARCH models are said to poorly capture the long-run dependence of volatility because they assume weakly stationary returns and finite variances, that is, they assume that shocks to the second moment of the returns die out at a very fast rate. As an alternative, it was suggested by Engle and Bollerslev (1986) the use of the integrated GARCH model, or IGARCH. The IGARCH captures the long memory effect of volatility shocks on future volatility by assuming $\sum_{i=1}^{q} \alpha_i + \sum_{i=1}^{p} \beta_i = 1$ and, thus, according to the authors, is to be applied to time series that have a unit root or that are nonstationary in variance.

As Ghose and Kroner (1995, p. 233) point out, Diebold's (1986, 1988) aggregation theorem is valid only if the unconditional variance of the time series is finite, only under those circumstances does the aggregated returns converge to normality. Therefore, the theorem does not apply for nonstationary time series and, as the authors empirically demonstrate, the closer the data is to IGARCH, i.e. the closer $\sum_{i=1}^{q} \alpha_i + \sum_{i=1}^{p} \beta_i$ is to 1, the slower the convergence to normality (in the ultimate case of nonstationarity, the convergence to normality is not attained). Consequently, equations (17) and (20) cannot be applied to convert the SR frequency into a lower frequency when time series follow a nonstationary model. Moreover, recall that also Lo's (2002) results are valid only for stationary time series; to our knowledge, there is no conversion rule that can be applied to SR in cases of nonstationarity time series.

Diebold and Lopez (1995), however, refer that despite conditional variance dynamics are often found to be highly persistent, it is difficult to ascertain whether they are actually integrated. Moreover, the authors state that highly persistent covariance-stationary GARCH models, not IGARCH models, appear to provide a better approximation to conditional variance dynamics. As Diebold (1986) refers, some IGARCH results may be due to misspecification of the conditional variance function that may not allow for structural breaks in the unconditional variance. As an example, Diebold (1986) gives the case of interest-rate equations that may appear to follow an IGARCH, but if a monetary-regime dummy is included as the conditional variance intercept, the equation would correspond to a stationary GARCH movement with a "jump" occurring between regimes.

Additionally, Nelson (1990) shows that the IGARCH(1,1) process (with ω different from zero) is nevertheless strictly stationary and ergotic[1]. If these results hold, equations (17) and (20) can still be applied to convert a high frequency SR into a lower frequency SR.

It is also important to note that although volatility persistence is a feature that many time series are design to capture, Christoffersen and Diebold (1997) recently argue that volatility persistence decreases quickly with the horizon, demonstrating that volatility is not forecastable for periods of more than ten or twenty days, and therefore, for longer horizons, volatility series corresponds to an i.i.d. sequence. This result seems contradictory to Andersen and Bollerslev (1997) results that found evidence of memory in very high-frequency (5 minute) exchange rate returns which may indicate that volatility is forecastable well into the future. However, as Christoffersen and Diebold (1997) argue, it is possible that the long memory in volatility evident at 5 minute intervals may be largely irrelevant for risk management at horizons of 10 or 20 days, once even 5000 5 minute intervals are just over 17 days.

In order to evaluate, in the specific case of our sample, if the return series are integrated and nonstationary (in mean and variance) we performed two tests for each of the 65 daily return series: the Augmented Dikey-Fuller test and the likelihood-ratio test (or LR test) with the restriction that $\alpha_1 + \beta_1 = 1$. The Augmented Dikey-Fuller test is computed to assess the presence of unit roots in the series and the LR test to assess if the IGARCH model is

[1] See concept 2 and concept 6 in Appendix B.

statistically more appropriate than the GARCH model. For this last test, we estimated a GARCH(1,1) and an IGARCH(1,1) model for each fund series, assuming a t-student distribution with 5 degrees of freedom, and kept the log likelihood value of the models in order to compute the LR test. The results demonstrate, as can be observed in table 46 of appendix A, that there is no statistical evidence for the existence of unit roots in any of the sample series and, also, that 91% of the conditional variance of the sample series show no statistical evidence of following an IGARCH model.

Therefore, although the existence of infinitive variances in financial data might appear to be a restriction to our results on SR time aggregation, we showed that it is not the case. On one hand, our empirical evidence confirms Christoffersen and Diebold (1997) results (by demonstrating that there is no statistical evidence for the existence of unit roots) and shows that the majority of the fund's series do not follow an IGARCH model. On the other hand, Nelson's (1990) conclusions provide the theoretical support that allows the use of equations (17) and (20) even when the return series follow an IGARCH.

6. Conclusion

According to Lo (2002), the most common method of time aggregation for the SR, to multiply the higher-order SR by the square root of the number of periods contained in the lower-frequency holding period, is valid if returns are i.i.d. or if serial correlation is not significant.

We adopt Diebold's (1986, 1988) theorem, for GARCH (p,q) processes, as another method to demonstrate that conditional heteroskedasticity of returns, in the particular case of convergence to normality and weakly higher-frequency correlated returns, does not affect time aggregation of SR. It was shown, by performing statistical tests to a sample of 65 funds, that convergence to normality is attained, in 70% of the cases, at least when daily returns are aggregated into annual returns.

Moreover, we showed that serial correlation also tends to disappear when the aggregated period tends to infinity and that, when this is the case, the most common method of time aggregation for the SR should not be disregarded as a valid method to time aggregate the SR. In fact, making use of the Mann-Whitney test and the t-test to compare effective annual SR of the sample funds series with the aggregated SR series estimated according with Lo's (2002) methodology and with the rule of thumb, we showed that under some circumstances, the rule of thumb produces more similar results.

The thesis also highlights that the time aggregation methodologies for time aggregation of the SR, as well as the Diebold's (1986, 1988) theorem, are only valid if the unconditional variance of the time series model is finite and if the time series follows a GARCH process (Diebold's result). We demonstrate, through the ADF test, that all the return series of the sample funds reject the hypothesis of nonstationarity and, through the LR test, that in 91% of those series the conditional variance shows no statistical evidence of following an IGARCH model. For the cases where the return series shows evidence of following an IGARCH model, Nelson (1990) states that those processes are nevertheless strictly stationary and ergotic and, thus, even on those cases the rule of thumb can still be applied for the time aggregation of the SR.

The study has, however some limitations that result essentially from the limitations of the GARCH models itself. On one hand, GARCH models operate best under relatively stable market conditions, failing to capture highly irregular phenomena such as strong market fluctuations and other anticipated events that might lead to significant structural changes. On the other hand, GARCH models are only sensitive to the magnitude of the excess return and not to the sign of this excess return. Recall that volatility is negatively related with returns once that violent market movements are more pronounced in the downward trend than in the upward trend (leverage effect). According to Hansen and Lunde (2005), in a study of 330 ARCH-type models, the GARCH(1,1) model, in the ability of describing the conditional variance, is clearly inferior to models that can accommodate a leverage effect in the analysis of equity returns. To surpass these limitations other GARCH models were developed such as the Exponential ARCH (EGARCH) and the Threshold ARCH (TARCH), but those models are not considered in this study.

The results of the thesis are also restricted to the sample of funds assembled that, although extensive, is mostly composed of mutual funds. According to Lo (2002), mutual funds have little serial correlation in returns and thus, there is little difference between the i.i.d. estimator for the annual SR and his estimator that accounts for serial correlation. However, Lo (2002) also states that the impact of serial correlation on hedge funds is significant. Once hedge funds are not present in our sample, this effect was not confirmed.

An interesting extension to this thesis would be the study of the properties of the conditional distribution of the SR. Some research has showed that although the financial return's conditional mean and variance are time varying, the conditional SR itself is less so.

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Appendix A – Figures and Tables

Figure 5 – Plot of Fidelity Equity Income Fund data series of returns

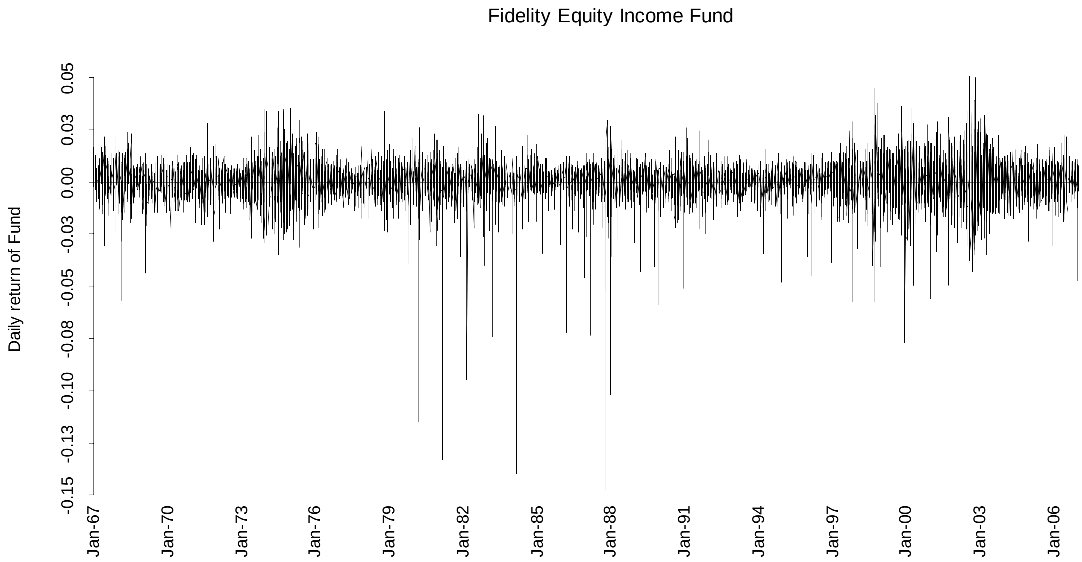

Table 5 – Sample's funds tenure

Fund	Ticker	Start date: Dailly frequency	Start date: Weekly frequency	Start date: Monthly frequency	Start date: Quarterly frequency	Number of observations: Dailly frequency	Number of observations: Weekly frequency	Number of observations: Monthly frequency	Number of observations: Quarterly frequency
AMERICAN BALANCED FUND-A	ABALX	12/31/75	12/26/75	12/31/75	12/31/75	7,831	1,618	372	124
THE BOND FUND OF AMER-A	ABNDX	12/31/74	12/27/74	12/31/74	12/31/74	8,180	1,670	384	128
VAN KAMPEN STRATEGIC GROW-A	ACEGX	12/31/70	12/25/70	12/31/70	12/31/70	9,074	1,879	432	144
VAN KAMPEN EQUITY AND INC-A	ACEIX	01/01/69	01/10/69	01/31/69	03/31/69	9,732	1,981	455	151
VAN KAMPEN GROWTH & INCOME-A	ACGIX	01/01/68	01/05/68	12/29/67	12/29/67	9,997	2,034	468	156
COMINVEST ADIFONDS	ADIF	12/31/69	12/26/69	12/31/68	12/31/68	9,204	1,931	456	152
COMINVEST ADIRENTA	ADIRT	12/31/74	12/27/74	12/31/74	12/31/74	7,969	1,670	384	128
COMINVEST ADIVERBA	ADIVER	12/31/69	12/26/69	12/31/69	12/31/69	9,212	1,931	444	148
AMERICAN GRW FD OF AMER-A	AGTHX	12/31/73	12/28/73	12/31/73	12/31/73	8,338	1,722	396	132
AIM SELECT EQUITY FUND-A	AGWFX	12/29/67	12/29/67	12/29/67	12/29/67	9,988	2,035	468	156
THE INVESTMENT CO AMER-A	AIVSX	12/29/39	12/30/38	12/30/38	12/30/38	16,852	3,548	816	272
AMERICAN NEW PERSPECTIV-A	ANWPX	12/31/73	12/28/73	12/31/73	12/31/73	8,338	1,722	396	132
ENDOWMENTS BOND PORTFOLIO	BENDX	12/31/75	12/26/75	12/31/75	12/31/75	7,830	1,618	372	124
AIM CHARTER FUND-A	CHTRX	12/31/69	12/26/69	12/31/69	12/31/69	9,628	1,931	444	148
AIM CONSTELLATION FUND-A	CSTGX	12/31/76	12/31/76	12/31/76	12/31/76	7,801	1,565	360	120
DELAWARE LARGE CAP VALUE-A	DELDX	12/31/71	12/31/71	12/31/71	12/31/71	8,842	1,826	420	140
DELAWARE BALANCED FUND-A	DELFX	12/31/71	12/31/71	12/31/71	12/31/71	8,841	1,826	420	140
DELAWARE TREND FUND-A	DELTX	12/31/71	12/31/71	12/31/71	12/31/71	8,841	1,826	420	140
DELAWARE DELCHESTER FUND-A	DETWX	12/31/71	12/31/71	12/31/71	12/31/71	8,839	1,826	420	140
EATON VANCE LARGE-CAP VAL-A	EHSTX	12/31/37	12/31/37	12/31/37	12/31/37	17,308	3,600	828	276
ENDOWMENTS GRTH & INCM PRTFL	ENDIX	12/31/75	12/26/75	12/31/75	12/31/75	7,833	1,618	372	124
EATON VANCE BALANCED FUND-A	EVIFX	12/31/37	12/30/38	12/31/37	12/31/37	17,309	3,548	828	276
EATON VANCE SPL EQUITIES-A	EVSEX	12/31/68	12/27/68	12/31/68	12/31/68	9,568	1,983	456	152
FIDELITY INVESTMENT GR BOND	FBNDX	12/31/71	12/31/71	12/31/71	12/31/71	8,845	1,826	420	140
FIDELITY CONTRAFUND	FCNTX	12/29/67	12/29/67	12/29/67	12/29/67	9,822	2,035	468	156
FIDELITY EQUITY-INCOME FD	FEQIX	12/30/66	12/30/66	12/30/66	12/30/66	10,078	2,087	480	160
FIDELITY MAGELLAN FUND	FMAGX	12/31/63	12/27/63	12/31/63	12/31/63	10,829	2,244	516	172
COMINVEST FONDRA	FNDR	12/31/69	12/26/69	12/31/69	12/31/69	9,215	1,931	444	148
COMINVEST FONDIS	FNDS	12/31/69	12/26/69	12/31/69	12/31/69	9,209	1,931	444	148
COMINVEST FONDAK-P	FONDAKI	12/31/69	12/26/69	12/31/69	12/31/69	9,215	1,931	444	148
FEDERATED STOCK & BOND FD-A	FSTBX	01/01/69	12/26/69	12/31/69	12/31/69	9,658	1,931	444	148
FEDERATED FUND FOR US GOVT-A	FUSGX	12/31/69	12/26/69	12/31/69	12/31/69	9,451	1,931	444	148
ADIG ADIFONDS	HJVC	12/31/69	12/26/69	12/31/69	12/31/69	9,233	1,931	444	148
JANUS FUND	JANSX	12/31/70	12/25/70	12/31/70	12/31/70	9,225	1,879	432	144
LORD ABBETT AFFILIATED-A	LAFFX	01/03/50	12/29/50	12/29/50	12/29/50	14,821	2,922	672	224
LORD ABBETT DEVELOPING GR-A	LAGWX	12/31/73	12/28/73	12/31/73	12/31/73	8,561	1,722	396	132
LORD ABBETT BOND-DEBENTURE-A	LBNDX	12/31/71	12/31/71	12/31/71	12/31/71	9,084	1,826	420	140
FEDERATED MUNICIPAL SEC-A	LMSFX	12/31/76	12/31/76	12/31/76	12/31/76	7,645	1,565	360	120
PIONEER GROWTH SHARES-A	MOMGX	12/31/68	12/27/68	03/31/68	12/31/68	9,717	1,983	463	152
MAIRS & POWER GROWTH FD	MPGFX	12/31/69	12/26/58	12/31/58	12/31/58	9,347	2,505	576	192
NEUBERGER BERMAN PARTNERS-IV	NPRTX	12/31/75	12/26/75	01/31/75	03/30/75	7,824	1,618	383	127
DAVIS NEW YORK VENTURE FD-A	NYVTX	12/31/69	12/26/69	12/31/69	12/31/69	9,344	1,931	444	148
OPPENHEIMER EQUITY FD INC-A	OEQAX	12/31/75	12/26/75	12/31/75	12/31/75	7,821	1,618	372	124
OPPENHEIMER GLOBAL FD-A	OPPAX	01/01/70	12/31/69	12/30/69	12/31/69	9,336	1,931	444	148
OPPENHEIMER CAPITAL INCOME-A	OPPEX	12/31/70	12/25/70	12/29/70	12/31/70	9,086	1,879	432	144
OPPENHEIMER GROWTH FD-A	OPPSX	12/31/73	12/28/73	12/31/73	12/31/73	8,279	1,722	396	132
OPPENHEIMER AMT-FREE MUNI-A	OPTAX	12/31/76	12/31/76	12/31/76	12/31/76	7,568	1,565	360	120
ROYCE PENNSYLVANIA MUT FD-IN	PENNX	12/31/73	12/28/73	12/31/73	12/31/73	8,343	1,722	396	132
PIONEER FUND-CLASS A	PIODX	01/01/70	01/01/70	12/30/69	12/30/69	9,469	1,930	444	148
PIONEER VALUE FUND-A	PIOTX	01/01/70	01/01/70	12/30/69	12/30/69	9,461	1,930	444	148
JPM GLOBAL-A-ACC	SAVGRFI	01/04/72	12/29/72	12/29/72	12/29/72	8,838	1,774	408	136
WELLS FARGO ADV SPEC FIN-A	SIFEX	01/01/68	01/05/68	01/31/68	03/29/68	9,875	2,034	467	155
UNIGLOBAL	U1IH	12/30/66	12/29/67	12/30/66	12/30/66	9,964	2,035	480	160
UNIFONDS	UNIFNDS	12/31/56	12/28/56	12/31/56	12/31/56	12,515	2,609	600	200
UNIGLOBAL	UNIGLOB	12/30/66	12/29/67	12/30/66	12/30/66	9,953	2,035	480	160
UNIRENTA	UNIRNTA	01/03/69	01/03/69	12/31/68	12/31/68	9,503	1,982	456	152
VANGUARD EXPLORER FUND-INV	VEXPX	01/03/68	12/28/73	12/29/67	12/29/67	9,780	1,722	468	156
VANGUARD 500 INDEX FUND-INV	VFINX	12/31/76	12/31/76	12/31/76	12/31/76	7,586	1,565	360	120
VANGUARD MORGAN GROWTH FD-IV	VMRGX	01/01/69	01/03/69	12/31/68	12/31/68	9,592	1,982	456	152
VANGUARD WELLINGTON-INV	VWELX	01/03/72	10/26/73	12/31/71	12/31/30	8,806	1,731	420	304
VANGUARD L/T INVEST GR FD-IV	VWESX	12/31/73	12/28/73	12/31/73	12/31/73	8,344	1,722	396	132
VANGUARD WELLESLEY INCOME-IV	VWINX	12/31/70	12/25/70	12/31/70	12/31/70	9,097	1,879	432	144
VANGUARD WINDSOR FUND-INV	VWNDX	12/31/58	12/26/58	12/31/58	12/31/58	12,055	2,505	576	192
VANGUARD US GROWTH FUND-INV	VWUSX	12/29/61	12/29/61	12/29/61	12/29/61	11,301	2,348	540	180
EATON VANCE TAX-MGD GR 1.0-A	CAPEX	12/30/66	12/31/66	12/31/66	12/31/66	10,047	2,087	468	160

List of publicly traded funds considered in the study. The list is constituted by all funds available at Bloomberg with at least 30 years of historical daily information. The funds total 65 and are mainly open-end-funds (64) from the US. Four series were retrieved for each fund, one for each frequency: daily, weekly, monthly and quarterly frequency.

Table 6 – Sample's funds description as of December 2006

Ticker	Fund description	Country of Incorporation	Geographic Focus	Primary investments	Total Fund Assets (Billion USD)
ABALX	Open-end fund with the objective of capital conservation, current income, and long-term growth of both capital and income. The Fund invests in a broad range of securities, including stocks and bonds.	USA	USA	Broad range of securities, including stocks and bonds	56,199.5
ABNDX	Open-end fund with the objective of maximizing current income and preserve capital. The Fund invests the majority of its assets in bonds rated A and above. The Fund may also invests in lower rated bonds.	USA	USA	Bonds rated A and above; may also invest in lower rated bonds	28,007.8
ACEGX	Open-end fund with the objective of capital appreciation. The Fund invests primarly in a portfolio of common stocks of companies considered by the Fund's investment advisor to be emerging growth companies.	USA	USA	Stocks of emerging growth companies	4,204.1
ACEIX	Open-end fund with the objective of obtaining a high level of income, consistent with safety of principal, with long-term growth of capital as a secondary objective. The Fund invests primarily in income-producing equity securities and investment grade quality debt securities.	USA	USA	Income-producing equity securities and investment grade quality debt securities	18,145.7
ACGIX	Open-end fund with the objective of obtaining income and long-term capital growth. The Fund invests in a portfolio of income-producing equity securities, including common stocks and convertible securities.	USA	USA	Income producing equity securities, including stocks and convertible securities	10,417.8
ADIF	Open-end fund with the objective of growth and income. The Fund primarily invests in stocks issued by major publicly traded German companies with strong earnings potential. The Fund may, based on market situations, also add foreign stocks and domestic and foreign fixed-income securities to its portfolio.	Germany	Germany	Stocks issued by major publicly traded Germany companies with strong earnings potential	383.0
ADIRT	Open-end fund with the objective of creating an attractive yield through reinvestment or distribution of yearly earnings. The Fund invests primarily in government, municipal and bank bonds in Germany.	Germany	Germany	Government, municipal and bank loas in Germany	531.4
ADIVER	Open-end fund with the objective of capital growth. The Fund invests primarily in stocks issued by banks and insurance companies, both domestic and international.	Germany	Not Focused	Stocks issued by banks and insurance companies, both domestic and international	653.0
AGTHX	Open-end fund with the objective of growth. The Fund invests primarily in common stocks of companies that appear to offer superior opportunities for growth of capital. Investors in the fund should have a long-term perspective and be able to tolerate potentially wide price fluctuations.	USA	North America	Common stocks of companies that appear to offer superior opportunities for growth of capital	134,217.7
AGWFX	Open-end fund with the objective of long-term growth of capital. The Fund invests at least 80% of its assets in equity securities, including convertibles, with prospects for above-average market returns, without regard to market capitalization.	USA	USA	Equity securities with prospects for above-average market returns	366.3
AIVSX	Open-end fund with the objective of long-term growth of capital and income. The Fund invests primarily in common stocks that offer growth and dividend potential. The Fund is designed for investors seeking both capital appreciation and income.	USA	USA	Common stocks that offer growth and dividend potential	89,054.1
ANWPX	Open-end fund with the objective of long-term capital growth and, secondarily, income. The Fund invests primarily in common stocks, including growth-oriented stocks, on a global basis. The Fund also invests in undervalued securities that represent good long-term investment opportunities.	USA	North America	Common stocks, including growth oriented stocks	53,451.5
BENDX	Open-end fund with the objective of maximizing the level of current income and of preserving the capital. The Fund invests at least 80% of its assets in bonds and also in investment grade debt securities rated Baa or above by Moody's or BBB or above by S&P.	USA	USA	Investment grade debt securities rated Baa or above (Moody's) or BBB or above (S&P).	61.2
CHTRX	Open-end fund with the objective of capital growth. The Fund invests at least 65% of its total assets in securities of established companies that have long-term above-average growth in earnings and growth companies that are believed to have the potential for above-average growth in earnings and are considered undervalued.	USA	USA	Securities of established companies that have long-term above-average growth in earnings and growth companies that are believed to have the potential for above-average growth in earnings and are considered undervalued	6,809.2
CSTGX	Open-end fund with the objective of capital growth. The Fund invests in common stocks of companies regardless of market capitalization, that are likely to benefit from new or innovative products or services as well as those that have experienced above-average, long-term growth in earnings, and excellent prospects.	USA	NA	Stocks of companies that are likely to benefit from new or innovative products or services as well as those that have experienced above-average, long-term growth in earnings, and	7,649.0
DELDX	Open-end fund with the objective of long-term capital appreciation. The Fund invests at least 80% of its net assets in securities of large-capitalization companies (those companies with market capitalizations of $5 billion or greater at the time of purchase).	USA	USA	Securities of large-capitalization companies	1,456.6
DELFX	Open-end fund with the objective of capital appreciation, income and preservation of capital. The Fund invests in a combination of common stocks and various types of fixed-income securities, including both U.S. government securities and corporate bonds.	USA	USA	Common stocks and various types of fixed-income securities, including both U.S. government securities and corporate bonds	246.3
DELTX	Open-end fund with the objective of capital appreciation. The Fund invests in stocks of small, growth-oriented or emerging companies that are believed to be responsive to changes within the marketplace and have the fundamental characteristics to support continued growth.	USA	USA	Stocks of small, growth-oriented or emerging companies that are believed to be responsive to changes within the marketplace and have the fundamental characteristics to support continued growth	1,040.8
DETWX	Open-end fund with the objective of total return and, as a secondary objective, high current income. The Fund invests in high-yielding corporate bonds,rated BB or lower by Standard and Poor's and it may also invest in equity securities, foreign government securities and corporate bonds of foreign issuers.	USA	USA	High-yielding corporate bonds,rated BB or lower by Standard and Poor's	306.1
EHSTX	Open-end fund with the objective of total return. The Fund primarily invests in value stocks of large-cap companies. The Fund will invest 80% of its net assets in equity securities of large-cap companies and will also invest in dividend-paying stocks and convertible debt securities.	USA	USA	Value stocks of large-cap companies.	4,427.9
ENDIX	Open-end fund with the objective of long-term growth of principal with income and preservation of capital as a secondary objective. The Fund invests primarily on common stocks or securities convertible into common stock that have favorable prospects for long-term growth of capital and income.	USA	USA	Common stocks or securities convertible into common stock that have favorable prospects for long-term growth of capital and income	112.8

List of publicly traded funds considered in the study. The list is constituted by all funds available at Bloomberg with at least 30 years of historical daily information. The funds total 65 and are mainly from the US. Four series were retrieved for each fund, one for each frequency: daily, weekly, monthly and quarterly frequency.

Table 6 – Sample's funds description as of December 2006 (cont.)

Ticker	Fund description	Country of Incorporation	Geographic Focus	Primary investments	Total Fund Assets (Billion USD)
EVIFX	Open-end fund with the objective of current income and long-term growth of capital. The Fund invests between 50%-75% of its net assets in common stocks and between 25-50% its net assets in fixed-income securities.	USA	USA	Common stocks and net assets in fixed-income securities	213.5
EVSEX	Open-end fund with the objective of capital growth. The Fund invests primarily in common stocks of emerging growth companies. Many emerging growth companie acquired by the Fund have market capitalizations comparable to those of companies included in the S&P 600.	USA	USA	Common stocks of emerging growth companies	45.8
FBNDX	Open-end fund with the objective of high level of current income. The Fund normally invests at least 80% of assets in investment-grade debt securities all types and repurchase agreements for those securities.	USA	USA	Investment-grade debt securities	10,804.2
FCNTX	Open-end fund with the objective of capital appreciation. The Fund invests primarily in the common stock of domestic and foreign companies whose value is not fully recognized by the public. The Fund invests in either "growth" stocks or "value" stocks or both.	USA	North America	Common stock of domestic and foreign companies whose value is not fully recognized by the public	68,565.2
FEQIX	Open-end fund with the objective of obtaining reasonable income; it will also consider the potential for capital appreciation. The Fund normally invests primarily in income-producing equity securities, which tends to lead to investments in cap "value" stocks.	USA	General	Income-producing equity securities	30,628.9
FMAGX	Open-end fund with the objective of capital appreciation. The Fund normally invests primarily in common stocks (either growth stocks or value stocks) and in domestic and foreign issuers.	USA	General	Common stocks	44,962.2
FNDR	Open-end fund with the objective of creating an attractive yield through reinvestment of year earnings. The Fund exclusively invests in German company issued stocks, option and bonds, as well as mortgage and municipal bonds.	Germany	Germany	Stocks, options and bonds, as well as mortgage and municipal bonds	136.3
FNDS	Open-end fund with the objective of capital growth. The Fund invests in equities of domestic and international companies in growth oriented line of businesses. The Fund focus on companies in all geographic regions, but might temporarily be concentrated certain areas.	Germany	General	Equities of domestic and international companies in growth oriented line of businesses	393.9
FONDAKI	Open-end fund with the objective of growth and income. The Fund invests primarily in equities and equity-related securities issued by major German corporations and in companies with strong growth potential and also invests certain a portions in fixed interest securities.	Germany	Germany	Equities and equity-related securities issued by major German corporations	2,862.1
FSTBX	Open-end fund with the objective of providing safety of capital with the possibility of long-term growth of capital and income; consideration is also given to capital income. The Fund seeks to achieve its objective by investing in a diverse portfolio that is allocated between equity and fixed-income securities.	USA	General	Diverse portfolio that is allocated between equity and fixed-income securities	282.9
FUSGX	Open-end fund with the objective of providing current income. The Fund invests primarily in U.S. government securities, including mortgage-backed securities issued by U.S. government agencies.	USA	USA	U.S. government securities	866.6
HJVC	NA				
JANSX	Open-end fund with the objective of long-term growth of capital in a manner consistent with the preservation of capital. The Fund invests in common stocks of larger, well-established companies that are selected for their growth potential.	USA	NA	common stocks of larger, well-established companies that are selected for their growth potential	11,422.1
LAFFX	Open-end fund with the objective of long-term growth of capital and income without excessive fluctuations in market value. The Fund invests at least 80% of its net assets in equity securities of large companies with market capitalizations, at the time of purchase, that fall within the companies in the Russell 1000 Index.	USA	General	Equity securities of large companies with market capitalizations, at the time of purchase, that fall within the companies in the Russell 1000 Index	20,354.2
LAGWX	Open-end fund with the objective of long-term growth of capital. The Fund invests primarily in the common stocks of companies with above-average, long-term growth potential, particularly smaller companies considered to be in the developing growth phase.	USA	USA	Common stocks of companies with above-average, long-term growth potential, particularly smaller companies considered to be in the developing growth phase	741.5
LBNDX	Open-end fund with the objective of high current income and the opportunity for capital appreciation to produce a high total return. The Fund invests at least 80% of its net assets in bonds, debentures and other fixed income securities.	USA	USA	Bonds, debentures and other fixed income securities	7,671.2
LMSFX	Open-end fund with the objective of providing for its shareholders a high level of current income which is exempt from federal regular income tax. The Fund invests in long-term, investment-grade, tax-exempt securities.	USA	USA	Long-term, investment-grade, tax-exempt securities	507.5
MOMGX	Open-end fund with the objective of capital appreciation. The Fund invests in common stocks and other equity securities of U.S. companies. The Fund uses a growth style of management and seeks to invest in issuers with above average potential for earnings and revenue growth.	USA	USA	Common stocks and other equity securities of U.S. companies	508.9
MPGFX	Open-end fund with the objective of providing shareholders with diversified common stocks which have the potential for above-average long-term returns. The Fund invests primarily in a diversified portfolio of equity securities and is designed for long-term investors.	USA	USA	Diversified portfolio of equity securities	2,694.4
NPRTX	Open-end fund with the objective of capital growth. The Fund invests mainly in common stock of mid to large-capitalization companies. The manager looks for well-managed companies whose stock prices are undervalued.	USA	USA	Common stock of mid- to large-capitalization companies	4,066.1
NYVTX	Open-end fund with the objective of capital growth. The Fund invests primarily in equity securities issued by companies with market capitalizations of at least $10 billion. Extensive research is performed to buy companies with expanding earnings at value prices and hold them for the long term.	USA	General	Equity securities issued by companies with market capitalizations of at least $10 billion	43,669.4

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Table 6 – Sample's funds description as of December 2006 (cont.)

Ticker	Fund description	Country of Incorporation	Geographic Focus	Primary investments	Total Fund Assets (Billion USD)
OEQAX	Open-end fund with the objective of high total return. The Fund invests in equity securities for the purpose of seeking capital appreciation and income. The Fund's investments are primarily in medium and large capitalization stocks.	USA	USA	Medium and large capitalization stocks	2,743.2
OPPAX	Open-end fund with the objective of capital appreciation. The Fund invests in common stocks of companies in the U.S. and foreign countries, including countries with developing or emerging markets. It currently focuses its investments in mid and large companies in developing countries.	USA	General	Mid and large companies in developing countries	17,153.0
OPPEX	On open-end fund with the objective of seeking current income compatible with prudent investment. The Fund also attempts to conserve principal while providing an opportunity for capital appreciation and invests in both equity and debt securities.	USA	General	Equity and debt securities	3,277.7
OPPSX	Open-end fund with the objective of capital appreciation. The Fund invests in common stocks of growth companies, focusing on companies with large capitalization and mid-size capitalization. The Fund can invest in domestic companies and foreign companies, although most of its investments are in stocks of US companies.	USA	USA	Common stocks of growth companies, focusing on companies with large capitalization and mid-size capitalization	1,278.0
OPTAX	Open-end fund with the objective of high level of current interest income exempt from federal income tax. The Fund invests mainly in investment grade municipal securities that pay interest exempt from federal individual income tax. It currently focuses on securities with maturities between 5 and 30 years when issued.	USA	USA	Investment grade municipal securities that pay interest exempt from federal individual income tax	2,164.1
PENNX	Open-end fund with the objective of long-term growth of capital. The Fund invests its assets primarily in a broadly diversified portfolio of equity securities issued by small- and micro-cap companies that it believes are trading significantly below its estimate of their current worth.	USA	USA	Broadly diversified portfolio of equity securities issued by small- and micro-cap companies	4,597.0
PIODX	Open-end fund with the objective of reasonable income and capital growth. The Fund invests in a broad list of equity securities, primarily of U.S. issuers. The Fund invests using a value approach.	USA	USA	Broad list of equity securities, primarily of U.S. issuers	7,902.1
PIOTX	Open-end fund with the objective of reasonable income and capital growth. The Fund invests its assets in equity securities, primarily of U.S. issuers, using a value approach to select the fund's investments.	USA	USA	Equity securities, primarily of U.S. issuers	4,458.4
SAVGRFI	UCITS certified open-end investment company. The aim of the Fund is to provide capital growth over the long-term. The Fund invests in equity securities throughout the world in any economic sector.	UK	General	Equity securities throughout the world in any economic sector	239.0
SIFEX	Open-end fund with the objective of long-term capital appreciation. The Fund invests in equity securities of financial services companies such as financial services holding companies, bank holding companies commercial banks, savings and loan associations and brokerage companies.	USA	USA	Equity securities of financial services companies	365.2
U1IH	NA				
UNIFNDS	Open-end fund with the objective of capital growth. The Fund invests primarily in German stocks.	Germany	Germany	German stocks	3,064.0
UNIGLOB	Open-end fund with the objective of income and growth. The Fund primarily invests in stocks, stock options, warrants and profit-sharing certificates issued by blue-chip corporations in Europe, North America and the Asian-Pacific region.	Germany	General	Stocks, stock options, warrants and profit-sharing certificates issued by blue-chip corporations in Europe, North America and	4,158.7
UNIRNTA	Open-end fund with the objective of income and growth. UniRenta primarily invests in fixed interest bonds issued by federal and state governments, as well as mortgage a state financial institutes in Europe, North America and the Asian-Pacific region.	Germany	General	Fixed interest bonds issued by federal and state governments, as well as mortgage a state financial institutes in Europe, North America and the Asian-Pacific region	NA
VEXPX	Open-end fund with the objective of providing long-term capital appreciation. The Fund invests mostly in the stocks of small companies. These companies tend to be unseasoned but considered by the Fund's advisors to have superior growth potential; also, these companies often provide little or no dividend income.	USA	USA	Stocks of small companies	11,935.1
VFINX	Open-end fund with the objective of tracking the performance of the Standard & Poor's 500 Index. The fund is dominated by the stocks of large U.S. companies and invests substantially all of its assets in the stocks that make up the Index.	USA	USA	Stocks that make up the Index	119,192.2
VMRGX	Open-end fund with the objective of long-term capital appreciation. The Fund invests mainly in the stocks of mid and large-capitalization U.S. companies whose revenues and/or earnings are expected to grow faster than those of the average company in the market.	USA	USA	Stocks of mid and large-capitalization U.S. companies whose revenues and/or earnings are expected to grow faster than those of the average company in the market	7,526.7
VWELX	Open-end fund with the objective of conserving capital and of providing moderate long-term in capital and income. The Fund invests 60% to 70% of its assets in dividend-paying, and, to a lesser extent, non-dividend-paying common stock.	USA	USA	Dividend-paying common stock	45,719.0
VWESX	Open-end fund with the objective of providing high level of current income and preserving investors' principal. The Fund invests in a variety of high-quality and, to a lesser extent, medium-quality fixed-income securities, mainly long-term corporate bonds and other corporate fixed-income obligations.	USA	USA	High-quality fixed-income securities	5,711.5
VWINX	Open-end fund with the objective of providing long-term growth of income and a high and sustainable level of current income, along with moderate long-term capital appreciation. The Fund invests 60% to 65% of its assets in investment-grade corporate, US treasury, and government agency bonds.	USA	USA	Investment-grade corporate, US treasury, and government agency bonds	12,612.3
VWNDX	Open-end fund with the objective of long-term growth of capital. As a secondary objective, the Fund seeks to provide some dividend income. The Fund invests mainly in large and medium-size companies whose stocks are considered by the Fund's advisers to be undervalued.	USA	USA	Large and medium-size companies whose stocks are considered by the Fund's advisers to be undervalued	24,177.8
VWUSX	Open-end fund with the objective of long-term capital appreciation. The Fund invest mainly in stocks of large-capitalization U.S. companies with above-average earnings growth potential and reasonable stock prices in comparison with expected earnings.	USA	USA	Stocks of large-capitalization U.S. companies with above-average earnings growth potential and reasonable stock prices in comparison with expected earnings	5,846.8
CAPEX	Open-end fund with the objective of long-term capital appreciation. The Fund invests all of its assets in the Tax-Managed Portfolio, a separate open-end management investment company with substantially the same investment.	USA	USA	Tax-Managed Portfolio, a separate open-end management investment company with substantially the same investment	3,999.3

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Table 7 – Sample's funds asset allocation

Ticker	Government	Corporate	Mortage	Preferred	Municipal	Equity	Cash and Others
ABALX	8.28	10.19	11.74	0.09	0.18	65.17	4.35
ABNDX	18.32	47.27	26.25	0.90	0.63	0.30	6.33
ACEGX						96.85	3.15
ACEIX	10.59	14.37	2.52	3.44		56.05	13.03
ACGIX	1.94					93.82	4.24
ADIF		0.73				98.86	0.41
ADIRT	42.70	46.81			9.78		0.71
ADIVER						101.54	-1.54
AGTHX	6.61	0.12				88.79	4.48
AGWFX						95.98	4.02
AIVSX	8.46	0.25		0.23		84.07	6.99
ANWPX	0.14					93.29	6.57
BENDX	12.63	53.37	26.07	2.27	1.65		4.01
CHTRX						90.45	9.55
CSTGX						99.52	0.48
DELDX						98.89	1.11
DELFX	NA	NA	NA	NA	NA	NA	NA
DELTX						100.84	-0.84
DETWX	NA	NA	NA	NA	NA	NA	NA
EHSTX						100.00	
ENDIX	2.20	0.74				83.57	13.49
EVIFX	11.46	7.86	6.71	0.68		60.11	13.18
EVSEX						100.00	
FBNDX	12.58	19.99	31.83		0.04		35.56
FCNTX						92.47	7.53
FEQIX		0.79		0.73		95.14	3.34
FMAGX	0.01					99.44	0.55
FNDR	15.49	5.78			4.92	72.81	1.00
FNDS		1.06				98.11	0.83
FONDAKI						99.96	0.04
FSTBX	11.85	8.52	1.98			57.29	20.36
FUSGX			98.96				1.04
HJVC	NA	NA	NA	NA	NA	NA	NA
JANSX						98.62	1.38
LAFFX						100.00	
LAGWX						100.00	
LBNDX	3.10	79.72	8.04	3.38		5.76	
LMSFX		0.31			99.69		
MOMGX						99.70	0.30
MPGFX						97.50	2.50
NPRTX						98.94	1.06
NYVTX		0.31				97.49	2.20
OEQAX						98.07	1.93
OPPAX						99.30	0.70
OPPEX	1.00	23.09	10.44	17.11		49.06	-0.70
OPPSX						99.96	0.04
OPTAX					100.00		
PENNX						92.11	7.89
PIODX						99.87	0.13
PIOTX						96.00	4.00
SAVGRFI						100.00	
SIFEX						99.74	0.26
U1IH	NA	NA	NA	NA	NA	NA	NA
UNIFNDS		6.79				90.54	2.67
UNIGLOB						92.01	7.99
UNIRNTA	56.73	34.46	0.97				7.84
VEXPX	0.18					96.39	3.43
VFINX	0.02					99.61	0.37
VMRGX	0.33					92.27	7.40
VWELX	4.49	21.31	6.29		0.65	66.08	1.18
VWESX	9.16	85.91			4.51		0.42
VWINX	4.72	48.08	6.34		1.23	38.89	0.74
VWNDX	0.10					96.70	3.20
VWUSX	0.34					96.21	3.45
CAPEX						100.00	

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Table 8 – Sample's funds sector allocation

Ticker	Banks & Financial Services	Insurance	Telecom	Oil, Gas & Electric	Pharmaceuticals, Healthcare & Biotechnology	Computers, Software & Internet	Retail	Man	Others
ABALX	4.47		7.79	6.19	5.51	4.56	4.91		66.57
ABNDX	12.21		4.66	2.65					80.48
ACEGX	7.46		7.45		9.01	13.44	8.22		54.42
ACEIX	10.62	6.14	6.12	3.63	10.60				62.89
ACGIX	13.44	9.19	6.16		15.36			4.95	50.90
ADIF	16.38	10.03	4.99	16.85				11.23	40.52
ADIRT	39.67	1.18						1.39	57.76
ADIVER	76.58	17.09				1.20			5.13
AGTHX			6.15	9.51	6.81	4.97	7.35		65.21
AGWFX	22.69	7.01		9.00	6.12		6.05		49.13
AIVSX	5.56		9.45	7.02	6.91		6.76		64.30
ANWPX	8.66	5.16	5.98	8.02	8.37				63.81
BENDX	15.30	3.74	4.86	3.03					73.07
CHTRX		6.97	8.17	5.51	7.70			7.07	64.58
CSTGX	8.74		8.66		9.78	14.37	13.25		45.20
DELDX		11.77	5.94	6.16	15.02	6.38			54.73
DELFX	NA	NA	NA	NA	NA	NA	NA	NA	NA
DELTX					16.02	15.21	10.89		57.88
DETWX	NA	NA	NA	NA	NA	NA	NA	NA	NA
EHSTX	18.78	9.60	6.74	11.70			6.16		47.02
ENDIX	5.76		7.93	10.35	8.89	8.61	9.66		48.80
EVIFX	8.35		6.39	6.67	4.28	4.56			69.75
EVSEX	6.02			5.89	9.36	6.59			72.14
FBNDX	7.42		2.31	3.08					87.19
FCNTX	7.13	10.55	6.63	6.22		12.02			57.45
FEQIX	19.40	7.90	8.50	10.60				6.10	47.50
FMAGX		9.46	11.54		4.31	5.72	5.18		63.79
FNDR	11.77	9.26		9.50				15.01	54.46
FNDS	22.78		5.53	10.94				5.16	55.59
FONDAKI		10.40		7.83				18.96	62.81
FSTBX	9.64	7.78	5.98	7.49	5.78				63.33
FUSGX	NA	NA	NA	NA	NA	NA	NA	NA	NA
HJVC	NA	NA	NA	NA	NA	NA	NA	NA	NA
JANSX	12.02		5.61	5.86	8.43	5.50	6.10		56.48
LAFFX	16.25			15.79	9.33				58.63
LAGWX	7.18				7.78	24.70	6.21		54.13
LBNDX	4.15		5.08	8.97					81.80
LMSFX	NA	NA	NA	NA	NA	NA	NA	NA	NA
MOMGX	7.01		12.13		15.60		9.14		56.12
MPGFX	12.00				15.00	5.00		15.00	53.00
NPRTX	6.85			14.49	5.68		5.47	6.39	61.12
NYVTX	23.80	14.25		11.27			6.61		44.07
OEQAX	14.71	5.28	6.46		5.43	6.01			62.11
OPPAX	5.34		10.42		6.07	7.80	6.13		64.24
OPPEX	20.92	6.78	5.29						67.01
OPPSX			8.67			25.22	9.05		57.06
OPTAX	NA	NA	NA	NA	NA	NA	NA	NA	NA
PENNX	5.30			4.50		4.10	12.30		73.80
PIODX	8.94		7.19	7.45	13.61		7.69		55.12
PIOTX	16.00	11.00	9.00	7.00	15.00				42.00
SAVGRFI	23.73	6.31	7.21	6.66	6.48				49.61
SIFEX	75.09	22.72				0.61			1.58
U1IH	NA	NA	NA	NA	NA	NA	NA	NA	NA
UNIFNDS	17.12	12.50				5.53		17.69	47.16
UNIGLOB	19.00	5.70	5.40	8.10	7.80				54.00
UNIRNTA	NA	NA	NA	NA	NA	NA	NA	NA	NA
VEXPX			4.00		9.20	5.20	11.00		70.60
VFINX	15.59		6.19	8.05	5.76		5.58		58.83
VMRGX			4.94	6.51	7.71	13.25	7.09		60.50
VWELX	15.08	6.54	5.22	9.15	7.01				57.00
VWESX	18.53	10.95	8.23	9.65					52.64
VWINX	28.38	4.71	6.98	13.67					46.26
VWNDX	9.00	7.00	11.00	6.00	10.00				57.00
VWUSX	17.67				13.61	6.57	5.72		56.43
CAPEX	16.93	5.75		8.78	6.86		5.58		56.10

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Table 9 – Sample's funds geographic focus

Ticker	USA	Ger	UK	Rest of Europe	Canada and Mexico	Asia	Offshores	Others
ABALX	89.97		1.37	4.51				4.15
ABNDX	78.51	0.97	2.63			1.65	2.50	13.74
ACEGX	87.78		1.51	4.48	3.43			2.80
ACEIX	81.72	2.88	1.67	3.59				10.14
ACGIX	83.26	4.76	2.53	5.75				3.70
ADIF		100.00						
ADIRT		55.73		24.20				20.07
ADIVER	26.62	12.54	11.09	5.67		11.10		32.98
AGTHX	79.43			2.44	5.36	2.32	1.60	8.85
AGWFX	97.32			0.81	0.51		0.45	0.91
AIVSX	87.45		2.17	3.22			1.92	5.24
ANWPX	29.69		8.07	14.68		8.64		38.92
BENDX	84.80		1.31	1.33		1.34	3.58	7.64
CHTRX	74.44		5.80	7.00			4.67	8.09
CSTGX	82.64			5.87		4.74	1.02	5.73
DELDX	100.00							
DELFX	NA	NA	NA	NA	NA	NA	NA	NA
DELTX	95.39		1.64		0.51		2.47	-0.01
DETWX	NA	NA	NA	NA	NA	NA	NA	NA
EHSTX	96.56			3.44				
ENDIX	89.90			8.33				1.77
EVIFX	88.07		2.37		5.57	0.85	1.77	1.37
EVSEX	92.72				2.67	1.11	3.50	
FBNDX	93.49		1.26	0.82	0.93	0.69		2.81
FCNTX	75.70		3.43	3.18	6.45			11.24
FEQIX	90.00		2.00	1.20		0.70	3.40	2.70
FMAGX	71.42			4.20		9.19	2.61	12.58
FNDR		81.08		17.12				1.80
FNDS	38.14	6.38	11.75	4.66		13.09		25.98
FONDAKI		99.68		0.32				
FSTBX	81.39		4.63	3.56			2.08	8.34
FUSGX	NA	NA	NA	NA	NA	NA	NA	NA
HJVC	NA	NA	NA	NA	NA	NA	NA	NA
JANSX	82.50	1.93	1.84	6.28	1.83			5.62
LAFFX	90.57		2.32	2.22	1.85		1.07	1.97
LAGWX	92.74					7.26		
LBNDX	93.92			0.44	2.01		1.47	2.16
LMSFX	100.00							
MOMGX	93.54			0.77	0.65	2.82	2.22	
MPGFX	100.00							
NPRTX	82.62		1.80	1.77	5.44		1.70	6.67
NYVTX	84.83		4.75	1.60	1.21		3.83	3.78
OEQAX	85.76	2.69	1.32	4.65			2.25	3.33
OPPAX	36.50	5.62	12.45	6.42		10.59		28.42
OPPEX	90.44		1.64	0.87			4.95	2.10
OPPSX	91.35		1.59	4.68			0.88	1.50
OPTAX	100.00							
PENNX	89.60				8.00	0.40	1.20	0.80
PIODX	94.45		1.22	2.75		1.28		0.30
PIOTX	93.00		1.00	2.00			2.00	2.00
SAVGRFI	36.63		11.50	18.93		12.39		20.55
SIFEX	93.22		2.06		0.53		4.18	0.01
U1IH	NA	NA	NA	NA	NA	NA	NA	NA
UNIFNDS		96.60		1.32			2.08	
UNIGLOB	39.30	13.40	8.00			9.80		29.50
UNIRNTA	NA	NA	NA	NA	NA	NA	NA	NA
VEXPX	96.50			0.40	0.50	0.30	0.90	1.40
VFINX	99.10						0.90	
VMRGX	93.23	0.67	0.83			0.97	1.75	2.55
VWELX	81.73		3.15	4.53	2.71			7.88
VWESX	89.40		2.31	2.75	3.63			1.91
VWINX	86.31	1.45	1.44	1.87	3.14			5.79
VWNDX	81.00			5.00		1.00	5.00	8.00
VWUSX	90.99			1.59		5.31		2.11
CAPEX	92.03		2.25	1.66	0.76		0.68	2.62

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Table 10 – Statistics and results for the normality tests performed in the temporal aggregated series of funds returns: daily frequency – no aggregation

Ticker	Obser.	Mean	Max	Min	St. Dev.	Skewness	Kurtosis	Jarque-Bera	Prob.	Cramer-von Mises	Prob.	Anderson - Darling	Prob.
ABALX	7,831	0.0	4.4	-12.0	0.007	-3.7	54.9	897,099	0.0	29.665	0.0	174.315	0.0
ABNDX	8,180	0.0	2.8	-4.3	0.003	-3.7	41.7	530,069	0.0	75.729	0.0	418.552	0.0
ACEGX	9,074	0.0	299.8	-300.3	0.058	-0.1	2,100.7	1,660,000,000	0.0	398.899	0.0	2,022.067	0.0
ACEIX	9,732	0.0	5.5	-22.5	0.008	-6.0	128.2	6,418,651	0.0	52.104	0.0	293.909	0.0
ACGIX	9,997	0.0	11.1	-27.9	0.010	-4.7	98.3	3,823,965	0.0	40.644	0.0	233.937	0.0
ADIF	9,204	0.0	9.8	-11.8	0.012	-0.9	14.5	52,136	0.0	34.407	0.0	202.526	0.0
ADIRT	7,969	0.0	0.9	-8.7	0.004	-14.7	248.6	20,321,637	0.0	278.788	0.0	1,456.899	0.0
ADIVERF	9,212	0.0	69.1	-67.8	0.032	1.2	410.7	63,801,734	0.0	378.750	0.0	1,936.515	0.0
AGTHX	8,338	0.0	8.2	-20.0	0.011	-2.6	39.6	474,757	0.0	23.168	0.0	136.837	0.0
AGWFX	9,988	0.0	8.0	-20.1	0.012	-2.6	39.4	563,565	0.0	34.066	0.0	195.775	0.0
AIVSX	16,852	0.0	8.6	-91.6	0.014	-34.9	2,064.5	2,990,000,000	0.0	238.608	0.0	1,357.147	0.0
ANWPX	8,338	0.0	5.3	-109.7	0.015	-46.4	3,310.7	3,800,000,000	0.0	138.791	0.0	792.203	0.0
BENDX	7,830	0.0	4.7	-8.3	0.004	-6.1	82.5	2,108,854	0.0	106.780	0.0	591.521	0.0
CHTRX	9,628	0.0	8.3	-27.1	0.012	-4.8	93.6	3,332,902	0.0	48.672	0.0	276.849	0.0
CSTGX	7,801	0.0	24.4	-50.0	0.016	-5.6	159.2	7,967,209	0.0	36.054	0.0	209.566	0.0
DELDX	8,842	0.0	7.8	-19.9	0.009	-4.3	72.1	1,787,927	0.0	38.008	0.0	223.269	0.0
DELFX	8,841	0.0	7.2	-26.7	0.009	-6.8	153.3	8,393,744	0.0	45.611	0.0	265.655	0.0
DELTX	8,841	0.0	7.9	-19.3	0.013	-1.7	24.1	167,484	0.0	29.241	0.0	168.767	0.0
DETWX	8,839	0.0	17.1	-17.4	0.005	-1.3	478.1	83,132,589	0.0	160.161	0.0	828.591	0.0
EHSTX	17,308	0.0	12.2	-19.8	0.009	-2.4	50.7	1,656,977	0.0	82.330	0.0	473.799	0.0
ENDIX	7,833	0.0	11.1	-38.7	0.010	-12.8	401.5	52,040,668	0.0	70.350	0.0	415.151	0.0
EVIFX	17,309	0.0	21.0	-21.6	0.008	-0.9	117.8	9,502,289	0.0	373.219	0.0	1,864.709	0.0
EVSEX	9,568	0.0	109.8	-20.6	0.017	26.4	1,786.3	1,270,000,000	0.0	92.465	0.0	539.321	0.0
FBNDX	8,845	0.0	10.7	-10.8	0.003	-0.4	215.4	16,628,650	0.0	63.018	0.0	342.638	0.0
FCNTX	9,822	0.0	6.0	-32.8	0.011	-5.9	134.3	7,112,001	0.0	39.679	0.0	236.401	0.0
FEQIX	10,078	0.0	5.5	-14.8	0.009	-2.4	35.0	439,831	0.0	34.448	0.0	196.025	0.0
FMAGX	10,829	0.0	10.9	-40.3	0.014	-7.1	157.0	10,787,107	0.0	56.617	0.0	332.976	0.0
FNDR	9,215	0.0	5.3	-9.2	0.008	-2.2	24.5	185,253	0.0	41.865	0.0	242.707	0.0
FNDS	9,209	0.0	6.4	-12.3	0.009	-1.4	17.7	85,739	0.0	22.193	0.0	130.171	0.0
FONDAKI	9,215	0.0	7.5	-14.7	0.010	-1.3	17.4	81,827	0.0	26.832	0.0	159.090	0.0
FSTBX	9,658	0.0	3.3	-14.3	0.006	-3.3	60.0	1,324,416	0.0	29.851	0.0	170.766	0.0
FUSGX	9,451	0.0	3.5	-3.0	0.004	-0.1	16.2	68,215	0.0	92.186	0.0	479.613	0.0
HJVC	9,233	0.0	9.8	-64.9	0.014	-12.4	570.6	124,000,000	0.0	60.585	0.0	348.482	0.0
JANSX	9,225	0.0	285.0	-285.5	0.045	-1.8	3,396.2	4,430,000,000	0.0	420.058	0.0	2,115.083	0.0
LAFFX	14,821	0.0	19.4	-22.6	0.009	-3.1	92.5	4,971,863	0.0	92.059	0.0	516.599	0.0
LAGWX	8,561	0.0	7.8	-110.6	0.017	-33.8	2,125.5	1,610,000,000	0.0	97.889	0.0	563.676	0.0
LBNDX	9,084	0.0	4.3	-6.5	0.004	-4.2	43.8	657,801	0.0	103.832	0.0	565.239	0.0
LMSFX	7,645	0.0	3.5	-3.8	0.003	0.3	30.9	248,740	0.0	69.788	0.0	362.924	0.0
MOMGX	9,717	0.0	68.7	-68.8	0.015	-1.5	1,031.5	428,000,000	0.0	85.515	0.0	505.416	0.0
MPGFX	9,347	0.0	6.6	-15.8	0.009	-1.0	17.6	84,430	0.0	12.201	0.0	72.757	0.0
NPRTX	7,824	0.0	54.3	-52.8	0.014	-3.0	581.3	109,000,000	0.0	98.830	0.0	567.525	0.0
NYVTX	9,344	0.0	11.3	-30.6	0.012	-4.5	91.4	3,075,492	0.0	39.401	0.0	235.701	0.0
OEQAX	7,821	0.0	20.0	-20.7	0.010	-2.4	71.0	1,513,467	0.0	30.878	0.0	183.005	0.0
OPPAX	9,336	0.0	10.4	-21.6	0.010	-4.3	72.9	1,931,753	0.0	37.864	0.0	229.191	0.0
OPPEX	9,086	0.0	22.5	-22.8	0.010	-3.7	174.9	11,206,356	0.0	81.769	0.0	474.065	0.0
OPPSX	8,279	0.0	13.5	-25.5	0.013	-4.7	82.7	2,219,730	0.0	49.736	0.0	288.575	0.0
OPTAX	7,568	0.0	2.7	-3.2	0.003	-0.9	16.9	61,657	0.0	52.532	0.0	268.433	0.0
PENNX	8,343	0.0	7.1	-36.6	0.011	-9.9	238.7	19,442,498	0.0	98.097	0.0	534.297	0.0
PIODX	9,469	0.0	18.7	-17.5	0.010	-1.6	67.1	1,626,911	0.0	47.508	0.0	278.748	0.0
PIOTX	9,461	0.0	9.4	-16.8	0.009	-2.5	39.8	544,635	0.0	41.120	0.0	237.221	0.0
SAVGRFI	8,838	0.0	5.9	-14.4	0.009	-0.9	16.1	64,577	0.0	13.129	0.0	78.073	0.0
SIFEX	9,875	0.0	33.6	-30.5	0.011	-1.0	160.3	10,184,016	0.0	54.942	0.0	300.885	0.0
U1IH	9,964	0.0	8.0	-65.4	0.012	-18.4	956.2	378,000,000	0.0	78.591	0.0	455.293	0.0
UNIFNDS	12,515	0.0	8.9	-14.5	0.011	-1.5	21.4	181,159	0.0	48.598	0.0	288.420	0.0
UNIGLOB	9,953	0.0	8.0	-15.9	0.010	-2.7	37.5	506,892	0.0	40.060	0.0	233.377	0.0
UNIRNTA	9,503	0.0	6.8	-9.6	0.006	-11.2	178.5	12,390,531	0.0	211.905	0.0	1,148.694	0.0
VEXPX	9,780	0.0	25.4	-69.9	0.014	-15.0	750.9	228,000,000	0.0	93.585	0.0	528.564	0.0
VFINX	7,586	0.0	9.0	-17.7	0.010	-1.0	21.5	109,105	0.0	14.251	0.0	82.763	0.0
VMRGX	9,592	0.0	7.9	-57.6	0.013	-12.1	477.3	90,126,539	0.0	57.150	0.0	336.193	0.0
VWELX	8,806	0.0	8.6	-9.5	0.007	-1.7	27.7	228,666	0.0	25.153	0.0	152.965	0.0
VWESX	8,344	0.0	4.2	-3.1	0.004	-0.3	8.0	8,962	0.0	21.084	0.0	106.519	0.0
VWINX	9,097	0.0	11.2	-11.0	0.005	-2.0	91.8	2,998,076	0.0	66.430	0.0	389.662	0.0
VWNDX	12,055	0.0	329.2	-329.3	0.044	-0.1	5,368.8	14,500,000,000	0.0	589.950	0.0	2,947.712	0.0
VWUSX	11,301	0.0	19.8	-70.0	0.015	-14.1	537.5	135,000,000	0.0	92.881	0.0	539.378	0.0
CAPEX	10,047	0.0	5.9	-16.9	0.009	-0.7	18.2	97,791	0.0	13.738	0.0	79.444	0.0

The table presents summary statistics for the daily returns series of each fund. The column "Obser." represents the number of observations considered in each series. The Jarque-Bera, the Cramer-von Mises and the Anderson-Darling statistics are tests for the normality of the distribution. The columns "Mean", "Max", "Min" and "Prob." are in percentage (i.e, 1 represents 1%).

Table 11 – Statistics and results for the normality tests performed in the temporal aggregated series of funds returns: daily frequency – weekly aggregation

Ticker	Obser.	Mean	Max	Min	St. Dev.	Skewness	Kurtosis	Jarque-Bera	Prob.	Cramer-von Mises	Prob.	Anderson - Darling	Prob.
ABALX	1,643	0.1	5.3	-12.4	0.015	-1.4	11.2	5,070	0.0	3.087	0.0	18.754	0.0
ABNDX	1,696	0.0	4.3	-4.6	0.008	-0.7	9.5	3,135	0.0	6.789	0.0	40.074	0.0
ACEGX	1,908	0.1	18.9	-30.1	0.035	-1.1	11.2	5,706	0.0	4.795	0.0	27.013	0.0
ACEIX	2,015	0.0	8.0	-22.2	0.018	-2.3	24.5	40,538	0.0	4.832	0.0	29.090	0.0
ACGIX	2,068	0.0	12.3	-27.2	0.024	-2.0	20.9	28,919	0.0	5.225	0.0	31.141	0.0
ADIF	1,962	0.1	20.9	-15.3	0.026	-0.6	9.5	3,510	0.0	4.051	0.0	25.433	0.0
ADIRT	1,696	0.0	1.8	-8.9	0.010	-6.1	46.2	142,508	0.0	43.708	0.0	237.485	0.0
ADIVERF	1,962	0.1	73.0	-67.4	0.040	3.0	210.5	3,522,397	0.0	35.429	0.0	202.386	0.0
AGTHX	1,749	0.2	9.7	-22.7	0.026	-1.5	12.6	7,317	0.0	2.832	0.0	17.193	0.0
AGWFX	2,068	0.0	13.5	-22.0	0.028	-1.4	11.6	7,112	0.0	3.956	0.0	24.325	0.0
AIVSX	3,553	0.0	9.4	-91.2	0.030	-15.2	407.7	24,378,667	0.0	34.165	0.0	202.781	0.0
ANWPX	1,749	0.0	8.3	-111.0	0.034	-20.1	642.9	29,957,068	0.0	21.072	0.0	124.261	0.0
BENDX	1,643	0.0	5.0	-7.5	0.010	-1.9	14.3	9,673	0.0	12.059	0.0	66.619	0.0
CHTRX	1,962	0.1	11.9	-27.8	0.028	-2.2	19.5	23,761	0.0	6.493	0.0	37.895	0.0
CSTGX	1,589	0.1	12.7	-51.1	0.037	-2.9	33.0	61,745	0.0	4.433	0.0	26.775	0.0
DELDX	1,855	0.0	9.4	-18.0	0.021	-1.8	14.7	11,613	0.0	4.776	0.0	28.633	0.0
DELFX	1,855	0.0	10.4	-26.3	0.022	-2.7	28.4	51,968	0.0	6.517	0.0	37.020	0.0
DELTX	1,855	0.1	14.1	-32.6	0.032	-1.6	14.3	10,605	0.0	3.987	0.0	23.316	0.0
DETWX	1,855	-0.1	5.9	-6.1	0.009	-0.7	10.0	3,883	0.0	11.255	0.0	59.756	0.0
EHSTX	3,658	0.1	12.6	-17.9	0.020	-1.2	11.1	10,949	0.0	8.822	0.0	51.906	0.0
ENDIX	1,643	0.0	7.5	-37.2	0.022	-6.0	90.2	530,722	0.0	9.610	0.0	58.059	0.0
EVIFX	3,658	0.0	19.8	-21.9	0.018	-1.4	21.0	50,554	0.0	15.507	0.0	87.713	0.0
EVSEX	2,015	0.1	110.4	-22.2	0.039	10.9	329.5	8,988,794	0.0	12.515	0.0	74.984	0.0
FBNDX	1,855	0.0	5.1	-3.6	0.007	0.1	8.2	2,077	0.0	3.614	0.0	21.661	0.0
FCNTX	2,068	0.1	12.7	-36.3	0.025	-2.7	32.6	78,072	0.0	4.931	0.0	29.867	0.0
FEQIX	2,121	0.1	9.3	-14.9	0.020	-0.9	8.1	2,543	0.0	3.534	0.0	20.325	0.0
FMAGX	2,280	0.1	11.5	-41.4	0.032	-2.8	27.8	61,411	0.0	7.167	0.0	42.212	0.0
FNDR	1,962	0.0	9.5	-9.6	0.017	-1.1	8.3	2,693	0.0	4.900	0.0	30.349	0.0
FNDS	1,962	0.0	12.3	-14.2	0.021	-0.8	8.1	2,357	0.0	2.932	0.0	18.231	0.0
FONDAKI	1,962	0.1	13.8	-16.0	0.022	-0.8	7.8	2,100	0.0	2.714	0.0	17.486	0.0
FSTBX	2,015	0.0	7.3	-13.5	0.014	-1.3	12.0	7,379	0.0	3.496	0.0	20.208	0.0
FUSGX	1,961	0.0	7.2	-5.8	0.008	0.5	14.9	11,701	0.0	10.103	0.0	58.602	0.0
HJVC	1,962	0.0	20.9	-62.1	0.029	-5.3	110.2	948,709	0.0	8.260	0.0	49.715	0.0
JANSX	1,909	0.0	23.8	-106.8	0.038	-12.5	340.8	9,123,696	0.0	20.102	0.0	114.774	0.0
LAFFX	3,022	0.0	18.5	-19.7	0.020	-1.3	15.3	19,980	0.0	8.766	0.0	51.480	0.0
LAGWX	1,749	0.0	12.5	-111.1	0.040	-12.9	334.6	8,062,773	0.0	13.840	0.0	83.463	0.0
LBNDX	1,855	0.0	3.8	-8.0	0.010	-1.4	9.7	4,108	0.0	8.707	0.0	49.389	0.0
LMSFX	1,589	0.0	6.8	-5.1	0.008	0.3	16.7	12,422	0.0	8.836	0.0	51.242	0.0
MOMGX	2,015	0.0	9.0	-30.4	0.025	-1.6	17.3	17,969	0.0	2.319	0.0	13.772	0.0
MPGFX	1,962	0.1	10.7	-19.5	0.022	-0.6	7.5	1,789	0.0	1.270	0.0	8.024	0.0
NPRTX	1,643	0.1	11.4	-28.0	0.025	-2.8	24.4	33,485	0.0	7.180	0.0	42.683	0.0
NYVTX	1,962	0.1	12.9	-34.1	0.026	-2.4	25.8	44,371	0.0	4.838	0.0	29.007	0.0
OEQAX	1,643	0.1	24.5	-20.9	0.023	-0.9	20.4	21,009	0.0	4.098	0.0	26.338	0.0
OPPAX	1,961	0.1	11.2	-31.7	0.025	-2.7	27.8	52,533	0.0	5.167	0.0	32.196	0.0
OPPEX	1,909	0.0	10.5	-24.9	0.020	-2.6	26.9	47,473	0.0	6.752	0.0	39.983	0.0
OPPSX	1,749	0.1	11.2	-23.8	0.027	-2.2	18.0	17,750	0.0	6.706	0.0	40.509	0.0
OPTAX	1,589	0.0	4.4	-4.4	0.007	-0.4	9.7	2,984	0.0	4.769	0.0	27.771	0.0
PENNX	1,749	0.1	12.6	-37.8	0.028	-3.5	36.4	84,627	0.0	15.819	0.0	86.155	0.0
PIODX	1,961	0.1	17.3	-20.0	0.022	-1.0	13.2	8,893	0.0	3.811	0.0	23.364	0.0
PIOTX	1,961	0.1	9.2	-20.0	0.022	-1.3	11.0	5,713	0.0	4.041	0.0	23.929	0.0
SAVGRFI	1,855	0.1	13.3	-18.9	0.022	-0.5	10.1	3,958	0.0	2.166	0.0	12.942	0.0
SIFEX	2,068	0.1	15.7	-19.8	0.024	-0.8	10.7	5,307	0.0	2.872	0.0	17.572	0.0
U1IH	2,121	0.0	12.9	-56.8	0.025	-6.3	128.5	1,405,765	0.0	9.921	0.0	59.795	0.0
UNIFNDS	2,651	0.1	17.8	-15.1	0.024	-0.7	9.1	4,370	0.0	6.294	0.0	39.616	0.0
UNIGLOB	2,121	0.0	12.9	-16.6	0.022	-1.4	11.3	6,781	0.0	5.072	0.0	31.240	0.0
UNIRNTA	2,014	0.0	2.9	-10.4	0.012	-4.8	35.0	93,571	0.0	32.361	0.0	181.489	0.0
VEXPX	2,068	0.1	13.7	-65.9	0.031	-5.6	109.0	978,472	0.0	9.471	0.0	54.472	0.0
VFINX	1,589	0.1	9.0	-18.3	0.021	-0.7	7.7	1,590	0.0	1.093	0.0	6.475	0.0
VMRGX	2,014	0.0	11.7	-58.3	0.029	-5.1	90.0	643,476	0.0	6.800	0.0	41.416	0.0
VWELX	1,855	0.1	7.8	-9.9	0.016	-0.8	6.7	1,247	0.0	2.688	0.0	15.734	0.0
VWESX	1,749	0.0	5.8	-3.9	0.010	0.0	4.8	244	0.0	1.088	0.0	6.149	0.0
VWINX	1,909	0.0	12.0	-11.6	0.012	-0.7	17.6	17,093	0.0	5.741	0.0	33.383	0.0
VWNDX	2,545	0.0	11.2	-19.7	0.024	-1.6	12.3	10,249	0.0	7.609	0.0	45.418	0.0
VWUSX	2,386	0.0	11.2	-73.3	0.034	-7.1	121.5	1,416,765	0.0	14.077	0.0	84.536	0.0
CAPEX	2,121	0.2	10.4	-21.3	0.021	-0.7	9.1	3,408	0.0	1.622	0.0	9.675	0.0

The table presents summary statistics for the weekly returns of each fund obtained through a non-overlapping sum of the respective daily returns. The column "Obser." represents the number of observations considered in each series. The Jarque-Bera, the Cramer-von Mises and the Anderson-Darling statistics are tests for the normality of the distribution. The columns "Mean", "Max", "Min" and "Prob." are in percentage (i.e, 1 represents 1%).

Table 12 – Statistics and results for the normality tests performed in the temporal aggregated series of funds returns: daily frequency – monthly aggregation

Ticker	Obser.	Mean	Max	Min	St. Dev.	Skewness	Kurtosis	Jarque-Bera	Prob.	Cramer-von Mises	Prob.	Anderson - Darling	Prob.
ABALX	372	0.3	7.5	-14.9	0.029	-1.0	6.2	212	0.0	0.605	0.0	3.526	0.0
ABNDX	384	0.0	9.9	-7.1	0.018	0.3	7.0	264	0.0	0.577	0.0	3.356	0.0
ACEGX	432	0.6	24.8	-36.8	0.074	-0.5	6.3	216	0.0	0.646	0.0	4.006	0.0
ACEIX	456	0.1	11.6	-27.7	0.040	-1.2	9.5	916	0.0	0.838	0.0	4.789	0.0
ACGIX	468	0.1	18.8	-42.8	0.052	-1.6	13.7	2,429	0.0	1.032	0.0	6.046	0.0
ADIF	444	0.3	17.4	-30.0	0.057	-1.0	6.5	302	0.0	0.591	0.0	3.678	0.0
ADIRT	384	0.0	4.0	-9.2	0.020	-2.2	8.4	777	0.0	4.852	0.0	27.874	0.0
ADIVERF	444	0.5	69.3	-30.5	0.057	3.3	51.3	44,004	0.0	1.664	0.0	12.319	0.0
AGTHX	396	0.7	16.8	-27.1	0.053	-0.8	5.8	170	0.0	0.273	0.1	1.867	0.0
AGWFX	468	0.2	15.4	-30.3	0.056	-0.9	5.4	169	0.0	0.577	0.0	3.588	0.0
AIVSX	804	0.1	11.9	-91.1	0.062	-7.1	91.2	267,386	0.0	5.360	0.0	35.190	0.0
ANWPX	396	0.2	12.1	-105.6	0.070	-9.1	135.1	293,548	0.0	3.485	0.0	21.603	0.0
BENDX	372	0.0	6.3	-8.2	0.020	-0.6	4.8	72	0.0	0.403	0.0	2.470	0.0
CHTRX	444	0.4	15.2	-27.7	0.056	-1.2	7.0	408	0.0	0.790	0.0	5.172	0.0
CSTGX	360	0.6	18.6	-43.9	0.079	-1.3	7.6	420	0.0	0.501	0.0	3.248	0.0
DELDX	420	0.1	12.5	-22.9	0.043	-0.9	5.8	193	0.0	0.714	0.0	4.237	0.0
DELFX	420	0.1	11.9	-36.2	0.048	-1.8	13.8	2,276	0.0	1.139	0.0	6.557	0.0
DELTX	420	0.4	18.5	-49.4	0.070	-1.5	9.9	992	0.0	0.495	0.0	3.273	0.0
DETWX	420	-0.3	11.8	-9.0	0.024	-0.1	6.0	155	0.0	0.982	0.0	5.878	0.0
EHSTX	828	0.2	17.9	-27.0	0.044	-1.0	7.5	846	0.0	1.239	0.0	7.939	0.0
ENDIX	372	0.1	11.3	-38.0	0.045	-3.2	26.3	9,099	0.0	1.781	0.0	10.458	0.0
EVIFX	828	0.1	21.6	-26.8	0.040	-0.9	8.7	1,245	0.0	1.809	0.0	10.744	0.0
EVSEX	456	0.3	107.2	-32.8	0.082	4.4	66.0	76,826	0.0	1.796	0.0	13.256	0.0
FBNDX	420	-0.1	10.2	-6.8	0.018	0.2	8.0	445	0.0	0.670	0.0	3.960	0.0
FCNTX	468	0.4	17.3	-38.0	0.053	-1.6	12.2	1,832	0.0	0.527	0.0	3.850	0.0
FEQIX	480	0.4	15.4	-22.1	0.046	-0.7	5.5	169	0.0	0.635	0.0	3.817	0.0
FMAGX	516	0.6	18.4	-36.8	0.069	-1.3	7.7	613	0.0	0.894	0.0	5.573	0.0
FNDR	444	0.2	11.4	-20.4	0.038	-1.0	5.9	225	0.0	0.634	0.0	4.143	0.0
FNDS	444	0.2	13.5	-33.0	0.048	-1.3	8.6	709	0.0	0.831	0.0	4.727	0.0
FONDAKI	444	0.4	14.8	-31.3	0.051	-1.0	7.0	366	0.0	0.377	0.0	2.583	0.0
FSTBX	456	0.1	9.9	-12.9	0.031	-0.5	4.8	82	0.0	0.464	0.0	2.888	0.0
FUSGX	444	-0.1	14.9	-10.2	0.019	1.0	19.3	5,002	0.0	3.269	0.0	19.040	0.0
HJVC	444	0.1	17.4	-66.3	0.065	-3.0	28.3	12,463	0.0	1.365	0.0	8.393	0.0
JANSX	432	0.2	15.5	-106.0	0.076	-6.8	90.6	141,323	0.0	3.675	0.0	21.349	0.0
LAFFX	684	0.2	14.0	-25.6	0.040	-0.8	6.3	371	0.0	0.754	0.0	4.464	0.0
LAGWX	396	0.1	17.5	-109.5	0.090	-5.2	59.6	54,602	0.0	1.868	0.0	12.355	0.0
LBNDX	420	-0.1	8.1	-10.4	0.024	-0.4	5.2	98	0.0	0.792	0.0	4.720	0.0
LMSFX	360	-0.1	10.0	-11.6	0.022	-0.8	9.2	604	0.0	1.620	0.0	9.918	0.0
MOMGX	456	0.2	14.5	-34.6	0.055	-1.1	8.4	652	0.0	0.300	0.0	1.993	0.0
MPGFX	444	0.6	14.5	-32.5	0.047	-0.9	8.3	589	0.0	0.302	0.0	1.992	0.0
NPRTX	372	0.4	10.0	-30.2	0.052	-1.7	8.4	617	0.0	1.170	0.0	7.173	0.0
NYVTX	444	0.4	12.7	-32.7	0.054	-1.6	9.0	860	0.0	0.853	0.0	5.760	0.0
OEQAX	372	0.2	12.3	-25.8	0.044	-1.0	6.5	252	0.0	0.324	0.0	2.196	0.0
OPPAX	444	0.4	15.4	-55.3	0.056	-2.7	25.3	9,683	0.0	0.701	0.0	5.091	0.0
OPPEX	432	0.2	14.7	-25.6	0.045	-1.5	8.9	796	0.0	1.251	0.0	8.436	0.0
OPPSX	396	0.2	14.7	-26.8	0.056	-1.1	6.0	234	0.0	1.073	0.0	6.791	0.0
OPTAX	360	0.0	7.0	-8.3	0.019	-0.6	5.8	146	0.0	0.937	0.0	5.255	0.0
PENNX	396	0.4	26.1	-36.7	0.063	-1.3	10.2	952	0.0	1.838	0.0	10.923	0.0
PIODX	444	0.3	12.3	-31.7	0.045	-1.2	8.8	722	0.0	0.454	0.0	2.755	0.0
PIOTX	444	0.5	20.8	-31.7	0.051	-1.0	8.2	576	0.0	0.825	0.0	4.885	0.0
SAVGRFI	420	0.6	21.4	-32.4	0.051	-0.9	8.2	524	0.0	0.748	0.0	4.417	0.0
SIFEX	468	0.3	17.3	-33.2	0.053	-1.0	7.3	426	0.0	0.422	0.0	2.690	0.0
U1IH	480	-0.1	12.7	-63.9	0.056	-3.9	40.2	28,958	0.0	1.712	0.0	10.823	0.0
UNIFNDS	600	0.3	15.2	-26.8	0.052	-0.7	5.3	189	0.0	0.451	0.0	2.824	0.0
UNIGLOB	480	0.1	12.7	-35.4	0.048	-1.4	9.7	1,061	0.0	0.708	0.0	4.434	0.0
UNIRNTA	456	-0.1	6.1	-11.2	0.025	-1.6	7.0	504	0.0	2.905	0.0	17.538	0.0
VEXPX	468	0.2	15.2	-66.2	0.067	-2.6	24.2	9,282	0.0	0.668	0.0	4.567	0.0
VFINX	360	0.6	12.0	-27.3	0.043	-1.0	7.8	398	0.0	0.383	0.0	2.353	0.0
VMRGX	456	0.1	12.7	-60.6	0.062	-2.7	24.8	9,573	0.0	1.019	0.0	6.398	0.0
VWELX	420	0.2	10.1	-16.4	0.033	-0.7	5.1	109	0.0	0.440	0.0	2.641	0.0
VWESX	396	0.0	9.9	-8.3	0.021	0.0	5.1	71	0.0	0.220	0.3	1.461	0.1
VWINX	432	0.1	10.0	-9.3	0.024	-0.1	4.3	33	0.0	0.338	0.0	1.797	0.0
VWNDX	576	0.2	18.7	-24.1	0.052	-1.0	5.9	299	0.0	1.174	0.0	7.236	0.0
VWUSX	540	0.0	17.8	-62.6	0.072	-3.3	26.2	13,062	0.0	2.743	0.0	16.608	0.0
CAPEX	480	0.7	14.8	-28.7	0.044	-0.8	7.3	418	0.0	0.373	0.0	2.428	0.0

The table presents summary statistics for the monthly returns of each fund obtained through a non-overlapping sum of the respective daily returns. The column "Obser." represents the number of observations considered in each series. The Jarque-Bera, the Cramer-von Mises and the Anderson-Darling statistics are tests for the normality of the distribution. The columns "Mean", "Max", "Min" and "Prob." are in percentage (i.e, 1 represents 1%).

Table 13 – Statistics and results for the normality tests performed in the temporal aggregated series of funds returns: daily frequency – quarterly aggregation

Ticker	Obser.	Mean	Max	Min	St. Dev.	Skewness	Kurtosis	Jarque-Bera	Prob.	Cramer-von Mises	Prob.	Anderson-Darling	Prob.
ABALX	124	0.8	13.1	-17.0	0.051	-0.5	4.2	13	0.13	0.196	0.60	1.090	0.74
ABNDX	128	0.0	12.7	-10.5	0.032	0.3	6.1	51	0.00	0.209	0.42	1.458	0.09
ACEGX	144	1.8	40.2	-49.4	0.148	-0.3	4.2	10	0.56	0.269	0.08	1.567	0.05
ACEIX	152	0.2	19.0	-31.2	0.076	-0.9	5.3	52	0.00	0.336	0.01	1.952	0.01
ACGIX	156	0.4	23.1	-43.4	0.095	-1.0	5.9	79	0.00	0.313	0.02	1.875	0.01
ADIF	148	0.8	27.2	-40.5	0.109	-0.9	5.4	56	0.00	0.326	0.02	2.134	0.00
ADIRT	128	0.1	8.7	-8.1	0.034	-0.6	2.8	7	3.35	0.356	0.01	2.237	0.00
ADIVERF	148	1.6	70.7	-36.0	0.106	1.3	14.8	905	0.00	0.404	0.00	2.638	0.00
AGTHX	132	2.1	26.0	-28.0	0.097	-0.8	4.0	18	0.01	0.279	0.06	1.655	0.03
AGWFX	156	0.5	23.0	-44.0	0.113	-1.0	4.5	40	0.00	0.386	0.00	2.198	0.00
AIVSX	268	0.2	20.2	-89.0	0.107	-3.9	28.6	7,988	0.00	2.048	0.00	12.152	0.00
ANWPX	132	0.6	24.2	-97.6	0.118	-4.6	37.9	7,155	0.00	1.022	0.00	6.217	0.00
BENDX	124	-0.1	15.4	-9.1	0.035	0.3	5.7	41	0.00	0.174	1.15	1.063	0.86
CHTRX	148	1.1	27.4	-46.7	0.109	-1.1	5.6	70	0.00	0.284	0.05	1.876	0.01
CSTGX	120	1.8	32.5	-81.4	0.159	-1.7	8.7	215	0.00	0.386	0.00	2.279	0.00
DELDX	140	0.4	16.1	-33.8	0.075	-0.9	5.4	54	0.00	0.234	0.20	1.283	0.25
DELFX	140	0.3	18.5	-59.1	0.094	-2.0	13.4	724	0.00	0.459	0.00	2.577	0.00
DELTX	140	1.2	31.8	-44.7	0.139	-0.7	3.6	12	0.21	0.148	2.53	1.043	0.97
DETWX	140	-0.8	17.9	-13.7	0.050	0.1	4.6	15	0.05	0.234	0.21	1.427	0.11
EHSTX	276	0.7	23.0	-30.6	0.076	-0.8	4.8	72	0.00	0.529	0.00	2.980	0.00
ENDIX	124	0.4	14.1	-36.1	0.079	-1.7	8.6	225	0.00	0.387	0.00	2.480	0.00
EVIFX	276	0.3	17.0	-27.5	0.068	-0.8	4.7	62	0.00	0.427	0.00	2.510	0.00
EVSEX	152	0.8	99.9	-39.9	0.149	1.4	15.3	1,009	0.00	0.623	0.00	3.811	0.00
FBNDX	140	-0.2	13.4	-11.1	0.033	0.0	5.6	40	0.00	0.184	0.85	1.221	0.35
FCNTX	156	1.1	24.2	-38.4	0.101	-0.9	4.9	45	0.00	0.242	0.16	1.532	0.06
FEQIX	160	1.1	21.3	-30.8	0.085	-0.6	4.1	17	0.02	0.423	0.00	2.230	0.00
FMAGX	216	1.4	34.1	-50.5	0.121	-0.6	5.3	61	0.00	1.031	0.00	5.006	0.00
FNDR	148	0.5	15.4	-23.8	0.070	-0.8	4.5	30	0.00	0.197	0.59	1.375	0.15
FNDS	148	0.6	21.9	-38.2	0.093	-1.0	5.4	58	0.00	0.244	0.15	1.540	0.06
FONDAKI	148	1.2	23.4	-38.0	0.096	-0.9	5.3	54	0.00	0.234	0.20	1.624	0.04
FSTBX	152	0.2	14.8	-20.4	0.057	-0.5	4.5	20	0.00	0.272	0.07	1.445	0.10
FUSGX	148	-0.2	18.6	-15.0	0.037	0.4	12.5	556	0.00	1.139	0.00	6.969	0.00
HJVC	148	0.3	27.2	-69.1	0.124	-1.7	10.1	385	0.00	0.611	0.00	3.696	0.00
JANSX	144	0.6	22.9	-92.7	0.129	-2.9	20.7	2,079	0.00	0.582	0.00	3.456	0.00
LAFFX	228	0.6	21.2	-37.4	0.072	-0.9	6.4	139	0.00	0.225	0.26	1.470	0.09
LAGWX	132	0.4	33.4	-95.0	0.150	-1.9	13.8	724	0.00	0.238	0.18	1.528	0.06
LBNDX	140	-0.2	16.4	-13.8	0.045	0.0	4.7	17	0.02	0.213	0.37	1.429	0.11
LMSFX	120	-0.2	14.8	-19.8	0.043	-0.9	8.3	157	0.00	0.705	0.00	4.194	0.00
MOMGX	152	0.5	22.8	-38.4	0.105	-0.8	4.2	26	0.00	0.202	0.51	1.224	0.35
MPGFX	148	1.8	23.9	-35.9	0.092	-0.9	5.0	46	0.00	0.393	0.00	2.181	0.00
NPRTX	124	1.2	17.0	-34.2	0.091	-1.2	4.8	45	0.00	0.495	0.00	2.869	0.00
NYVTX	148	1.2	22.8	-43.4	0.106	-1.3	6.2	101	0.00	0.278	0.06	1.779	0.02
OEQAX	124	0.7	22.5	-36.7	0.079	-1.0	6.2	70	0.00	0.190	0.72	1.105	0.68
OPPAX	148	1.2	23.2	-61.4	0.107	-1.6	9.9	355	0.00	0.306	0.03	1.788	0.01
OPPEX	144	0.7	25.4	-26.5	0.082	-0.4	4.2	14	0.11	0.436	0.00	2.306	0.00
OPPSX	132	0.7	31.5	-36.2	0.100	-0.7	4.4	21	0.00	0.355	0.01	2.005	0.00
OPTAX	120	0.0	13.8	-18.0	0.040	-0.9	8.0	141	0.00	0.589	0.00	3.496	0.00
PENNX	132	1.3	53.2	-39.2	0.125	-0.2	6.2	56	0.00	0.622	0.00	3.359	0.00
PIODX	148	0.9	20.5	-35.1	0.083	-0.8	4.9	39	0.00	0.235	0.20	1.303	0.22
PIOTX	148	1.6	31.8	-35.1	0.096	-0.4	4.8	25	0.00	0.234	0.20	1.307	0.22
SAVGRFI	140	1.8	31.4	-34.1	0.096	-0.8	4.9	35	0.00	0.282	0.05	1.786	0.01
SIFEX	156	1.0	27.6	-38.3	0.096	-1.0	5.3	60	0.00	0.275	0.06	1.883	0.01
U1IH	160	-0.2	21.2	-54.3	0.103	-1.8	9.5	366	0.00	0.531	0.00	3.208	0.00
UNIFNDS	200	0.8	28.1	-40.7	0.102	-0.7	4.9	45	0.00	0.294	0.04	1.804	0.01
UNIGLOB	160	0.3	21.2	-49.1	0.095	-1.3	7.0	151	0.00	0.339	0.01	1.989	0.00
UNIRNTA	152	-0.2	12.5	-13.1	0.043	-0.3	3.1	2	32.64	0.146	2.69	0.905	2.11
VEXPX	156	0.7	30.5	-78.7	0.134	-1.6	10.1	387	0.00	0.306	0.03	1.882	0.01
VFINX	120	1.8	17.2	-26.7	0.075	-0.9	4.4	25	0.00	0.161	1.69	1.078	0.79
VMRGX	152	0.4	27.7	-52.8	0.117	-1.4	7.3	167	0.00	0.581	0.00	3.116	0.00
VWELX	140	0.7	16.0	-17.1	0.056	-0.4	3.7	6	5.99	0.150	2.40	0.746	5.21
VWESX	132	-0.1	15.6	-11.0	0.041	0.2	4.0	6	4.87	0.054	45.79	0.325	52.34
VWINX	144	0.4	15.9	-10.4	0.042	0.1	3.9	5	8.61	0.044	60.50	0.337	50.46
VWNDX	192	0.6	31.0	-41.8	0.100	-1.0	5.7	87	0.00	0.439	0.00	2.604	0.00
VWUSX	180	0.1	23.4	-58.0	0.132	-1.7	7.2	224	0.00	1.163	0.00	6.622	0.00
CAPEX	160	2.1	23.4	-33.0	0.087	-0.9	5.4	61	0.00	0.359	0.01	2.121	0.00

The table presents summary statistics for the quarterly returns of each fund obtained through a non-overlapping sum of the respective daily returns. The column "Obser." represents the number of observations considered in each series. The Jarque-Bera, the Cramer-von Mises and the Anderson-Darling statistics are tests for the normality of the distribution. The columns "Mean", "Max", "Min" and "Prob." are in percentage (i.e, 1 represents 1%).

Table 14 – Statistics and results for the normality tests performed in the temporal aggregated series of funds returns: daily frequency – semi-annual aggregation

Ticker	Obser.	Mean	Max	Min	St. Dev.	Skewness	Kurtosis	Jarque-Bera	Prob.	Cramer-von Mises	Prob.	Anderson-Darling	Prob.
ABALX	62	1.6	21.8	-18.1	0.068	-0.4	4.4	6.9	3.21	0.068	29.87	0.627	10.22
ABNDX	64	0.0	17.1	-11.6	0.044	0.6	5.4	19.1	0.01	0.082	19.65	0.597	11.87
ACEGX	72	3.5	68.0	-67.2	0.206	-0.1	5.1	12.8	0.17	0.100	11.42	0.752	5.03
ACEIX	76	0.4	31.6	-29.1	0.104	-0.5	4.5	9.9	0.71	0.127	4.90	0.975	1.42
ACGIX	78	0.8	35.2	-35.2	0.125	-0.4	4.0	5.6	6.09	0.084	18.66	0.653	8.83
ADIF	74	1.6	33.7	-43.0	0.142	-0.5	3.4	3.4	18.29	0.051	49.68	0.314	54.59
ADIRT	64	0.2	9.3	-7.7	0.039	0.0	2.1	2.1	34.92	0.109	8.38	0.690	7.16
ADIVERF	74	3.3	76.3	-31.9	0.146	1.4	10.1	178.3	0.00	0.099	11.44	0.850	2.89
AGTHX	66	4.2	38.7	-26.5	0.132	-0.3	3.0	0.8	67.34	0.065	32.88	0.486	22.60
AGWFX	78	1.0	38.3	-38.2	0.144	-0.4	3.0	1.9	39.22	0.165	1.49	0.889	2.31
AIVSX	134	0.4	33.6	-79.6	0.146	-2.2	11.8	531.3	0.00	0.704	0.00	4.278	0.00
ANWPX	66	1.2	39.1	-108.1	0.175	-3.6	24.3	1,395.2	0.00	0.578	0.00	3.659	0.00
BENDX	62	-0.1	19.0	-12.5	0.047	0.8	6.6	39.5	0.00	0.071	27.17	0.552	15.47
CHTRX	74	2.2	37.3	-41.3	0.147	-0.6	3.6	6.0	4.93	0.157	1.90	0.912	2.03
CSTGX	60	3.5	43.3	-80.0	0.219	-0.9	5.3	21.7	0.00	0.085	17.67	0.546	16.05
DELDX	70	0.8	26.4	-32.0	0.103	-0.2	3.5	1.3	53.18	0.031	83.07	0.238	78.19
DELFX	70	0.6	31.6	-55.8	0.133	-1.1	6.8	56.3	0.00	0.181	0.93	1.168	0.47
DELTX	70	2.4	54.0	-51.1	0.193	-0.2	3.3	1.0	61.99	0.048	53.26	0.311	55.37
DETWX	70	-1.6	24.0	-21.1	0.076	0.2	4.5	7.2	2.79	0.139	3.38	0.840	3.06
EHSTX	138	1.5	28.3	-30.6	0.107	-0.6	3.6	11.2	0.37	0.235	0.20	1.534	0.06
ENDIX	62	0.7	24.2	-28.6	0.100	-0.8	4.3	11.0	0.40	0.157	1.90	1.024	1.08
EVIFX	138	0.5	27.1	-22.3	0.095	-0.1	3.4	1.1	57.90	0.134	3.86	0.865	2.65
EVSEX	76	1.7	80.0	-35.9	0.183	0.7	6.3	42.5	0.00	0.164	1.58	1.069	0.83
FBNDX	70	-0.4	14.5	-11.5	0.044	0.0	4.3	5.3	7.07	0.098	11.88	0.660	8.51
FCNTX	78	2.1	43.1	-44.5	0.141	-0.5	4.3	8.5	1.45	0.116	6.84	0.689	7.18
FEQIX	80	2.3	39.3	-29.3	0.123	-0.1	4.0	3.4	18.26	0.144	2.91	0.931	1.83
FMAGX	86	3.5	66.9	-69.5	0.195	-0.4	5.4	23.4	0.00	0.095	13.31	0.701	6.71
FNDR	74	0.9	21.1	-23.8	0.091	-0.5	3.2	2.8	24.33	0.094	13.40	0.527	17.89
FNDS	74	1.3	23.8	-33.7	0.128	-0.4	2.6	2.1	35.55	0.036	75.24	0.336	50.66
FONDAKI	74	2.3	27.2	-34.9	0.126	-0.5	3.2	3.4	18.22	0.051	49.75	0.338	50.37
FSTBX	76	0.4	26.1	-22.5	0.080	0.1	4.7	9.5	0.85	0.153	2.20	0.980	1.38
FUSGX	74	-0.4	22.0	-16.3	0.045	1.0	11.5	236.4	0.00	0.357	0.00	2.192	0.00
HJVC	74	0.7	33.7	-53.7	0.155	-0.8	4.4	14.5	0.07	0.091	14.96	0.595	12.07
JANSX	72	1.1	32.8	-75.1	0.158	-1.5	9.0	137.9	0.00	0.112	7.68	0.856	2.80
LAFFX	114	1.1	35.4	-34.2	0.100	-0.2	4.5	11.4	0.33	0.067	30.36	0.442	28.84
LAGWX	66	0.7	48.7	-77.1	0.181	-0.9	7.1	56.1	0.00	0.078	21.88	0.646	9.21
LBNDX	70	-0.5	18.6	-16.4	0.064	0.4	3.8	4.0	13.37	0.064	33.12	0.453	27.08
LMSFX	60	-0.3	18.8	-21.8	0.060	-0.8	6.6	38.4	0.00	0.346	0.01	1.994	0.00
MOMGX	76	1.1	27.9	-34.4	0.145	-0.2	2.6	1.3	52.10	0.040	67.98	0.313	54.73
MPGFX	74	3.6	40.9	-31.7	0.125	-0.3	4.1	5.1	8.00	0.158	1.87	0.949	1.64
NPRTX	62	2.3	21.9	-33.2	0.117	-0.8	3.4	6.8	3.36	0.123	5.45	0.798	3.88
NYVTX	74	2.5	28.3	-48.4	0.145	-1.2	5.0	30.4	0.00	0.199	0.55	1.375	0.15
OEQAX	62	1.5	23.4	-30.3	0.099	-0.4	3.4	2.2	33.85	0.025	90.35	0.207	86.81
OPPAX	74	2.5	28.5	-48.5	0.149	-0.6	3.6	5.2	7.36	0.045	58.25	0.329	51.66
OPPEX	72	1.3	39.4	-26.1	0.121	0.3	3.8	2.5	28.03	0.088	16.42	0.566	14.32
OPPSX	66	1.4	49.5	-30.4	0.138	0.1	4.3	4.7	9.32	0.055	43.78	0.455	26.85
OPTAX	60	-0.1	16.8	-17.0	0.055	-0.7	5.5	20.1	0.00	0.276	0.06	1.612	0.04
PENNX	66	2.7	88.9	-48.6	0.179	1.3	10.3	166.2	0.00	0.215	0.35	1.480	0.08
PIODX	74	1.9	34.3	-28.0	0.117	-0.3	3.6	1.8	39.93	0.136	3.66	0.732	5.65
PIOTX	74	3.1	47.2	-31.6	0.137	0.1	4.0	3.3	19.33	0.079	21.04	0.504	20.42
SAVGRFI	70	3.6	39.0	-37.7	0.138	-0.5	3.8	4.6	10.14	0.101	10.78	0.650	8.99
SIFEX	78	2.0	29.7	-39.4	0.132	-0.6	3.5	5.8	5.41	0.075	24.26	0.557	15.07
U1IH	80	-0.3	25.1	-46.4	0.141	-0.8	4.0	11.8	0.27	0.108	8.84	0.750	5.09
UNIFNDS	100	1.7	35.9	-36.2	0.139	-0.2	3.3	1.2	54.67	0.031	83.39	0.256	72.61
UNIGLOB	80	0.5	25.1	-44.2	0.133	-0.6	3.4	5.0	8.11	0.085	18.05	0.545	16.12
UNIRNTA	76	-0.5	11.1	-13.6	0.057	0.1	2.4	1.5	48.27	0.040	67.29	0.283	63.63
VEXPX	78	1.4	40.5	-67.7	0.181	-0.8	4.8	19.9	0.00	0.206	0.45	1.147	0.54
VFINX	60	3.7	23.6	-22.3	0.097	-0.3	2.7	1.1	56.30	0.043	62.39	0.262	70.53
VMRGX	76	0.9	43.5	-49.9	0.162	-0.6	4.4	11.2	0.37	0.233	0.21	1.274	0.26
VWELX	70	1.4	21.7	-18.1	0.079	0.0	3.1	0.0	97.97	0.025	90.63	0.181	91.46
VWESX	66	-0.1	15.1	-12.6	0.056	-0.1	3.2	0.1	95.33	0.096	12.75	0.655	8.74
VWINX	72	0.8	15.3	-11.7	0.056	0.1	2.9	0.1	94.21	0.022	94.83	0.146	96.81
VWNDX	96	1.2	43.3	-47.1	0.136	-0.6	4.9	20.0	0.00	0.096	12.60	0.740	5.39
VWUSX	90	0.2	39.0	-56.7	0.178	-0.8	3.7	11.9	0.26	0.296	0.04	1.696	0.02
CAPEX	80	4.1	34.7	-29.0	0.115	-0.3	4.0	4.5	10.40	0.163	1.60	0.914	2.01

The table presents summary statistics for the semi-annual returns of each fund obtained through a non-overlapping sum of the respective daily returns. The column "Obser." represents the number of observations considered in each series. The Jarque-Bera, the Cramer-von Mises and the Anderson-Darling statistics are tests for the normality of the distribution. The columns "Mean", "Max", "Min" and "Prob." are in percentage (i.e, 1 represents 1%).

Table 15 – Statistics and results for the normality tests performed in the temporal aggregated series of funds returns: daily frequency – annual aggregation

Ticker	Obser.	Mean	Max	Min	St. Dev.	Skewness	Kurtosis	Jarque-Bera	Prob.	Cramer-von Mises	Prob.	Anderson-Darling	Prob.
ABALX	31	3.2	18.1	-10.0	0.086	0.2	2.1	1.3	53.19	0.051	49.53	0.458	26.37
ABNDX	32	-0.1	15.2	-13.1	0.064	0.4	3.0	1.0	59.31	0.064	33.10	0.398	36.74
ACEGX	36	7.0	63.0	-53.4	0.271	-0.3	3.2	0.7	69.04	0.134	3.92	0.755	4.94
ACEIX	38	0.8	28.2	-42.3	0.147	-0.8	3.7	4.7	9.40	0.076	23.58	0.521	18.54
ACGIX	39	1.5	28.5	-37.9	0.158	-0.3	2.8	0.7	69.47	0.033	81.09	0.232	79.99
ADIF	37	3.2	46.7	-64.4	0.228	-0.5	3.6	2.3	31.50	0.046	57.46	0.320	53.29
ADIRT	32	0.4	10.6	-8.5	0.046	0.1	2.6	0.3	85.41	0.053	47.07	0.315	54.40
ADIVERF	37	6.6	93.8	-45.1	0.251	0.8	5.6	14.9	0.06	0.083	19.07	0.578	13.33
AGTHX	33	8.5	37.3	-31.1	0.162	-0.8	3.1	3.1	20.99	0.157	1.94	0.829	3.24
AGWFX	39	1.9	30.9	-36.4	0.192	-0.5	2.1	2.8	24.42	0.178	1.01	0.971	1.45
AIVSX	67	0.8	31.4	-91.1	0.194	-2.0	9.6	166.6	0.00	0.288	0.05	1.886	0.01
ANWPX	33	2.5	32.2	-95.0	0.226	-2.5	11.6	135.0	0.00	0.258	0.10	1.668	0.03
BENDX	31	-0.2	18.1	-12.4	0.069	0.6	3.3	1.7	41.84	0.062	35.21	0.371	42.26
CHTRX	37	4.4	33.2	-33.1	0.177	-0.3	2.1	2.0	36.47	0.086	17.57	0.580	13.17
CSTGX	30	7.1	56.7	-50.8	0.257	-0.1	2.9	0.1	97.11	0.085	17.81	0.556	15.10
DELDX	35	1.6	26.7	-22.8	0.131	-0.1	2.3	0.8	66.24	0.053	46.68	0.313	54.83
DELFX	35	1.1	28.6	-35.0	0.162	-0.4	2.6	1.0	59.70	0.051	49.40	0.370	42.52
DELTX	35	4.7	55.3	-50.9	0.230	-0.4	3.0	0.8	67.85	0.050	50.61	0.317	53.94
DETWX	35	-3.1	22.9	-34.7	0.122	-0.3	3.3	0.6	73.72	0.046	57.72	0.300	58.13
EHSTX	69	3.0	34.6	-48.3	0.141	-0.8	4.2	11.0	0.41	0.178	1.02	0.997	1.25
ENDIX	31	1.5	23.6	-23.6	0.113	0.0	2.6	0.2	90.77	0.018	98.53	0.134	97.97
EVIFX	69	1.0	28.2	-27.3	0.117	-0.1	2.7	0.3	84.09	0.014	99.61	0.100	99.62
EVSEX	38	3.4	90.3	-63.9	0.268	0.2	5.0	6.9	3.12	0.112	7.67	0.703	6.63
FBNDX	35	-0.8	13.9	-14.0	0.065	0.0	2.5	0.4	83.09	0.026	89.12	0.195	89.10
FCNTX	39	4.3	39.0	-54.8	0.194	-0.8	3.7	4.6	9.79	0.090	15.55	0.546	16.06
FEQIX	40	4.5	53.4	-39.4	0.183	-0.1	3.4	0.3	86.82	0.059	39.40	0.370	42.65
FMAGX	43	7.0	54.5	-73.0	0.268	-0.6	3.5	3.4	18.44	0.060	37.52	0.388	38.72
FNDR	37	1.8	31.6	-32.2	0.140	-0.3	2.7	0.6	73.32	0.034	78.75	0.220	83.46
FNDS	37	2.5	38.6	-44.3	0.193	-0.4	2.6	1.2	55.29	0.028	87.40	0.215	84.83
FONDAKI	37	4.6	48.0	-43.0	0.204	-0.3	2.9	0.6	75.16	0.043	63.27	0.324	52.48
FSTBX	38	0.7	18.9	-27.8	0.108	-0.9	4.1	7.6	2.23	0.150	2.36	1.008	1.18
FUSGX	37	-0.7	25.2	-12.7	0.063	1.6	9.1	73.0	0.00	0.155	2.06	1.094	0.72
HJVC	37	1.4	46.7	-64.4	0.231	-0.5	3.4	1.5	47.23	0.045	59.85	0.291	60.87
JANSX	36	2.3	33.7	-77.3	0.233	-1.1	4.9	13.3	0.13	0.079	21.14	0.589	12.50
LAFFX	57	2.3	29.6	-27.3	0.127	-0.3	2.9	0.7	69.61	0.134	3.83	0.729	5.73
LAGWX	33	1.5	41.3	-88.2	0.263	-1.2	5.4	16.6	0.03	0.072	26.43	0.557	15.03
LBNDX	35	-1.0	20.1	-20.3	0.099	0.2	2.8	0.4	80.41	0.028	87.00	0.224	82.45
LMSFX	30	-0.6	27.9	-26.9	0.099	-0.1	5.0	5.3	7.21	0.183	0.87	1.045	0.95
MOMGX	38	2.2	49.4	-44.0	0.195	-0.2	3.0	0.3	86.93	0.056	43.32	0.329	51.54
MPGFX	37	7.2	35.5	-47.3	0.169	-0.9	4.5	8.8	1.24	0.055	43.51	0.446	28.18
NPRTX	31	4.7	32.6	-30.2	0.148	-0.3	2.9	0.6	73.36	0.048	54.14	0.284	63.31
NYVTX	37	4.9	27.6	-35.3	0.179	-0.8	2.6	4.6	10.04	0.221	0.29	1.353	0.17
OEQAX	31	3.0	23.6	-20.5	0.121	-0.2	2.1	1.4	50.62	0.065	32.92	0.404	35.55
OPPAX	37	4.9	38.3	-35.5	0.205	-0.3	2.2	1.7	42.28	0.091	15.07	0.534	17.19
OPPEX	36	2.6	39.7	-36.7	0.168	-0.2	2.8	0.4	83.52	0.039	70.43	0.222	82.93
OPPSX	33	2.9	55.1	-36.4	0.195	0.1	3.4	0.3	83.95	0.112	7.77	0.595	12.01
OPTAX	30	-0.1	24.5	-23.6	0.093	-0.3	4.2	2.2	32.58	0.276	0.06	1.344	0.18
PENNX	33	5.3	82.8	-65.9	0.242	0.2	6.4	15.7	0.04	0.143	2.96	0.959	1.55
PIODX	37	3.7	28.3	-31.0	0.146	-0.4	2.5	1.5	46.23	0.110	8.33	0.548	15.88
PIOTX	37	6.3	42.0	-32.3	0.156	-0.3	3.3	0.7	68.99	0.096	12.65	0.536	17.04
SAVGRFI	35	7.2	43.3	-62.3	0.220	-1.2	4.6	11.4	0.33	0.148	2.54	0.881	2.42
SIFEX	39	4.0	40.5	-44.7	0.184	-0.7	3.6	3.4	18.15	0.101	10.98	0.592	12.26
U1IH	40	-0.6	27.4	-38.3	0.177	-0.3	2.4	1.4	50.86	0.034	78.29	0.287	62.34
UNIFNDS	50	3.3	50.3	-54.5	0.218	-0.2	2.9	0.2	89.59	0.067	30.21	0.353	46.53
UNIGLOB	40	1.0	42.1	-38.3	0.184	-0.2	2.7	0.4	82.08	0.026	90.02	0.206	87.18
UNIRNTA	38	-1.0	11.7	-17.5	0.061	-0.1	3.1	0.1	93.95	0.033	81.04	0.233	79.88
VEXPX	39	2.8	43.4	-51.5	0.230	-0.4	2.7	1.2	54.01	0.064	33.06	0.364	43.91
VFINX	30	7.3	28.6	-27.8	0.138	-0.6	2.7	1.7	42.35	0.047	56.11	0.345	48.56
VMRGX	38	1.7	34.6	-42.2	0.191	-0.6	2.6	2.6	26.72	0.187	0.79	0.947	1.67
VWELX	35	2.9	22.3	-29.4	0.109	-0.8	3.7	4.3	11.93	0.057	42.07	0.405	35.36
VWESX	33	-0.2	15.7	-15.9	0.074	-0.1	2.8	0.2	91.32	0.033	80.06	0.195	89.20
VWINX	36	1.6	17.6	-15.9	0.082	-0.4	2.8	1.3	52.78	0.071	27.55	0.475	23.99
VWNDX	48	2.5	41.0	-33.4	0.160	-0.3	3.2	0.8	66.97	0.125	5.18	0.777	4.36
VWUSX	45	0.5	44.8	-45.9	0.239	-0.4	2.4	2.2	32.95	0.113	7.39	0.793	3.99
CAPEX	40	8.2	29.9	-38.8	0.150	-1.1	4.2	10.2	0.60	0.130	4.42	0.870	2.58

The table presents summary statistics for the annual returns of each fund obtained through a non-overlapping sum of the respective daily returns. The column "Obser." represents the number of observations considered in each series. The Jarque-Bera, the Cramer-von Mises and the Anderson-Darling statistics are tests for the normality of the distribution. The columns "Mean", "Max", "Min" and "Prob." are in percentage (i.e, 1 represents 1%).

Table 16 – Statistics and results for the normality tests performed in the temporal aggregated series of funds returns: weekly frequency – no aggregation

Ticker	Obser.	Mean	Max	Min	St. Dev.	Skewness	Kurtosis	Jarque-Bera	Prob.	Cramer-von Mises	Prob.	Anderson - Darling	Prob.
ABALX	1,618	0.1	5.6	-13.7	0.014	-1.5	12.3	6,409	0.0	2.896	0.0	18.164	0.0
ABNDX	1,670	0.0	4.1	-4.7	0.008	-1.0	8.9	2,635	0.0	6.972	0.0	40.676	0.0
ACEGX	1,879	0.1	18.9	-32.5	0.035	-1.4	14.5	10,876	0.0	4.957	0.0	29.080	0.0
ACEIX	1,981	0.0	9.1	-21.6	0.018	-2.1	21.5	29,814	0.0	4.566	0.0	28.257	0.0
ACGIX	2,034	0.0	11.1	-26.0	0.024	-1.9	18.3	21,124	0.0	4.765	0.0	28.830	0.0
ADIF	1,931	0.1	18.1	-20.2	0.025	-0.8	9.3	3,411	0.0	3.281	0.0	20.034	0.0
ADIRT	1,670	0.0	1.8	-8.6	0.010	-6.0	45.1	133,563	0.0	41.730	0.0	228.438	0.0
ADIVERF	1,931	0.1	72.9	-68.6	0.040	2.8	212.9	3,546,239	0.0	35.673	0.0	203.137	0.0
AGTHX	1,722	0.2	9.9	-20.3	0.025	-1.3	11.0	5,135	0.0	2.133	0.0	13.933	0.0
AGWFX	2,035	0.0	13.0	-21.7	0.028	-1.4	11.9	7,425	0.0	3.779	0.0	24.351	0.0
AIVSX	3,548	0.0	11.5	-90.1	0.030	-14.5	378.2	20,931,645	0.0	33.834	0.0	201.572	0.0
ANWPX	1,722	0.1	8.3	-109.0	0.034	-19.6	619.2	27,350,655	0.0	21.599	0.0	126.753	0.0
BENDX	1,618	0.0	5.8	-7.8	0.010	-1.9	14.2	9,483	0.0	11.238	0.0	62.625	0.0
CHTRX	1,931	0.1	11.9	-29.2	0.028	-2.3	21.4	28,997	0.0	5.929	0.0	36.121	0.0
CSTGX	1,565	0.1	15.7	-51.0	0.038	-2.8	31.6	55,553	0.0	4.331	0.0	26.886	0.0
DELDX	1,826	0.0	10.0	-17.8	0.020	-1.8	14.0	10,234	0.0	3.954	0.0	25.865	0.0
DELFX	1,826	0.0	11.3	-28.0	0.022	-3.0	33.6	73,979	0.0	5.913	0.0	36.751	0.0
DELTX	1,826	0.1	18.2	-30.4	0.032	-1.5	13.8	9,579	0.0	3.948	0.0	23.851	0.0
DETWX	1,826	-0.1	17.3	-17.1	0.011	-0.6	64.7	289,929	0.0	16.995	0.0	90.058	0.0
EHSTX	3,600	0.1	13.6	-18.1	0.020	-1.2	12.4	14,115	0.0	7.894	0.0	49.092	0.0
ENDIX	1,618	0.0	8.6	-37.0	0.022	-5.8	85.5	468,228	0.0	8.983	0.0	55.557	0.0
EVIFX	3,548	0.0	10.0	-24.4	0.018	-2.1	21.5	53,172	0.0	11.342	0.0	66.936	0.0
EVSEX	1,983	0.1	110.9	-27.9	0.039	10.4	317.8	8,226,720	0.0	12.953	0.0	79.085	0.0
FBNDX	1,826	0.0	4.0	-4.0	0.007	-0.1	7.1	1,275	0.0	2.999	0.0	18.149	0.0
FCNTX	2,035	0.1	12.0	-33.2	0.025	-2.3	26.1	47,131	0.0	4.245	0.0	26.843	0.0
FEQIX	2,087	0.1	8.4	-13.0	0.020	-1.0	8.4	2,880	0.0	3.164	0.0	19.541	0.0
FMAGX	2,244	0.1	12.4	-42.3	0.032	-3.0	29.4	68,564	0.0	7.023	0.0	43.307	0.0
FNDR	1,931	0.0	8.7	-9.2	0.016	-1.1	7.7	2,173	0.0	3.667	0.0	23.134	0.0
FNDS	1,931	0.0	9.1	-16.6	0.021	-1.0	8.4	2,689	0.0	2.330	0.0	14.504	0.0
FONDAKI	1,931	0.1	13.9	-17.0	0.022	-0.8	7.9	2,112	0.0	2.172	0.0	13.907	0.0
FSTBX	1,931	0.0	8.3	-14.8	0.014	-1.1	13.1	8,642	0.0	2.464	0.0	15.256	0.0
FUSGX	1,931	0.0	5.1	-5.8	0.008	0.0	11.3	5,503	0.0	8.399	0.0	48.704	0.0
HJVC	1,931	0.0	18.1	-61.0	0.029	-5.5	111.9	963,742	0.0	7.130	0.0	42.858	0.0
JANSX	1,879	0.0	13.9	-106.2	0.037	-13.4	372.0	10,717,459	0.0	18.330	0.0	105.069	0.0
LAFFX	2,922	0.0	12.0	-17.1	0.020	-1.2	10.1	6,742	0.0	6.716	0.0	39.829	0.0
LAGWX	1,722	0.0	12.1	-110.1	0.040	-12.9	335.3	7,972,166	0.0	13.300	0.0	81.567	0.0
LBNDX	1,826	0.0	4.1	-7.3	0.010	-1.4	9.4	3,727	0.0	8.405	0.0	47.201	0.0
LMSFX	1,565	0.0	7.2	-6.6	0.008	0.4	18.8	16,230	0.0	9.109	0.0	52.450	0.0
MOMGX	1,983	0.0	9.1	-29.8	0.025	-1.5	16.3	15,322	0.0	2.155	0.0	12.849	0.0
MPGFX	2,505	0.1	11.9	-108.7	0.033	-18.1	547.0	31,025,300	0.0	26.080	0.0	156.196	0.0
NPRTX	1,618	0.1	7.8	-27.4	0.025	-3.2	27.5	43,311	0.0	7.044	0.0	43.917	0.0
NYVTX	1,931	0.1	11.3	-32.6	0.026	-2.3	23.8	36,415	0.0	4.816	0.0	30.203	0.0
OEQAX	1,618	0.1	10.3	-18.9	0.023	-1.5	12.0	6,096	0.0	3.025	0.0	20.067	0.0
OPPAX	1,931	0.1	10.2	-40.9	0.025	-3.5	46.7	157,683	0.0	4.855	0.0	30.987	0.0
OPPEX	1,879	0.1	16.5	-25.3	0.020	-2.3	28.8	53,650	0.0	7.002	0.0	42.947	0.0
OPPSX	1,722	0.1	17.0	-24.0	0.027	-2.3	19.9	21,903	0.0	6.704	0.0	41.129	0.0
OPTAX	1,565	0.0	3.7	-4.3	0.007	-0.4	8.3	1,849	0.0	4.392	0.0	26.011	0.0
PENNX	1,722	0.1	11.4	-38.2	0.027	-3.7	39.0	96,792	0.0	15.357	0.0	84.463	0.0
PIODX	1,930	0.1	10.4	-16.8	0.022	-1.0	9.0	3,215	0.0	3.119	0.0	19.536	0.0
PIOTX	1,930	0.1	8.2	-32.9	0.024	-2.6	27.5	50,288	0.0	6.153	0.0	37.914	0.0
SAVGRFI	1,774	0.1	13.8	-18.3	0.023	-0.7	10.1	3,843	0.0	2.423	0.0	14.269	0.0
SIFEX	2,034	0.1	15.1	-23.0	0.024	-0.8	11.5	6,382	0.0	2.335	0.0	14.796	0.0
U1IH	2,035	0.0	10.5	-56.7	0.025	-6.5	132.4	1,433,438	0.0	8.508	0.0	52.163	0.0
UNIFNDS	2,609	0.1	17.1	-18.0	0.024	-0.7	9.3	4,552	0.0	4.796	0.0	29.692	0.0
UNIGLOB	2,035	0.0	10.5	-18.3	0.022	-1.4	11.2	6,262	0.0	4.024	0.0	25.066	0.0
UNIRNTA	1,982	0.0	2.9	-11.1	0.012	-5.0	36.3	99,844	0.0	31.767	0.0	179.520	0.0
VEXPX	1,722	0.1	10.5	-68.4	0.032	-7.0	136.6	1,294,523	0.0	8.968	0.0	52.716	0.0
VFINX	1,565	0.1	8.4	-13.0	0.022	-0.6	6.2	751	0.0	1.042	0.0	6.678	0.0
VMRGX	1,982	0.0	10.6	-57.8	0.029	-5.0	86.9	589,403	0.0	6.852	0.0	42.593	0.0
VWELX	1,731	0.1	8.8	-9.4	0.016	-0.8	7.0	1,338	0.0	2.095	0.0	13.666	0.0
VWESX	1,722	0.0	5.0	-4.6	0.010	-0.1	4.7	211	0.0	1.018	0.0	5.920	0.0
VWINX	1,879	0.0	12.5	-11.7	0.012	-0.6	17.2	15,913	0.0	3.964	0.0	23.589	0.0
VWNDX	2,505	0.0	12.0	-20.9	0.024	-1.9	14.2	14,608	0.0	7.784	0.0	47.491	0.0
VWUSX	2,348	0.0	13.7	-64.9	0.033	-5.9	91.7	783,849	0.0	12.166	0.0	73.432	0.0
CAPEX	2,087	0.2	13.1	-17.7	0.021	-0.5	7.6	1,914	0.0	1.301	0.0	8.736	0.0

The table presents summary statistics for the weekly returns series of each fund. The column "Obser." represents the number of observations considered in each series. The Jarque-Bera, the Cramer-von Mises and the Anderson-Darling statistics are tests for the normality of the distribution. The columns "Mean", "Max", "Min" and "Prob." are in percentage (i.e, 1 represents 1%).

Table 17 – Statistics and results for the normality tests performed in the temporal aggregated series of funds returns: weekly frequency – monthly aggregation

Ticker	Obser.	Mean	Max	Min	St. Dev.	Skewness	Kurtosis	Jarque-Bera	Prob.	Cramer-von Mises	Prob.	Anderson - Darling	Prob.
ABALX	372	0.3	8.1	-14.8	0.030	-1.0	5.8	179	0.0	0.495	0.0	3.279	0.0
ABNDX	384	0.0	10.4	-6.9	0.018	0.3	7.1	280	0.0	0.593	0.0	3.645	0.0
ACEGX	432	0.6	28.1	-29.2	0.079	-0.3	5.6	126	0.0	0.706	0.0	4.678	0.0
ACEIX	456	0.1	15.5	-24.5	0.041	-1.1	8.2	596	0.0	0.930	0.0	5.386	0.0
ACGIX	468	0.1	16.4	-34.6	0.051	-1.3	9.1	877	0.0	0.845	0.0	5.352	0.0
ADIF	444	0.3	15.6	-27.8	0.058	-1.0	6.1	253	0.0	0.508	0.0	3.271	0.0
ADIRT	384	0.0	3.9	-9.0	0.020	-2.2	8.3	746	0.0	5.038	0.0	28.707	0.0
ADIVERF	444	0.5	77.3	-20.8	0.061	4.1	60.1	61,630	0.0	1.926	0.0	13.852	0.0
AGTHX	396	0.7	17.1	-26.2	0.055	-0.8	5.2	123	0.0	0.255	0.1	1.925	0.0
AGWFX	468	0.2	15.8	-29.6	0.058	-0.9	5.3	161	0.0	0.661	0.0	4.405	0.0
AIVSX	815	0.1	23.5	-93.0	0.065	-6.6	82.2	218,938	0.0	5.750	0.0	36.489	0.0
ANWPX	396	0.2	13.5	-104.4	0.070	-8.5	124.5	248,513	0.0	3.321	0.0	20.266	0.0
BENDX	372	0.0	6.0	-8.4	0.020	-0.7	5.2	104	0.0	0.625	0.0	3.867	0.0
CHTRX	444	0.4	18.3	-28.2	0.058	-1.1	7.0	397	0.0	0.793	0.0	5.219	0.0
CSTGX	360	0.6	20.0	-50.9	0.084	-1.5	8.7	623	0.0	0.825	0.0	5.229	0.0
DELDX	420	0.1	13.3	-19.0	0.043	-0.9	5.1	128	0.0	0.620	0.0	4.187	0.0
DELFX	420	0.1	12.1	-33.2	0.048	-1.8	12.5	1,792	0.0	1.089	0.0	6.399	0.0
DELTX	420	0.4	19.4	-41.7	0.072	-1.2	7.4	441	0.0	0.491	0.0	3.147	0.0
DETWX	420	-0.3	12.6	-9.2	0.024	0.1	6.1	166	0.0	0.821	0.0	5.130	0.0
EHSTX	828	0.2	16.2	-29.0	0.044	-1.0	7.2	739	0.0	1.347	0.0	8.432	0.0
ENDIX	372	0.1	11.8	-38.7	0.047	-3.4	26.8	9,508	0.0	1.823	0.0	11.063	0.0
EVIFX	816	0.1	18.4	-28.8	0.038	-1.3	9.5	1,662	0.0	1.824	0.0	10.903	0.0
EVSEX	456	0.3	108.5	-29.3	0.083	4.4	65.3	75,119	0.0	1.614	0.0	12.278	0.0
FBNDX	420	-0.1	10.8	-7.8	0.017	0.2	8.6	557	0.0	0.762	0.0	4.805	0.0
FCNTX	468	0.4	12.7	-35.8	0.053	-1.5	10.4	1,249	0.0	0.541	0.0	3.670	0.0
FEQIX	480	0.4	15.0	-18.3	0.046	-0.5	4.4	58	0.0	0.345	0.0	2.419	0.0
FMAGX	516	0.6	19.2	-35.7	0.072	-1.1	6.7	402	0.0	0.799	0.0	4.973	0.0
FNDR	444	0.2	10.3	-19.5	0.038	-1.0	5.4	175	0.0	0.601	0.0	3.845	0.0
FNDS	444	0.2	13.8	-24.1	0.049	-0.9	5.5	176	0.0	0.678	0.0	3.986	0.0
FONDAKI	444	0.4	13.4	-22.1	0.051	-0.8	5.0	130	0.0	0.332	0.0	2.435	0.0
FSTBX	444	0.1	10.1	-13.5	0.031	-0.5	4.9	81	0.0	0.409	0.0	2.642	0.0
FUSGX	444	-0.1	15.2	-11.4	0.019	0.8	19.8	5,282	0.0	2.886	0.0	17.246	0.0
HJVC	444	0.1	15.6	-59.0	0.065	-2.4	19.9	5,697	0.0	1.077	0.0	6.815	0.0
JANSX	432	0.2	14.7	-102.9	0.077	-6.1	77.5	102,515	0.0	3.274	0.0	19.014	0.0
LAFFX	672	0.2	13.0	-22.9	0.041	-0.9	5.9	325	0.0	0.848	0.0	4.999	0.0
LAGWX	396	0.1	14.8	-105.9	0.088	-4.9	55.5	47,007	0.0	1.714	0.0	11.211	0.0
LBNDX	420	-0.1	8.2	-10.7	0.024	-0.3	5.1	82	0.0	0.746	0.0	4.457	0.0
LMSFX	360	0.0	9.7	-11.2	0.022	-0.8	9.0	573	0.0	1.836	0.0	11.068	0.0
MOMGX	456	0.2	16.5	-31.8	0.054	-1.0	7.3	417	0.0	0.373	0.0	2.429	0.0
MPGFX	576	0.3	13.3	-107.3	0.072	-8.0	110.3	282,255	0.0	4.871	0.0	30.027	0.0
NPRTX	372	0.4	11.0	-30.0	0.053	-1.6	7.9	520	0.0	1.099	0.0	6.895	0.0
NYVTX	444	0.4	16.5	-31.2	0.055	-1.2	7.3	450	0.0	0.685	0.0	4.503	0.0
OEQAX	372	0.3	12.4	-23.3	0.047	-0.9	5.5	152	0.0	0.551	0.0	3.074	0.0
OPPAX	444	0.4	13.5	-42.4	0.056	-1.6	11.4	1,499	0.0	0.496	0.0	3.870	0.0
OPPEX	432	0.2	12.3	-30.7	0.045	-1.7	10.5	1,226	0.0	1.324	0.0	8.395	0.0
OPPSX	396	0.2	18.5	-22.3	0.057	-0.8	4.9	107	0.0	0.927	0.0	5.930	0.0
OPTAX	360	0.0	7.0	-8.8	0.020	-0.6	6.5	212	0.0	1.245	0.0	7.001	0.0
PENNX	396	0.5	25.9	-35.9	0.064	-1.1	9.4	756	0.0	1.877	0.0	11.153	0.0
PIODX	444	0.3	11.4	-26.2	0.047	-0.9	5.9	214	0.0	0.382	0.0	2.442	0.0
PIOTX	444	0.3	15.7	-42.5	0.056	-1.5	11.2	1,402	0.0	1.013	0.0	6.346	0.0
SAVGRFI	408	0.6	19.8	-22.6	0.052	-0.7	6.2	200	0.0	0.784	0.0	5.016	0.0
SIFEX	468	0.3	15.9	-33.0	0.054	-0.9	6.8	356	0.0	0.283	0.0	2.137	0.0
U1IH	468	-0.1	14.4	-56.7	0.055	-3.0	27.1	11,976	0.0	1.626	0.1	10.055	0.0
UNIFNDS	600	0.3	15.0	-25.1	0.053	-0.8	5.5	229	0.0	0.471	0.0	3.248	0.0
UNIGLOB	468	0.0	14.4	-23.4	0.049	-1.1	6.1	274	0.0	0.828	0.0	5.253	0.0
UNIRNTA	456	-0.1	6.3	-11.3	0.025	-1.7	7.2	566	0.0	3.271	0.0	19.491	0.0
VEXPX	396	0.3	18.2	-67.9	0.070	-2.7	25.2	8,628	0.0	0.813	0.0	5.307	0.0
VFINX	360	0.6	13.5	-26.0	0.045	-1.0	6.8	276	0.0	0.385	0.0	2.673	0.0
VMRGX	456	0.1	15.6	-60.1	0.063	-2.5	21.6	7,059	0.0	0.829	0.0	5.453	0.0
VWELX	399	0.3	8.7	-14.5	0.033	-0.7	4.4	62	0.0	0.274	0.0	1.788	0.0
VWESX	396	0.0	9.4	-8.6	0.021	-0.3	5.1	75	0.0	0.406	0.1	2.658	0.0
VWINX	432	0.1	8.6	-8.2	0.023	-0.2	4.0	22	0.0	0.262	0.0	1.569	0.0
VWNDX	576	0.2	15.2	-19.5	0.052	-0.8	4.6	119	0.0	0.970	0.1	6.040	0.1
VWUSX	540	0.0	16.5	-63.3	0.074	-3.2	24.3	11,149	0.0	2.854	0.0	16.934	0.0
CAPEX	480	0.7	13.3	-28.1	0.045	-0.9	6.8	363	0.0	0.329	0.0	2.359	0.0

The table presents summary statistics for the monthly returns of each fund obtained through a non-overlapping sum of the respective weekly returns. The column "Obser." represents the number of observations considered in each series. The Jarque-Bera, the Cramer-von Mises and the Anderson-Darling statistics are tests for the normality of the distribution. The columns "Mean", "Max", "Min" and "Prob." are in percentage (i.e, 1 represents 1%).

Table 18 – Statistics and results for the normality tests performed in the temporal aggregated series of funds returns: weekly frequency – quarterly aggregation

Ticker	Obser.	Mean	Max	Min	St. Dev.	Skewness	Kurtosis	Jarque-Bera	Prob.	Cramer-von Mises	Prob.	Anderson - Darling	Prob.
ABALX	124	0.8	13.1	-16.7	0.052	-0.5	4.1	11.9	0.3	0.173	1.2	1.008	1.2
ABNDX	128	0.0	12.7	-10.1	0.032	0.3	5.7	40.4	0.0	0.160	1.8	1.099	0.7
ACEGX	144	1.8	41.0	-53.2	0.153	-0.2	4.5	15.2	0.1	0.352	0.0	2.089	0.0
ACEIX	152	0.2	20.6	-31.9	0.076	-0.8	5.6	59.8	0.0	0.368	0.0	2.178	0.0
ACGIX	156	0.4	23.1	-44.4	0.095	-1.1	6.2	95.4	0.0	0.326	0.0	2.072	0.0
ADIF	148	0.8	26.9	-39.2	0.109	-0.9	5.3	53.5	0.0	0.296	0.0	1.945	0.0
ADIRT	128	0.1	8.7	-8.1	0.034	-0.5	2.8	6.1	4.8	0.314	0.0	1.987	0.0
ADIVERF	148	1.6	75.7	-33.6	0.108	1.7	17.3	1,321.5	0.0	0.447	0.0	2.897	0.0
AGTHX	132	2.1	26.7	-28.6	0.098	-0.5	3.6	6.8	3.4	0.141	3.1	0.753	5.0
AGWFX	156	0.5	26.8	-36.8	0.111	-0.7	3.5	14.2	0.1	0.342	0.0	2.020	0.0
AIVSX	272	0.2	20.7	-89.8	0.108	-3.8	28.3	7,899.0	0.0	1.948	0.0	11.722	0.0
ANWPX	132	0.7	25.3	-98.0	0.120	-4.4	36.0	6,422.1	0.0	0.931	0.0	5.788	0.0
BENDX	124	-0.1	15.0	-8.7	0.035	0.3	5.3	30.0	0.0	0.206	0.5	1.224	0.4
CHTRX	148	1.1	27.5	-34.4	0.107	-0.7	3.8	16.1	0.0	0.302	0.0	1.716	0.0
CSTGX	120	1.8	32.4	-50.9	0.151	-0.9	4.2	22.0	0.0	0.246	0.1	1.460	0.1
DELDX	140	0.4	18.3	-33.6	0.075	-0.9	5.4	53.0	0.0	0.246	0.2	1.399	0.1
DELFX	140	0.3	19.4	-59.3	0.095	-1.9	13.0	669.7	0.0	0.424	0.0	2.416	0.0
DELTX	140	1.2	35.0	-44.1	0.143	-0.6	3.4	8.1	1.8	0.167	1.4	1.005	1.2
DETWX	140	-0.8	18.0	-15.1	0.050	0.1	4.8	18.3	0.0	0.228	0.2	1.435	0.1
EHSTX	276	0.7	18.7	-30.6	0.074	-1.0	5.2	107.3	0.0	0.496	0.0	3.048	0.0
ENDIX	124	0.4	16.5	-37.5	0.081	-1.7	8.7	232.1	0.0	0.359	0.0	2.370	0.0
EVIFX	272	0.2	15.9	-28.9	0.064	-0.8	4.7	64.8	0.0	0.425	0.0	2.573	0.0
EVSEX	152	0.8	99.7	-38.0	0.146	1.5	15.8	1,098.3	0.0	0.514	0.0	3.197	0.0
FBNDX	140	-0.2	13.4	-11.3	0.033	0.1	5.5	36.8	0.0	0.151	2.3	1.058	0.9
FCNTX	156	1.1	25.6	-40.6	0.102	-0.9	5.2	52.4	0.0	0.260	0.1	1.565	0.1
FEQIX	160	1.1	23.4	-20.1	0.084	-0.3	3.5	4.3	11.8	0.339	0.0	1.874	0.0
FMAGX	172	1.8	31.4	-47.8	0.137	-0.6	4.0	18.4	0.0	0.219	0.3	1.239	0.3
FNDR	148	0.5	15.4	-25.2	0.070	-0.8	4.5	29.1	0.0	0.148	2.5	1.092	0.7
FNDS	148	0.6	18.9	-34.1	0.093	-0.9	4.8	41.8	0.0	0.252	0.1	1.594	0.0
FONDAKI	148	1.1	23.4	-36.5	0.096	-0.9	5.0	45.0	0.0	0.188	0.8	1.419	0.1
FSTBX	148	0.4	15.0	-19.8	0.057	-0.5	4.6	22.7	0.0	0.252	0.1	1.554	0.1
FUSGX	148	-0.2	18.6	-14.2	0.037	0.6	11.7	472.7	0.0	1.034	0.0	6.289	0.0
HJVC	148	0.3	26.9	-64.7	0.122	-1.6	8.9	279.1	0.0	0.522	0.0	3.227	0.0
JANSX	144	0.6	22.5	-89.0	0.127	-2.7	19.2	1,745.6	0.0	0.650	0.0	3.669	0.0
LAFFX	224	0.5	20.4	-37.5	0.073	-1.0	6.4	142.9	0.0	0.297	0.0	1.862	0.0
LAGWX	132	0.4	32.6	-90.6	0.148	-1.8	12.3	542.5	0.0	0.237	0.2	1.440	0.1
LBNDX	140	-0.2	16.4	-13.7	0.047	0.1	4.6	15.6	0.0	0.207	0.4	1.303	0.2
LMSFX	120	-0.1	14.8	-19.9	0.044	-1.0	8.3	160.9	0.0	0.835	0.0	4.897	0.0
MOMGX	152	0.5	21.7	-32.0	0.103	-0.8	3.4	16.1	0.0	0.337	0.0	1.911	0.0
MPGFX	192	0.9	24.5	-104.2	0.129	-3.9	28.9	5,865.2	0.0	1.725	0.0	9.752	0.0
NPRTX	124	1.2	17.6	-35.9	0.089	-1.0	4.7	36.1	0.0	0.229	0.2	1.444	0.1
NYVTX	148	1.2	22.1	-47.0	0.105	-1.2	6.3	104.3	0.0	0.223	0.3	1.402	0.1
OEQAX	124	0.8	20.3	-23.0	0.077	-0.4	3.4	4.7	9.6	0.154	2.1	0.776	4.4
OPPAX	148	1.2	23.2	-57.5	0.107	-1.4	8.2	212.3	0.0	0.280	0.1	1.643	0.0
OPPEX	144	0.7	23.7	-28.9	0.080	-0.3	4.2	11.8	0.3	0.388	0.0	1.998	0.0
OPPSX	132	0.7	31.4	-40.3	0.102	-0.6	4.8	25.1	0.0	0.212	0.4	1.259	0.3
OPTAX	120	0.0	13.8	-19.1	0.041	-1.0	8.3	161.0	0.0	0.702	0.0	4.059	0.0
PENNX	132	1.4	59.1	-39.5	0.128	0.1	6.9	85.5	0.0	0.752	0.0	4.024	0.0
PIODX	148	0.9	20.7	-35.3	0.085	-0.8	4.9	37.9	0.0	0.288	0.1	1.589	0.0
PIOTX	148	0.9	30.9	-41.7	0.103	-0.5	5.0	29.5	0.0	0.215	0.4	1.245	0.3
SAVGRFI	136	1.8	30.0	-34.6	0.094	-1.0	5.6	59.7	0.0	0.389	0.0	2.446	0.0
SIFEX	156	1.0	27.6	-39.2	0.096	-0.9	5.1	49.6	0.0	0.191	0.7	1.380	0.1
U1IH	156	-0.3	18.1	-50.6	0.102	-1.6	7.8	216.6	0.0	0.529	0.0	3.001	0.0
UNIFNDS	200	0.8	27.8	-38.1	0.103	-0.6	4.6	34.0	0.0	0.211	0.4	1.329	0.2
UNIGLOB	156	0.1	18.1	-45.0	0.095	-1.1	5.6	76.2	0.0	0.371	0.0	2.018	0.0
UNIRNTA	152	-0.2	12.0	-14.1	0.044	-0.3	3.0	2.5	28.2	0.108	8.7	0.641	9.4
VEXPX	132	1.0	28.4	-79.1	0.138	-1.7	10.7	386.5	0.0	0.283	0.1	1.804	0.0
VFINX	120	1.8	14.9	-25.0	0.075	-0.9	4.1	20.5	0.0	0.223	0.3	1.407	0.1
VMRGX	152	0.4	28.0	-51.7	0.111	-1.1	5.8	80.3	0.0	0.400	0.0	2.222	0.0
VWELX	133	0.8	16.0	-16.8	0.059	-0.3	3.6	4.6	9.9	0.097	12.5	0.571	13.9
VWESX	132	-0.1	15.6	-11.6	0.042	0.2	3.9	5.3	7.0	0.031	82.9	0.225	82.0
VWINX	144	0.4	15.9	-13.0	0.042	0.1	4.0	5.7	5.9	0.046	57.7	0.329	51.7
VWNDX	192	0.6	30.8	-45.6	0.099	-0.8	5.2	60.0	0.0	0.341	0.0	2.074	0.0
VWUSX	180	0.1	24.5	-57.3	0.131	-1.7	7.2	222.6	0.0	1.143	0.0	6.567	0.0
CAPEX	160	2.1	23.4	-32.6	0.086	-0.9	5.2	55.5	0.0	0.271	0.1	1.694	0.0

The table presents summary statistics for the quarterly returns of each fund obtained through a non-overlapping sum of the respective weekly returns. The column “Obser.” represents the number of observations considered in each series. The Jarque-Bera, the Cramer-von Mises and the Anderson-Darling statistics are tests for the normality of the distribution. The columns “Mean”, “Max”, “Min” and “Prob.” are in percentage (i.e, 1 represents 1%).

Table 19 – Statistics and results for the normality tests performed in the temporal aggregated series of funds returns: weekly frequency – semi-annual aggregation

Ticker	Obser.	Mean	Max	Min	St. Dev.	Skewness	Kurtosis	Jarque-Bera	Prob.	Cramer-von Mises	Prob.	Anderson-Darling	Prob.
ABALX	62	1.7	21.7	-17.0	0.068	-0.3	4.1	4.3	11.94	0.048	53.31	0.470	24.70
ABNDX	64	0.0	16.5	-14.4	0.046	0.2	5.5	16.9	0.02	0.074	25.16	0.542	16.45
ACEGX	72	3.6	69.7	-69.3	0.209	0.0	5.3	16.0	0.03	0.088	16.57	0.743	5.28
ACEIX	76	0.4	33.0	-30.0	0.105	-0.4	4.7	11.1	0.39	0.166	1.49	1.121	0.62
ACGIX	78	0.8	36.1	-36.6	0.128	-0.5	4.1	7.6	2.19	0.115	6.96	0.866	2.63
ADIF	74	1.6	37.2	-41.8	0.144	-0.5	3.4	3.1	20.97	0.100	11.11	0.562	14.61
ADIRT	64	0.2	9.9	-8.3	0.040	0.0	2.2	1.7	42.12	0.088	16.41	0.575	13.53
ADIVERF	74	3.3	81.0	-30.8	0.150	1.6	11.2	240.6	0.00	0.129	4.57	1.035	1.01
AGTHX	66	4.3	39.4	-26.7	0.134	-0.2	3.1	0.5	77.47	0.028	87.37	0.266	69.20
AGWFX	78	0.9	39.5	-30.5	0.138	-0.1	2.7	0.3	85.95	0.062	35.28	0.396	37.10
AIVSX	136	0.3	34.2	-80.4	0.147	-2.2	11.7	538.4	0.00	0.715	0.00	4.343	0.00
ANWPX	66	1.4	40.1	-108.4	0.180	-3.4	22.4	1,166.3	0.00	0.479	0.00	3.189	0.00
BENDX	62	-0.1	18.7	-15.1	0.047	0.4	6.7	37.1	0.00	0.074	24.78	0.641	9.46
CHTRX	74	2.2	38.9	-35.4	0.144	-0.3	3.0	1.1	56.94	0.111	7.96	0.605	11.59
CSTGX	60	3.6	47.9	-42.2	0.198	-0.2	2.9	0.4	80.90	0.032	82.41	0.228	81.33
DELDX	70	0.8	26.4	-32.2	0.103	-0.2	3.5	1.2	54.81	0.028	86.97	0.217	84.42
DELFX	70	0.6	32.0	-55.8	0.135	-1.0	6.6	49.8	0.00	0.168	1.37	1.114	0.64
DELTX	70	2.4	55.9	-53.6	0.198	-0.3	3.4	1.3	52.23	0.045	59.36	0.292	60.77
DETWX	70	-1.6	24.1	-20.9	0.077	0.2	4.3	5.5	6.41	0.108	8.79	0.690	7.17
EHSTX	138	1.5	29.4	-31.8	0.107	-0.6	3.6	9.5	0.85	0.163	1.60	1.095	0.72
ENDIX	62	0.8	24.0	-30.0	0.102	-0.8	4.4	11.9	0.26	0.145	2.75	0.942	1.71
EVIFX	136	0.4	23.6	-22.2	0.089	-0.2	3.4	1.7	42.15	0.113	7.50	0.692	7.08
EVSEX	76	1.6	80.9	-34.7	0.182	0.8	6.6	50.9	0.00	0.145	2.74	1.014	1.14
FBNDX	70	-0.4	14.9	-13.1	0.044	-0.1	4.8	9.1	1.08	0.104	10.06	0.682	7.48
FCNTX	78	2.1	44.5	-46.8	0.140	-0.5	4.7	12.8	0.16	0.153	2.16	0.898	2.20
FEQIX	80	2.2	38.4	-29.3	0.119	0.1	4.1	4.1	12.74	0.135	3.75	0.903	2.14
FMAGX	86	3.6	61.3	-69.3	0.197	-0.5	5.1	19.4	0.01	0.086	17.16	0.652	8.91
FNDR	74	0.9	23.1	-23.1	0.092	-0.4	3.1	2.2	33.98	0.136	3.65	0.717	6.14
FNDS	74	1.2	25.0	-31.8	0.131	-0.3	2.5	1.8	41.56	0.042	64.16	0.319	53.46
FONDAKI	74	2.3	29.9	-34.1	0.129	-0.5	3.2	3.8	15.10	0.109	8.49	0.654	8.79
FSTBX	74	0.9	26.2	-21.0	0.078	0.2	4.6	8.2	1.70	0.096	12.62	0.683	7.45
FUSGX	74	-0.4	21.5	-19.8	0.046	0.4	12.2	263.6	0.00	0.450	0.00	2.739	0.00
HJVC	74	0.7	37.2	-50.1	0.155	-0.7	4.0	9.7	0.77	0.146	2.69	0.818	3.46
JANSX	72	1.2	34.6	-78.3	0.156	-1.7	11.0	225.3	0.00	0.172	1.23	1.237	0.32
LAFFX	112	1.1	34.6	-34.4	0.101	-0.2	4.5	10.9	0.42	0.063	34.85	0.428	31.16
LAGWX	66	0.7	48.0	-73.9	0.181	-0.8	6.2	35.0	0.00	0.065	33.00	0.571	13.90
LBNDX	70	-0.5	18.6	-17.1	0.066	0.4	3.7	3.8	14.73	0.059	39.44	0.505	20.23
LMSFX	60	-0.3	15.7	-25.7	0.059	-1.4	8.0	80.5	0.00	0.344	0.01	1.951	0.01
MOMGX	76	1.1	25.0	-32.3	0.138	-0.2	2.6	1.2	54.09	0.034	78.78	0.325	52.34
MPGFX	96	1.8	41.5	-109.5	0.185	-3.0	17.5	981.9	0.00	0.859	0.00	5.032	0.00
NPRTX	62	2.4	23.7	-27.6	0.114	-0.6	2.9	4.1	12.70	0.096	12.72	0.652	8.87
NYVTX	74	2.4	28.0	-47.8	0.140	-1.0	4.6	19.8	0.01	0.124	5.29	0.911	2.04
OEQAX	62	1.5	24.2	-17.6	0.093	0.2	2.4	1.1	57.12	0.043	61.96	0.272	66.99
OPPAX	74	2.5	31.3	-44.1	0.149	-0.5	3.2	3.1	20.73	0.060	38.16	0.371	42.27
OPPEX	72	1.3	37.7	-30.5	0.118	0.4	4.2	6.0	5.02	0.103	10.29	0.670	8.04
OPPSX	66	1.5	49.3	-32.4	0.136	0.2	4.4	5.9	5.11	0.077	22.42	0.539	16.74
OPTAX	60	0.0	14.9	-20.9	0.056	-1.0	6.1	34.7	0.00	0.325	0.02	1.742	0.02
PENNX	66	2.7	94.8	-51.5	0.185	1.5	11.6	227.0	0.00	0.292	0.04	1.881	0.01
PIODX	74	1.8	34.3	-28.3	0.116	-0.3	3.7	2.5	28.84	0.090	15.26	0.542	16.45
PIOTX	74	1.7	46.3	-35.1	0.141	0.1	3.9	2.6	26.83	0.050	51.36	0.358	45.26
SAVGRFI	68	3.5	37.6	-34.7	0.139	-0.5	3.6	3.7	15.46	0.073	25.87	0.541	16.52
SIFEX	78	2.0	28.5	-38.1	0.132	-0.6	3.3	4.6	10.02	0.071	26.97	0.517	18.99
U1IH	78	-0.6	26.6	-42.0	0.138	-0.6	3.3	4.5	10.73	0.086	17.27	0.567	14.20
UNIFNDS	100	1.6	39.7	-36.0	0.140	-0.1	3.4	0.9	62.65	0.044	61.28	0.346	48.22
UNIGLOB	78	0.3	26.6	-40.4	0.133	-0.3	2.9	1.5	47.89	0.074	25.05	0.431	30.72
UNIRNTA	76	-0.5	11.7	-11.9	0.058	0.2	2.2	2.4	30.71	0.067	30.71	0.426	31.56
VEXPX	66	2.1	38.4	-69.0	0.183	-0.9	5.3	24.1	0.00	0.147	2.63	0.898	2.20
VFINX	60	3.7	24.4	-20.9	0.093	-0.3	2.8	1.2	55.66	0.091	14.99	0.491	21.95
VMRGX	76	0.8	43.8	-49.1	0.150	-0.4	4.3	7.4	2.51	0.120	6.07	0.750	5.10
VWELX	67	1.6	21.6	-18.1	0.083	0.1	2.8	0.2	92.59	0.015	99.52	0.093	99.74
VWESX	66	-0.1	14.5	-13.2	0.056	-0.2	3.2	0.5	79.47	0.084	18.60	0.502	20.63
VWINX	72	0.8	15.6	-13.2	0.056	0.0	3.3	0.2	89.14	0.029	85.73	0.201	88.16
VWNDX	96	1.2	43.1	-51.3	0.133	-0.4	4.9	17.5	0.02	0.041	65.67	0.391	38.09
VWUSX	90	0.3	40.1	-56.8	0.179	-0.8	3.7	11.6	0.30	0.280	0.06	1.604	0.04
CAPEX	80	4.1	34.8	-28.1	0.114	-0.3	3.9	3.8	14.83	0.120	6.06	0.707	6.49

The table presents summary statistics for the semi-annual returns of each fund obtained through a non-overlapping sum of the respective weekly returns. The column "Obser." represents the number of observations considered in each series. The Jarque-Bera, the Cramer-von Mises and the Anderson-Darling statistics are tests for the normality of the distribution. The columns "Mean", "Max", "Min" and "Prob." are in percentage (i.e, 1 represents 1%).

Table 20 – Statistics and results for the normality tests performed in the temporal aggregated series of funds returns: weekly frequency – annual aggregation

Ticker	Obser.	Mean	Max	Min	St. Dev.	Skewness	Kurtosis	Jarque-Bera	Prob.	Cramer-von Mises	Prob.	Anderson-Darling	Prob.
ABALX	31	3.4	17.9	-15.1	0.083	-0.2	2.5	0.4	81.13	0.068	29.43	0.427	31.37
ABNDX	32	-0.1	13.4	-13.4	0.065	0.1	2.8	0.1	93.66	0.045	59.22	0.276	65.90
ACEGX	36	7.1	64.5	-54.6	0.269	-0.3	3.3	0.8	67.03	0.136	3.68	0.773	4.47
ACEIX	38	0.8	27.4	-43.3	0.148	-0.8	3.8	5.3	7.24	0.069	29.22	0.499	20.97
ACGIX	39	1.5	27.6	-35.3	0.158	-0.5	2.8	1.7	42.72	0.053	46.70	0.363	44.19
ADIF	37	3.2	44.2	-57.0	0.217	-0.4	3.2	1.3	51.61	0.042	64.75	0.302	57.82
ADIRT	32	0.4	10.1	-8.5	0.045	0.1	2.5	0.4	83.85	0.055	44.66	0.338	50.33
ADIVERF	37	6.6	97.2	-44.1	0.249	1.0	6.3	23.3	0.00	0.100	11.11	0.662	8.40
AGTHX	33	8.5	37.1	-29.3	0.154	-0.7	3.0	2.9	23.09	0.195	0.62	1.000	1.23
AGWFX	39	1.9	35.0	-36.5	0.192	-0.4	2.0	2.5	29.14	0.154	2.09	0.844	2.99
AIVSX	69	0.7	30.5	-91.2	0.193	-2.0	9.8	178.5	0.00	0.328	0.02	2.077	0.00
ANWPX	33	2.8	30.6	-94.4	0.219	-2.7	12.7	170.0	0.00	0.316	0.02	1.979	0.00
BENDX	31	-0.2	16.2	-12.9	0.068	0.2	3.0	0.3	87.03	0.051	50.29	0.301	58.00
CHTRX	37	4.4	32.8	-30.7	0.177	-0.3	2.0	2.0	36.23	0.088	16.54	0.543	16.34
CSTGX	30	7.1	55.5	-35.3	0.244	0.0	2.4	0.5	78.05	0.047	55.29	0.365	43.73
DELDX	35	1.6	26.8	-25.7	0.138	-0.3	2.3	1.2	55.01	0.073	25.32	0.452	27.30
DELFX	35	1.2	27.3	-37.4	0.163	-0.6	2.9	1.8	40.84	0.052	47.64	0.415	33.49
DELTX	35	4.7	46.8	-46.7	0.227	-0.5	2.8	1.6	45.51	0.087	17.04	0.522	18.43
DETWX	35	-3.1	22.2	-34.7	0.120	-0.4	3.3	0.9	62.49	0.056	42.63	0.347	48.11
EHSTX	69	2.9	32.3	-45.3	0.140	-0.8	3.9	8.8	1.20	0.168	1.37	0.964	1.51
ENDIX	31	1.5	22.5	-23.2	0.106	-0.1	2.8	0.1	95.08	0.026	90.20	0.165	94.17
EVIFX	68	0.9	26.5	-26.9	0.118	-0.2	2.7	0.7	71.73	0.026	89.90	0.174	92.64
EVSEX	38	3.3	90.9	-59.7	0.259	0.3	5.6	11.0	0.40	0.146	2.67	0.929	1.84
FBNDX	35	-0.8	11.1	-14.2	0.063	-0.1	2.4	0.7	70.20	0.042	63.95	0.257	72.24
FCNTX	39	4.3	31.1	-57.6	0.189	-1.0	4.2	9.2	1.02	0.138	3.39	0.845	2.97
FEQIX	40	4.5	51.5	-40.3	0.176	-0.1	3.5	0.5	78.14	0.045	58.41	0.288	61.93
FMAGX	43	7.1	50.6	-75.9	0.266	-0.8	3.9	6.5	3.89	0.079	21.59	0.506	20.15
FNDR	37	1.8	29.4	-28.6	0.133	-0.3	2.5	0.8	67.08	0.046	56.44	0.278	64.98
FNDS	37	2.5	41.4	-39.3	0.189	-0.3	2.6	0.6	72.88	0.027	87.98	0.214	85.16
FONDAKI	37	4.6	46.1	-41.6	0.196	-0.3	2.8	0.6	75.48	0.039	69.31	0.321	53.02
FSTBX	37	1.8	17.7	-26.8	0.096	-1.0	4.7	11.3	0.36	0.111	7.83	0.795	3.94
FUSGX	37	-0.7	21.4	-15.3	0.059	1.0	7.4	35.7	0.00	0.128	4.74	0.889	2.31
HJVC	37	1.3	44.2	-57.0	0.219	-0.4	3.1	1.0	61.65	0.045	59.01	0.311	55.33
JANSX	36	2.3	30.9	-80.0	0.218	-1.6	6.8	37.1	0.00	0.159	1.82	0.974	1.43
LAFFX	56	2.1	29.0	-27.4	0.122	-0.3	2.8	0.9	64.50	0.141	3.13	0.718	6.11
LAGWX	33	1.5	35.8	-89.3	0.260	-1.3	5.7	19.8	0.01	0.093	14.03	0.687	7.28
LBNDX	35	-1.0	19.5	-20.8	0.097	0.1	2.9	0.1	94.42	0.029	85.55	0.222	83.09
LMSFX	30	-0.6	22.4	-30.8	0.095	-0.8	5.3	9.9	0.72	0.188	0.76	1.064	0.86
MOMGX	38	2.1	38.8	-41.6	0.181	-0.5	2.9	1.6	44.16	0.095	13.37	0.561	14.70
MPGFX	48	3.6	34.4	-107.5	0.266	-2.4	9.8	137.5	0.00	0.476	0.00	2.950	0.00
NPRTX	31	4.7	32.2	-25.4	0.149	-0.3	2.3	1.1	59.15	0.070	28.39	0.398	36.58
NYVTX	37	4.9	24.9	-33.3	0.170	-0.9	2.8	4.9	8.53	0.222	0.28	1.363	0.16
OEQAX	31	3.0	24.6	-17.8	0.121	-0.1	1.9	1.5	46.40	0.074	24.88	0.468	25.01
OPPAX	37	4.9	38.2	-30.4	0.193	-0.3	2.2	1.6	45.70	0.072	26.03	0.485	22.68
OPPEX	36	2.7	36.2	-22.4	0.145	0.1	2.6	0.4	81.79	0.030	84.64	0.206	86.97
OPPSX	33	2.9	52.5	-34.7	0.182	0.1	3.6	0.5	76.59	0.098	11.90	0.535	17.08
OPTAX	30	-0.1	21.2	-28.7	0.093	-0.8	4.9	8.2	1.62	0.287	0.05	1.394	0.13
PENNX	33	5.4	86.2	-67.8	0.246	0.2	6.8	20.1	0.00	0.152	2.26	1.028	1.05
PIODX	37	3.7	29.2	-27.4	0.142	-0.2	2.2	1.4	50.44	0.129	4.57	0.676	7.74
PIOTX	37	3.4	41.5	-32.5	0.155	0.0	3.3	0.1	94.01	0.050	51.35	0.337	50.44
SAVGRFI	34	7.0	41.9	-57.3	0.218	-1.1	4.2	8.7	1.30	0.133	3.96	0.824	3.34
SIFEX	39	3.9	42.1	-41.0	0.180	-0.5	3.3	1.9	39.48	0.092	14.60	0.512	19.49
U1IH	39	-1.2	27.0	-37.5	0.167	-0.2	2.4	0.9	64.65	0.019	97.69	0.178	91.89
UNIFNDS	50	3.3	51.8	-46.6	0.208	-0.1	2.7	0.2	92.07	0.062	35.42	0.348	47.71
UNIGLOB	39	0.6	44.3	-37.5	0.178	0.0	2.9	0.0	98.96	0.016	99.17	0.137	97.74
UNIRNTA	38	-1.0	11.0	-16.2	0.060	0.0	2.9	0.0	98.72	0.028	86.79	0.217	84.21
VEXPX	33	4.1	41.2	-51.0	0.218	-0.5	2.9	1.6	45.69	0.051	49.30	0.317	53.97
VFINX	30	7.3	27.0	-24.4	0.131	-0.5	2.5	1.7	42.30	0.071	27.13	0.496	21.35
VMRGX	38	1.7	34.7	-40.0	0.185	-0.6	2.6	2.4	30.32	0.124	5.32	0.682	7.50
VWELX	34	3.2	21.7	-26.4	0.100	-0.7	3.6	3.5	17.46	0.099	11.79	0.553	15.40
VWESX	33	-0.2	15.0	-16.5	0.073	-0.4	2.9	0.8	65.48	0.062	35.51	0.352	46.89
VWINX	36	1.5	16.8	-16.3	0.082	-0.6	2.9	1.9	38.06	0.092	14.54	0.614	11.05
VWNDX	48	2.5	39.1	-36.8	0.150	-0.3	3.7	1.7	41.94	0.095	13.09	0.586	12.71
VWUSX	45	0.5	41.8	-44.6	0.234	-0.6	2.4	3.3	19.49	0.173	1.21	1.170	0.47
CAPEX	40	8.2	30.0	-35.1	0.144	-1.1	4.0	10.1	0.63	0.189	0.74	1.216	0.36

The table presents summary statistics for the annual returns of each fund obtained through a non-overlapping sum of the respective weekly returns. The column “Obser.” represents the number of observations considered in each series. The Jarque-Bera, the Cramer-von Mises and the Anderson-Darling statistics are tests for the normality of the distribution. The columns “Mean”, “Max”, “Min” and “Prob.” are in percentage (i.e, 1 represents 1%).

Table 21 – Statistics and results for the normality tests performed in the temporal aggregated series of funds returns: monthly frequency – no aggregation

	Obser.	Mean	Max	Min	St. Dev.	Skewness	Kurtosis	Jarque-Bera	Prob.	Cramer-von Mises	Prob.	Anderson - Darling	Prob.
ABALX	372	0.3	7.9	-15.1	0.030	-0.8	5.7	156	0.0	0.486	0.0	2.879	0.0
ABNDX	384	0.0	8.9	-6.9	0.018	0.3	6.0	152	0.0	0.448	0.0	2.693	0.0
ACEGX	432	0.6	27.9	-27.7	0.073	-0.4	5.3	105	0.0	0.480	0.0	3.083	0.0
ACEIX	455	0.1	12.9	-22.2	0.039	-0.9	7.2	385	0.0	0.651	0.0	3.779	0.0
ACGIX	468	0.1	17.0	-31.8	0.051	-1.0	7.8	535	0.0	0.878	0.0	5.274	0.0
ADIF	456	0.3	21.5	-29.4	0.057	-0.8	6.2	240	0.0	0.552	0.0	3.451	0.0
ADIRT	384	0.0	3.9	-9.2	0.020	-2.2	8.4	780	0.0	4.738	0.0	27.262	0.0
ADIVERF	444	0.5	71.2	-26.6	0.058	3.7	53.8	48,800	0.0	1.579	0.0	11.677	0.0
AGTHX	396	0.7	16.6	-26.3	0.054	-0.9	6.0	199	0.0	0.325	0.0	2.204	0.0
AGWFX	468	0.2	18.1	-26.5	0.057	-0.8	5.1	144	0.0	0.482	0.0	3.201	0.0
AIVSX	816	0.1	17.0	-90.1	0.062	-6.5	82.3	219,562	0.0	5.033	0.0	32.667	0.0
ANWPX	396	0.2	12.0	-106.9	0.070	-9.2	138.2	307,081	0.0	3.532	0.0	21.759	0.0
BENDX	372	0.0	6.1	-8.5	0.020	-0.6	4.8	75	0.0	0.436	0.0	2.654	0.0
CHTRX	444	0.4	16.4	-28.0	0.056	-1.1	6.4	317	0.0	0.715	0.0	4.904	0.0
CSTGX	360	0.6	31.6	-37.8	0.080	-0.9	6.1	187	0.0	0.475	0.0	3.304	0.0
DELDX	420	0.2	12.3	-19.8	0.042	-0.8	5.1	117	0.0	0.534	0.0	3.355	0.0
DELFX	420	0.1	13.9	-34.9	0.048	-2.0	15.2	2,876	0.0	1.227	0.0	7.231	0.0
DELTX	420	0.4	24.7	-42.0	0.071	-1.3	8.4	622	0.0	0.429	0.0	3.115	0.0
DETWX	420	-0.3	10.5	-9.0	0.024	-0.2	5.5	113	0.0	0.982	0.0	5.674	0.0
EHSTX	828	0.2	18.3	-26.1	0.044	-1.0	7.2	754	0.0	1.226	0.0	7.714	0.0
ENDIX	372	0.1	11.9	-35.9	0.045	-2.9	22.7	6,511	0.0	1.692	0.0	9.827	0.0
EVIFX	828	0.1	24.6	-28.3	0.039	-1.1	11.4	2,569	0.0	3.684	0.0	19.635	0.0
EVSEX	456	0.3	107.6	-26.9	0.083	4.4	65.0	74,526	0.0	1.782	0.0	13.314	0.0
FBNDX	420	-0.1	9.1	-7.1	0.018	0.0	6.5	211	0.0	0.637	0.0	3.732	0.0
FCNTX	468	0.4	20.2	-34.1	0.053	-1.4	10.6	1,279	0.0	0.521	0.0	3.854	0.0
FEQIX	480	0.4	14.7	-19.3	0.046	-0.6	5.2	129	0.0	0.464	0.0	3.042	0.0
FMAGX	516	0.6	18.0	-37.4	0.069	-1.2	7.2	495	0.0	0.944	0.0	5.832	0.0
FNDR	444	0.1	11.7	-16.0	0.038	-0.8	5.2	137	0.0	0.622	0.0	3.893	0.0
FNDS	444	0.2	11.9	-28.6	0.047	-1.0	6.2	269	0.0	0.635	0.0	3.660	0.0
FONDAKI	444	0.4	17.4	-25.2	0.051	-0.7	5.4	144	0.0	0.342	0.0	2.288	0.0
FSTBX	444	0.1	11.0	-13.3	0.030	-0.5	5.0	93	0.0	0.394	0.0	2.533	0.0
FUSGX	444	-0.1	13.0	-8.4	0.018	0.9	17.3	3,827	0.0	3.063	0.0	18.087	0.0
HJVC	444	0.1	21.5	-64.3	0.065	-2.6	25.0	9,429	0.0	1.259	0.0	7.700	0.0
JANSX	432	0.2	14.5	-104.6	0.076	-6.5	86.8	129,579	0.0	3.269	0.0	19.140	0.0
LAFFX	672	0.2	13.7	-23.2	0.041	-0.7	6.3	363	0.0	0.642	0.0	3.978	0.0
LAGWX	396	0.1	16.5	-107.4	0.088	-5.2	59.9	55,209	0.0	1.678	0.0	11.428	0.0
LBNDX	420	-0.1	8.4	-10.1	0.024	-0.4	5.1	94	0.0	0.854	0.0	5.002	0.0
LMSFX	360	0.0	9.5	-12.5	0.023	-0.9	9.4	658	0.0	1.655	0.0	10.040	0.0
MOMGX	463	0.2	16.5	-31.0	0.054	-0.9	7.1	385	0.0	0.225	0.3	1.693	0.0
MPGFX	576	0.3	16.3	-106.7	0.071	-8.1	111.2	287,224	0.0	4.988	0.0	30.927	0.0
NPRTX	383	0.4	10.3	-28.8	0.051	-1.6	7.8	526	0.0	1.034	0.0	6.380	0.0
NYVTX	444	0.4	14.1	-34.5	0.055	-1.5	8.9	806	0.0	0.758	0.0	5.164	0.0
OEQAX	372	0.3	14.6	-26.2	0.044	-1.0	7.0	303	0.0	0.346	0.0	2.408	0.0
OPPAX	444	0.4	13.8	-50.8	0.056	-2.3	19.4	5,344	0.0	0.640	0.0	4.690	0.0
OPPEX	432	0.2	14.3	-28.4	0.044	-1.3	9.5	894	0.0	0.940	0.0	6.645	0.0
OPPSX	396	0.2	14.3	-27.3	0.056	-1.2	6.2	255	0.0	0.894	0.0	5.781	0.0
OPTAX	360	0.0	7.7	-8.1	0.019	-0.6	6.0	156	0.0	0.919	0.0	5.110	0.0
PENNX	396	0.4	25.0	-37.0	0.062	-1.3	10.4	1,012	0.0	1.603	0.0	9.812	0.0
PIODX	444	0.3	12.9	-28.0	0.046	-1.0	7.0	366	0.0	0.439	0.0	2.761	0.0
PIOTX	444	0.3	20.1	-42.4	0.055	-1.6	12.3	1,786	0.0	1.163	0.0	6.801	0.0
SAVGRFI	408	0.6	25.9	-33.1	0.051	-0.8	9.0	657	0.0	0.767	0.0	4.479	0.0
SIFEX	467	0.3	20.2	-33.0	0.053	-0.9	7.8	518	0.0	0.410	0.0	2.624	0.0
U1IH	480	-0.1	10.9	-55.9	0.054	-3.3	30.6	16,075	0.0	1.554	0.0	9.539	0.0
UNIFNDS	600	0.3	18.3	-24.7	0.053	-0.6	5.0	138	0.0	0.374	0.0	2.511	0.0
UNIGLOB	480	0.1	10.9	-37.9	0.048	-1.6	11.6	1,705	0.0	0.851	0.0	5.050	0.0
UNIRNTA	456	-0.1	5.8	-11.0	0.025	-1.6	6.7	466	0.0	2.894	0.0	17.379	0.0
VEXPX	468	0.3	18.3	-67.1	0.068	-2.5	23.8	8,957	0.0	0.730	0.0	5.013	0.0
VFINX	360	0.6	12.5	-24.5	0.044	-0.8	6.0	176	0.0	0.250	0.1	1.630	0.0
VMRGX	456	0.1	15.6	-59.9	0.061	-2.6	23.6	8,612	0.0	1.071	0.0	6.562	0.0
VWELX	420	0.3	11.7	-14.2	0.033	-0.5	4.5	58	0.0	0.295	0.0	1.870	0.0
VWESX	396	0.0	9.4	-9.5	0.022	-0.2	4.7	52	0.0	0.158	1.9	1.006	1.2
VWINX	432	0.1	9.2	-8.0	0.024	0.0	3.9	14	0.1	0.275	0.1	1.493	0.1
VWNDX	576	0.2	17.1	-26.5	0.052	-1.0	5.9	299	0.0	1.021	0.0	6.186	0.0
VWUSX	540	0.0	21.0	-62.1	0.074	-3.5	26.8	13,871	0.0	2.879	0.0	17.802	0.0
CAPEX	468	0.7	16.6	-28.6	0.045	-0.8	7.1	380	0.0	0.282	0.1	2.015	0.0

The table presents summary statistics for the monthly returns series of each fund. The column “Obser.” represents the number of observations considered in each series. The Jarque-Bera, the Cramer-von Mises and the Anderson-Darling statistics are tests for the normality of the distribution. The columns “Mean”, “Max”, “Min” and “Prob.” are in percentage (i.e, 1 represents 1%).

Table 22 – Statistics and results for the normality tests performed in the temporal aggregated series of funds returns: monthly frequency – quarterly aggregation

	Obser.	Mean	Max	Min	St. Dev.	Skewness	Kurtosis	Jarque-Bera	Prob.	Cramer-von Mises	Prob.	Anderson - Darling	Prob.
ABALX	124	0.8	11.2	-18.0	0.051	-0.9	4.8	35	0.0	0.295	0.0	1.693	0.0
ABNDX	128	0.0	9.9	-8.3	0.031	0.1	3.8	3	18.5	0.113	7.4	0.670	8.0
ACEGX	144	1.8	54.6	-38.4	0.148	0.1	4.5	13	0.1	0.189	0.7	1.283	0.3
ACEIX	152	0.2	20.4	-29.5	0.067	-0.9	6.3	88	0.0	0.375	0.0	2.185	0.0
ACGIX	156	0.4	22.0	-39.6	0.088	-1.0	5.7	71	0.0	0.261	0.1	1.569	0.1
ADIF	152	0.8	27.8	-36.0	0.094	-0.8	5.5	55	0.0	0.226	0.3	1.483	0.1
ADIRT	128	0.1	8.2	-7.9	0.035	-0.5	2.7	6	5.7	0.298	0.0	1.772	0.0
ADIVERF	148	1.6	69.3	-36.9	0.099	1.6	17.7	1,390	0.0	0.441	0.0	2.944	0.0
AGTHX	132	2.1	22.9	-34.6	0.094	-0.5	4.0	12	0.2	0.073	25.3	0.503	20.5
AGWFX	156	0.5	24.5	-35.8	0.101	-0.7	4.0	19	0.0	0.253	0.1	1.505	0.1
AIVSX	272	0.2	19.6	-86.4	0.106	-3.7	27.0	7,147	0.0	1.661	0.0	10.342	0.0
ANWPX	132	0.7	17.4	-96.5	0.113	-4.9	42.4	9,051	0.0	0.980	0.0	6.078	0.0
BENDX	124	0.0	8.5	-9.8	0.033	-0.2	3.8	4	13.2	0.119	6.2	0.741	5.4
CHTRX	148	1.1	24.7	-43.0	0.099	-1.0	6.0	81	0.0	0.385	0.0	2.245	0.0
CSTGX	120	1.8	55.5	-53.8	0.158	-0.3	4.5	14	0.1	0.255	0.1	1.450	0.1
DELDX	140	0.5	15.9	-29.2	0.071	-1.0	4.8	41	0.0	0.442	0.0	2.432	0.0
DELFX	140	0.3	19.8	-69.9	0.096	-2.9	22.0	2,302	0.0	0.598	0.0	3.495	0.0
DELTX	140	1.3	33.1	-55.5	0.137	-0.8	4.7	33	0.0	0.259	0.1	1.477	0.1
DETWX	140	-0.8	10.8	-19.2	0.048	-0.7	4.8	31	0.0	0.343	0.0	1.867	0.0
EHSTX	276	0.7	18.5	-27.4	0.074	-0.9	4.7	76	0.0	0.603	0.0	3.573	0.0
ENDIX	124	0.4	14.4	-43.6	0.079	-2.0	11.4	447	0.0	0.473	0.0	2.967	0.0
EVIFX	276	0.3	22.2	-24.0	0.064	-0.7	5.0	70	0.0	0.410	0.0	2.533	0.0
EVSEX	152	0.8	99.8	-34.8	0.141	1.8	17.8	1,477	0.0	0.406	0.0	2.719	0.0
FBNDX	140	-0.2	11.7	-10.8	0.034	-0.2	4.6	16	0.0	0.217	0.3	1.450	0.1
FCNTX	156	1.1	21.3	-43.9	0.099	-1.3	7.1	157	0.0	0.327	0.0	2.015	0.0
FEQIX	160	1.2	20.8	-27.2	0.081	-0.6	4.0	18	0.0	0.360	0.0	2.022	0.0
FMAGX	172	1.8	38.3	-46.0	0.122	-0.3	4.7	24	0.0	0.283	0.1	1.414	0.1
FNDR	148	0.4	15.4	-24.6	0.061	-0.7	4.7	29	0.0	0.158	1.9	0.993	1.3
FNDS	148	0.6	16.6	-36.6	0.087	-0.9	4.8	41	0.0	0.169	1.4	1.204	0.4
FONDAKI	148	1.1	21.7	-40.1	0.085	-0.9	6.4	93	0.0	0.205	0.5	1.285	0.2
FSTBX	148	0.4	13.3	-16.2	0.051	-0.5	3.7	10	0.7	0.193	0.7	1.140	0.6
FUSGX	148	-0.2	15.6	-13.2	0.034	0.5	9.2	241	0.0	0.921	0.0	5.234	0.0
HJVC	148	0.3	27.8	-71.3	0.111	-2.2	14.4	928	0.0	0.607	0.0	3.683	0.0
JANSX	144	0.6	29.7	-86.5	0.126	-2.5	17.7	1,439	0.0	0.719	0.0	3.891	0.0
LAFFX	224	0.5	14.9	-46.7	0.072	-1.5	10.3	580	0.0	0.287	0.1	1.631	0.0
LAGWX	132	0.4	30.7	-113.7	0.160	-2.9	20.9	1,950	0.0	0.469	0.0	2.871	0.0
LBNDX	140	-0.2	11.9	-11.6	0.043	-0.4	3.4	4	10.7	0.338	0.0	1.761	0.0
LMSFX	120	-0.1	11.0	-13.3	0.039	-0.7	5.0	29	0.0	0.493	0.0	2.730	0.0
MOMGX	154	0.6	23.7	-35.9	0.096	-0.6	3.8	12	0.2	0.126	5.0	0.686	7.3
MPGFX	192	0.9	20.3	-96.5	0.123	-4.2	30.4	6,541	0.0	1.746	0.0	10.099	0.0
NPRTX	128	1.2	18.7	-33.1	0.088	-0.9	4.7	33	0.0	0.144	2.9	1.026	1.1
NYVTX	148	1.2	24.2	-42.6	0.103	-1.4	7.1	152	0.0	0.592	0.0	3.266	0.0
OEQAX	124	0.8	22.3	-26.8	0.073	-0.5	4.4	16	0.0	0.087	16.9	0.573	13.7
OPPAX	148	1.3	20.8	-57.1	0.103	-1.5	9.3	298	0.0	0.231	0.2	1.442	0.1
OPPEX	144	0.7	20.6	-27.7	0.076	-0.7	4.6	27	0.0	0.296	0.0	1.790	0.0
OPPSX	132	0.7	28.0	-37.6	0.104	-0.4	4.0	10	0.7	0.076	23.0	0.479	23.5
OPTAX	120	0.0	9.7	-11.4	0.036	-0.6	4.6	20	0.0	0.285	0.1	1.757	0.0
PENNX	132	1.3	41.5	-42.8	0.117	-0.2	5.9	48	0.0	0.490	0.0	2.730	0.0
PIODX	148	0.9	20.1	-33.9	0.076	-0.9	5.7	63	0.0	0.375	0.0	1.974	0.0
PIOTX	148	0.9	25.9	-50.3	0.099	-1.1	7.6	158	0.0	0.240	0.2	1.493	0.1
SAVGRFI	136	1.7	31.3	-33.4	0.093	-0.6	5.4	42	0.0	0.299	0.0	1.907	0.0
SIFEX	156	1.0	18.4	-31.3	0.094	-0.9	4.2	33	0.0	0.278	0.1	1.862	0.0
U1IH	160	-0.2	14.9	-58.1	0.101	-2.0	10.5	477	0.0	0.461	0.0	3.118	0.0
UNIFNDS	200	0.8	28.1	-40.5	0.096	-0.5	4.7	33	0.0	0.322	0.0	1.740	0.0
UNIGLOB	160	0.2	14.9	-45.5	0.090	-1.2	6.1	107	0.0	0.326	0.0	2.156	0.0
UNIRNTA	152	-0.2	7.6	-13.9	0.042	-0.7	3.2	12	0.2	0.268	0.1	1.564	0.1
VEXPX	156	0.8	27.4	-64.2	0.126	-1.0	6.8	118	0.0	0.146	2.7	0.914	2.0
VFINX	120	1.8	19.7	-35.9	0.074	-1.3	7.6	138	0.0	0.258	0.1	1.512	0.1
VMRGX	152	0.4	19.5	-54.0	0.103	-1.6	8.3	237	0.0	0.428	0.0	2.629	0.0
VWELX	140	0.8	11.6	-21.8	0.057	-0.8	4.2	23	0.0	0.134	3.9	0.864	2.7
VWESX	132	-0.1	13.7	-11.9	0.042	-0.1	3.3	1	71.7	0.060	38.3	0.388	38.7
VWINX	144	0.4	9.6	-12.1	0.040	-0.4	3.2	4	11.9	0.095	13.1	0.610	11.3
VWNDX	192	0.7	19.3	-31.2	0.089	-0.9	4.6	45	0.0	0.405	0.0	2.406	0.0
VWUSX	180	0.1	24.9	-68.7	0.129	-1.9	9.3	408	0.0	0.832	0.0	5.103	0.0
CAPEX	156	2.0	19.1	-37.9	0.080	-1.0	6.4	105	0.0	0.196	0.6	1.218	0.4

The table presents summary statistics for the quarterly returns of each fund obtained through a non-overlapping sum of the respective monthly returns. The column "Obser." represents the number of observations considered in each series. The Jarque-Bera, the Cramer-von Mises and the Anderson-Darling statistics are tests for the normality of the distribution. The columns "Mean", "Max", "Min" and "Prob." are in percentage (i.e, 1 represents 1%).

Table 23 – Statistics for the monthly frequency funds returns – semi-annual aggregation

	Obser.	Mean	Max	Min	St. Dev.	Skewness	Kurtosis	Jarque-Bera	Prob.	Cramer-von Mises	Prob.	Anderson - Darling	Prob.
ABALX	62	1.7	17.8	-19.1	0.059	-0.6	4.8	11.3	0.3	0.067	30.4	0.502	20.6
ABNDX	64	-0.1	11.3	-10.7	0.042	-0.1	3.4	0.6	75.3	0.034	79.6	0.243	76.8
ACEGX	72	3.6	74.7	-67.5	0.215	0.2	5.5	19.1	0.0	0.202	0.5	1.271	0.3
ACEIX	76	0.4	30.0	-27.9	0.096	-0.5	4.6	11.9	0.3	0.235	0.2	1.509	0.1
ACGIX	78	0.9	32.8	-31.9	0.118	-0.5	4.0	6.4	4.2	0.151	2.3	0.967	1.5
ADIF	76	1.5	36.3	-39.5	0.136	-0.4	3.2	1.8	40.3	0.077	22.7	0.450	27.6
ADIRT	64	0.3	11.7	-7.9	0.043	0.2	2.4	1.2	54.5	0.051	49.5	0.398	36.7
ADIVERF	74	3.2	72.3	-28.0	0.145	1.2	8.5	111.0	0.0	0.076	23.4	0.669	8.1
AGTHX	66	4.3	31.8	-29.4	0.122	-0.5	3.4	3.2	20.4	0.054	46.0	0.398	36.6
AGWFX	78	0.9	29.0	-28.8	0.132	-0.3	2.8	1.2	55.7	0.102	10.7	0.596	12.0
AIVSX	136	0.4	28.0	-79.4	0.144	-2.4	12.6	656.2	0.0	0.865	0.0	5.109	0.0
ANWPX	66	1.4	30.3	-111.0	0.168	-4.6	31.9	2,520.3	0.0	0.775	0.0	4.811	0.0
BENDX	62	-0.1	14.2	-14.8	0.045	-0.3	5.2	14.0	0.1	0.072	26.1	0.596	12.0
CHTRX	74	2.1	41.0	-33.5	0.129	-0.4	3.9	4.3	11.6	0.204	0.5	1.134	0.6
CSTGX	60	3.6	54.1	-43.3	0.197	-0.2	3.4	0.9	62.6	0.140	3.2	0.793	4.0
DELDX	70	0.9	17.8	-20.0	0.089	-0.5	2.6	3.3	19.4	0.127	4.9	0.763	4.7
DELFX	70	0.7	30.5	-59.2	0.129	-1.5	8.6	116.7	0.0	0.197	0.6	1.284	0.3
DELTX	70	2.6	49.9	-49.9	0.184	-0.5	3.8	4.5	10.3	0.073	25.7	0.514	19.3
DETWX	70	-1.5	17.0	-21.7	0.070	-0.2	3.8	2.4	30.6	0.084	18.2	0.505	20.3
EHSTX	138	1.5	24.2	-29.7	0.104	-0.6	3.5	10.7	0.5	0.265	0.1	1.494	0.1
ENDIX	62	0.8	21.2	-30.0	0.094	-1.0	5.1	22.8	0.0	0.157	1.9	1.071	0.8
EVIFX	138	0.5	27.1	-24.8	0.092	-0.3	3.7	5.0	8.3	0.196	0.6	1.207	0.4
EVSEX	76	1.7	90.6	-37.1	0.188	1.2	8.2	104.6	0.0	0.121	5.7	0.820	3.4
FBNDX	70	-0.4	9.8	-12.3	0.042	-0.4	3.4	2.9	24.0	0.112	7.7	0.737	5.5
FCNTX	78	2.3	32.4	-40.7	0.134	-0.8	4.3	14.6	0.1	0.242	0.2	1.398	0.1
FEQIX	80	2.3	29.0	-27.0	0.111	-0.4	3.4	3.2	20.7	0.117	6.6	0.715	6.2
FMAGX	86	3.6	48.2	-63.5	0.180	-0.4	4.7	12.7	0.2	0.093	14.3	0.571	13.9
FNDR	74	0.8	22.9	-19.7	0.088	-0.3	3.0	1.2	56.1	0.074	25.0	0.469	24.8
FNDS	74	1.2	27.2	-26.7	0.128	-0.3	2.4	2.2	33.2	0.063	34.5	0.430	30.9
FONDAKI	74	2.2	29.4	-30.6	0.123	-0.5	3.0	2.6	26.8	0.083	18.7	0.505	20.3
FSTBX	74	0.8	18.1	-21.0	0.073	-0.4	4.2	5.7	5.7	0.095	13.3	0.638	9.6
FUSGX	74	-0.3	15.8	-14.7	0.039	0.2	8.1	79.6	0.0	0.274	0.1	1.743	0.0
HJVC	74	0.6	36.3	-65.9	0.159	-1.1	6.1	44.0	0.0	0.134	3.9	0.847	2.9
JANSX	72	1.2	47.4	-66.4	0.153	-0.8	7.7	73.3	0.0	0.160	1.8	1.047	0.9
LAFFX	112	1.1	24.8	-35.8	0.098	-0.6	4.0	11.2	0.4	0.072	26.0	0.530	17.6
LAGWX	66	0.7	34.6	-116.1	0.213	-2.4	15.0	458.2	0.0	0.249	0.1	1.694	0.0
LBNDX	70	-0.4	13.2	-16.4	0.059	0.1	3.4	0.6	73.1	0.061	36.3	0.510	19.7
LMSFX	60	-0.3	9.7	-16.5	0.049	-0.7	4.0	7.2	2.7	0.194	0.7	0.979	1.4
MOMGX	77	1.3	28.5	-30.9	0.127	-0.5	2.9	3.7	15.7	0.081	20.2	0.581	13.1
MPGFX	96	1.8	31.9	-85.9	0.164	-2.8	15.2	716.2	0.0	0.912	0.0	5.192	0.0
NPRTX	64	2.4	20.7	-28.1	0.105	-0.7	3.3	6.1	4.7	0.097	12.4	0.713	6.3
NYVTX	74	2.4	28.1	-42.8	0.135	-0.9	4.3	15.0	0.1	0.155	2.0	0.966	1.5
OEQAX	62	1.6	24.8	-24.0	0.095	0.0	3.1	0.1	97.0	0.015	99.3	0.124	98.7
OPPAX	74	2.5	35.2	-42.7	0.137	-0.5	4.0	5.7	5.8	0.136	3.7	0.719	6.1
OPPEX	72	1.3	29.7	-23.2	0.107	0.2	3.2	0.6	73.4	0.039	70.0	0.310	55.7
OPPSX	66	1.5	43.7	-29.7	0.131	0.3	4.0	3.6	16.8	0.049	52.0	0.342	49.2
OPTAX	60	0.0	11.7	-12.2	0.050	-0.4	3.3	1.5	46.3	0.257	0.1	1.376	0.2
PENNX	66	2.7	81.5	-46.9	0.173	1.1	8.9	109.0	0.0	0.240	0.2	1.447	0.1
PIODX	74	1.8	26.0	-25.2	0.101	-0.5	3.6	3.7	16.0	0.214	0.4	1.149	0.5
PIOTX	74	1.7	33.0	-37.4	0.135	-0.2	3.4	1.1	57.2	0.076	23.4	0.391	38.1
SAVGRFI	68	3.5	44.9	-47.3	0.140	-0.6	5.2	18.0	0.0	0.124	5.3	0.864	2.7
SIFEX	78	2.0	30.3	-39.4	0.131	-0.6	3.6	6.3	4.3	0.153	2.2	0.860	2.7
U1IH	80	-0.4	24.7	-49.6	0.138	-0.8	3.9	11.4	0.3	0.122	5.7	0.710	6.4
UNIFNDS	100	1.6	32.8	-35.2	0.131	-0.2	3.0	0.9	64.5	0.025	90.8	0.179	91.9
UNIGLOB	80	0.5	24.7	-35.0	0.127	-0.4	2.7	2.9	22.9	0.097	12.5	0.557	15.0
UNIRNTA	76	-0.5	11.3	-11.4	0.056	0.2	2.2	2.6	27.8	0.074	25.1	0.466	25.2
VEXPX	78	1.5	42.4	-56.9	0.170	-0.5	4.1	6.7	3.6	0.116	6.8	0.712	6.3
VFINX	60	3.7	23.5	-23.0	0.092	-0.5	3.3	2.9	23.3	0.087	16.7	0.519	18.7
VMRGX	76	0.9	32.6	-50.1	0.139	-0.8	4.8	18.0	0.0	0.238	0.2	1.312	0.2
VWELX	70	1.6	16.3	-15.5	0.073	-0.1	2.6	0.5	77.2	0.030	85.4	0.197	88.8
VWESX	66	-0.1	11.2	-12.1	0.055	-0.1	2.6	0.7	72.0	0.069	28.5	0.401	36.0
VWINX	72	0.9	12.1	-9.7	0.053	0.0	2.4	1.0	61.9	0.023	94.2	0.168	93.6
VWNDX	96	1.3	30.9	-34.0	0.112	-0.5	3.6	4.9	8.8	0.141	3.2	0.841	3.0
VWUSX	90	0.2	29.7	-61.1	0.177	-1.3	5.1	40.9	0.0	0.293	0.0	1.874	0.0
CAPEX	78	3.9	26.6	-26.3	0.109	-0.4	3.4	2.3	32.2	0.053	46.2	0.384	39.6

The table presents summary statistics for the semi-annual returns of each fund obtained through a non-overlapping sum of the respective monthly returns. The column "Obser." represents the number of observations considered in each series. The Jarque-Bera, the Cramer-von Mises and the Anderson-Darling statistics are tests for the normality of the distribution. The columns "Mean", "Max", "Min" and "Prob." are in percentage (i.e, 1 represents 1%).

Table 24 – Statistics and results for the normality tests performed in the temporal aggregated series of funds returns: monthly frequency – annual aggregation

	Obser.	Mean	Max	Min	St. Dev.	Skewness	Kurtosis	Jarque-Bera	Prob.	Cramer-von Mises	Prob.	Anderson-Darling	Prob.
ABALX	31	3.3	18.5	-14.8	0.083	-0.5	2.7	1.7	42.81	0.096	12.64	0.573	13.75
ABNDX	32	-0.1	9.8	-15.0	0.063	-0.3	2.5	0.8	67.56	0.029	86.25	0.248	75.21
ACEGX	36	7.3	58.5	-57.2	0.262	-0.5	3.5	2.0	36.84	0.112	7.66	0.669	8.05
ACEIX	38	0.9	22.3	-36.0	0.139	-0.8	3.0	4.0	13.23	0.159	1.79	0.891	2.29
ACGIX	39	1.7	38.3	-32.1	0.167	-0.4	2.5	1.4	50.00	0.181	0.93	0.981	1.37
ADIF	38	3.1	38.3	-43.9	0.196	-0.5	2.9	1.9	38.62	0.062	35.52	0.487	22.42
ADIRT	32	0.5	9.4	-7.7	0.044	0.0	2.3	0.7	71.33	0.030	84.48	0.218	84.03
ADIVERF	37	6.4	84.6	-46.0	0.234	0.6	5.0	8.7	1.31	0.060	37.52	0.456	26.67
AGTHX	33	8.6	34.2	-26.8	0.165	-0.9	2.8	4.3	11.87	0.257	0.11	1.437	0.10
AGWFX	39	1.8	30.6	-41.9	0.195	-0.5	2.2	2.5	28.82	0.169	1.35	0.903	2.13
AIVSX	68	0.8	27.2	-90.6	0.195	-2.0	9.2	155.0	0.00	0.310	0.03	2.102	0.00
ANWPX	33	2.7	28.1	-96.3	0.216	-3.0	14.4	228.7	0.00	0.425	0.00	2.579	0.00
BENDX	31	-0.1	12.3	-18.2	0.067	-0.5	3.5	1.6	44.80	0.090	15.24	0.496	21.39
CHTRX	37	4.3	28.7	-30.4	0.179	-0.5	2.0	2.8	24.75	0.124	5.27	0.828	3.27
CSTGX	30	7.3	70.3	-48.2	0.261	0.1	3.0	0.0	99.14	0.032	81.18	0.199	88.52
DELDX	35	1.8	22.7	-27.2	0.137	-0.6	2.3	2.6	26.81	0.146	2.72	0.842	3.02
DELFX	35	1.3	24.5	-47.2	0.167	-0.9	4.0	6.3	4.23	0.071	27.30	0.558	14.94
DELTX	35	5.1	48.7	-50.4	0.236	-0.7	2.8	2.7	25.65	0.167	1.43	0.916	1.98
DETWX	35	-3.1	23.7	-36.2	0.120	-0.5	3.9	2.4	29.60	0.068	29.50	0.466	25.30
EHSTX	69	3.0	33.6	-43.6	0.142	-0.6	3.4	4.9	8.43	0.125	5.15	0.709	6.44
ENDIX	31	1.6	16.8	-59.3	0.139	-2.8	13.1	174.1	0.00	0.293	0.04	1.946	0.01
EVIFX	69	1.1	28.9	-26.6	0.117	-0.1	2.7	0.4	79.90	0.036	75.81	0.213	85.47
EVSEX	38	3.4	105.5	-54.6	0.279	0.9	6.2	21.0	0.00	0.080	20.51	0.631	10.01
FBNDX	35	-0.7	9.6	-12.7	0.059	-0.4	2.3	1.5	48.38	0.076	23.20	0.477	23.79
FCNTX	39	4.6	36.0	-52.2	0.195	-0.7	3.2	3.5	17.51	0.125	5.15	0.695	6.96
FEQIX	40	4.6	47.0	-34.7	0.173	-0.3	3.0	0.6	74.91	0.183	0.89	0.973	1.44
FMAGX	43	7.2	58.0	-72.6	0.266	-0.7	3.5	4.0	13.46	0.105	9.57	0.598	11.83
FNDR	37	1.7	24.8	-25.6	0.124	-0.4	2.6	1.5	47.12	0.050	50.81	0.365	43.77
FNDS	37	2.3	32.5	-34.7	0.184	-0.3	2.4	1.3	52.35	0.055	43.73	0.387	38.86
FONDAKI	37	4.4	41.1	-44.7	0.187	-0.5	3.1	1.8	41.51	0.054	45.16	0.366	43.50
FSTBX	37	1.7	14.8	-28.0	0.096	-1.2	4.4	12.0	0.25	0.164	1.58	0.996	1.26
FUSGX	37	-0.7	13.3	-12.3	0.047	0.1	4.4	3.0	22.11	0.073	25.53	0.474	24.22
HJVC	37	1.1	38.3	-53.0	0.218	-0.6	2.9	2.4	30.03	0.083	18.98	0.570	13.93
JANSX	36	2.4	41.1	-69.1	0.216	-1.0	5.1	12.4	0.20	0.123	5.45	0.731	5.68
LAFFX	56	2.2	23.8	-24.8	0.121	-0.5	2.4	3.1	20.96	0.179	0.99	1.010	1.16
LAGWX	33	1.4	37.7	-85.4	0.246	-1.2	5.9	19.7	0.01	0.066	31.16	0.537	16.92
LBNDX	35	-0.9	19.6	-21.4	0.092	0.0	2.8	0.0	98.18	0.040	67.43	0.239	78.03
LMSFX	30	-0.5	13.5	-22.5	0.079	-0.8	3.4	3.3	19.02	0.188	0.76	0.970	1.46
MOMGX	39	2.5	30.2	-36.2	0.168	-0.4	2.5	1.4	49.44	0.078	22.24	0.435	30.05
MPGFX	48	3.6	39.4	-83.0	0.239	-1.9	7.4	66.5	0.00	0.380	0.00	2.296	0.00
NPRTX	32	4.9	28.9	-23.2	0.143	-0.6	2.2	2.7	25.70	0.214	0.36	1.200	0.40
NYVTX	37	4.8	34.9	-39.4	0.180	-0.7	2.8	3.2	20.15	0.195	0.63	0.992	1.29
OEQAX	31	3.2	25.8	-25.1	0.136	-0.3	2.1	1.7	43.64	0.109	8.46	0.620	10.65
OPPAX	37	5.1	44.2	-33.3	0.187	-0.4	2.6	1.3	52.80	0.087	16.98	0.529	17.71
OPPEX	36	2.6	33.6	-20.5	0.140	0.0	2.2	1.0	61.40	0.076	23.54	0.481	23.26
OPPSX	33	2.9	48.3	-36.0	0.185	-0.1	3.2	0.1	95.91	0.110	8.26	0.609	11.34
OPTAX	30	0.0	15.9	-21.0	0.087	-0.7	3.2	2.4	29.84	0.220	0.30	1.084	0.76
PENNX	33	5.4	77.0	-61.9	0.234	-0.1	5.8	10.8	0.46	0.118	6.39	0.840	3.05
PIODX	37	3.7	28.3	-24.9	0.139	-0.5	2.2	2.2	33.18	0.172	1.23	0.911	2.04
PIOTX	37	3.4	31.0	-26.7	0.161	-0.4	2.4	1.8	41.31	0.107	8.99	0.691	7.11
SAVGRFI	34	7.0	45.2	-75.2	0.229	-1.4	6.1	24.9	0.00	0.137	3.49	0.857	2.77
SIFEX	39	4.0	42.1	-38.1	0.182	-0.6	3.0	2.1	35.19	0.084	18.15	0.558	14.97
U1IH	40	-0.7	33.1	-37.2	0.175	-0.2	2.3	1.0	59.50	0.037	73.98	0.276	65.86
UNIFNDS	50	3.3	46.8	-37.5	0.198	-0.1	2.6	0.5	78.54	0.024	91.97	0.185	90.84
UNIGLOB	40	0.9	35.8	-37.2	0.177	-0.1	2.5	0.6	74.41	0.029	86.34	0.194	89.31
UNIRNTA	38	-1.0	10.5	-14.7	0.058	0.0	2.5	0.4	79.97	0.034	78.44	0.229	80.95
VEXPX	39	3.1	49.1	-42.1	0.220	-0.2	2.3	1.1	57.35	0.120	6.08	0.600	11.94
VFINX	30	7.4	28.6	-19.5	0.136	-0.4	2.1	2.0	36.09	0.118	6.41	0.661	8.45
VMRGX	38	1.8	29.9	-40.5	0.182	-0.6	2.5	2.4	29.69	0.146	2.68	0.778	4.35
VWELX	35	3.2	24.0	-25.8	0.111	-0.7	2.9	2.7	26.10	0.181	0.95	0.953	1.61
VWESX	33	-0.2	15.4	-16.9	0.071	-0.5	3.0	1.3	52.10	0.132	4.17	0.751	5.07
VWINX	36	1.7	16.8	-15.1	0.080	-0.6	2.8	2.0	37.60	0.123	5.45	0.786	4.14
VWNDX	48	2.6	35.4	-38.4	0.153	-0.7	3.8	5.5	6.46	0.155	2.07	0.931	1.83
VWUSX	45	0.5	34.0	-71.5	0.256	-1.0	3.5	8.2	1.63	0.195	0.62	1.176	0.45
CAPEX	39	7.9	30.6	-33.5	0.143	-0.8	3.4	4.8	8.94	0.130	4.40	0.760	4.80

The table presents summary statistics for the annual returns of each fund obtained through a non-overlapping sum of the respective monthly returns. The column "Obser." represents the number of observations considered in each series. The Jarque-Bera, the Cramer-von Mises and the Anderson-Darling statistics are tests for the normality of the distribution. The columns "Mean", "Max", "Min" and "Prob." are in percentage (i.e, 1 represents 1%).

Table 25 – Statistics and results for the normality tests performed in the temporal aggregated series of funds returns: quarterly frequency – no aggregation

	Obser.	Mean	Max	Min	St. Dev.	Skewness	Kurtosis	Jarque-Bera	Prob.	Cramer-von Mises	Prob.	Anderson - Darling	Prob.
ABALX	124	0.8	11.7	-17.3	0.052	-0.6	4.1	13	0.1	0.178	1.0	0.985	1.3
ABNDX	128	0.0	11.9	-9.9	0.032	0.2	5.5	34	0.0	0.204	0.5	1.374	0.2
ACEGX	144	1.7	39.9	-50.2	0.152	-0.5	4.8	24	0.0	0.255	0.1	1.634	0.0
ACEIX	151	0.2	19.6	-31.7	0.076	-0.9	5.3	52	0.0	0.312	0.0	1.796	0.0
ACGIX	156	0.4	23.7	-44.8	0.097	-1.0	6.0	85	0.0	0.279	0.1	1.681	0.0
ADIF	152	0.7	31.6	-47.6	0.112	-1.1	6.5	104	0.0	0.458	0.0	2.778	0.0
ADIRT	128	0.2	8.6	-7.9	0.034	-0.5	2.8	5	6.5	0.331	0.0	2.023	0.0
ADIVERF	148	1.7	70.9	-35.6	0.109	1.1	14.0	773	0.0	0.418	0.0	2.746	0.0
AGTHX	132	2.1	23.5	-31.9	0.099	-0.8	4.1	21	0.0	0.223	0.3	1.387	0.1
AGWFX	156	0.4	22.9	-44.3	0.113	-0.9	4.3	33	0.0	0.321	0.0	1.847	0.0
AIVSX	272	0.2	20.9	-88.9	0.107	-3.7	27.4	7,384	0.0	1.982	0.0	11.811	0.0
ANWPX	132	0.6	22.5	-97.2	0.119	-4.4	36.2	6,477	0.0	0.975	0.0	5.904	0.0
BENDX	124	-0.1	15.0	-8.9	0.034	0.3	5.5	35	0.0	0.177	1.1	1.079	0.8
CHTRX	148	1.0	27.8	-47.1	0.111	-1.0	5.4	60	0.0	0.237	0.2	1.578	0.1
CSTGX	120	1.7	34.0	-81.7	0.159	-1.6	8.7	212	0.0	0.315	0.0	1.916	0.0
DELDX	140	0.4	15.8	-34.7	0.075	-1.0	5.6	60	0.0	0.192	0.7	1.135	0.6
DELFX	140	0.2	18.8	-60.0	0.094	-2.0	13.8	775	0.0	0.375	0.0	2.200	0.0
DELTX	140	1.2	25.6	-45.7	0.137	-0.8	3.7	16	0.0	0.157	1.9	1.207	0.4
DETWX	140	-0.8	17.3	-12.9	0.049	0.1	4.5	13	0.1	0.235	0.2	1.505	0.1
EHSTX	276	0.6	22.9	-32.8	0.078	-0.9	4.9	81	0.0	0.627	0.0	3.600	0.0
ENDIX	124	0.4	13.7	-38.3	0.081	-1.8	8.9	246	0.0	0.361	0.0	2.409	0.0
EVIFX	276	0.1	28.9	-27.3	0.072	-0.7	5.4	88	0.0	0.489	0.0	3.049	0.0
EVSEX	152	0.8	100.0	-41.5	0.150	1.3	14.8	929	0.0	0.513	0.0	3.236	0.0
FBNDX	140	-0.2	13.3	-11.1	0.034	0.1	5.0	24	0.0	0.124	5.3	0.810	3.6
FCNTX	156	1.1	22.3	-38.6	0.100	-0.9	4.9	46	0.0	0.262	0.1	1.554	0.1
FEQIX	160	1.1	21.3	-31.2	0.086	-0.6	4.0	17	0.0	0.324	0.0	1.731	0.0
FMAGX	172	1.8	33.9	-49.6	0.136	-0.6	4.1	20	0.0	0.189	0.7	1.115	0.6
FNDR	148	0.4	17.8	-25.7	0.072	-0.9	5.1	47	0.0	0.263	0.1	1.720	0.0
FNDS	148	0.6	21.9	-38.4	0.094	-1.0	5.4	62	0.0	0.329	0.0	1.990	0.0
FONDAKI	148	1.1	26.8	-37.5	0.098	-1.0	5.6	66	0.0	0.310	0.0	2.118	0.0
FSTBX	148	0.4	14.2	-20.6	0.057	-0.6	4.7	27	0.0	0.281	0.1	1.555	0.1
FUSGX	148	-0.2	16.8	-15.1	0.035	0.2	11.0	397	0.0	0.984	0.0	6.057	0.0
HJVC	148	0.3	31.6	-69.4	0.127	-1.8	10.1	389	0.0	0.732	0.0	4.294	0.0
JANSX	144	0.6	22.6	-89.3	0.129	-2.7	18.3	1,584	0.0	0.650	0.0	3.779	0.0
LAFFX	224	0.6	19.0	-38.9	0.073	-1.0	6.7	161	0.0	0.210	0.4	1.432	0.1
LAGWX	132	0.4	30.8	-94.4	0.154	-2.0	12.8	618	0.0	0.324	0.0	1.947	0.0
LBNDX	140	-0.2	15.3	-13.3	0.045	0.0	4.4	12	0.3	0.174	1.2	1.207	0.4
LMSFX	120	-0.2	14.8	-20.0	0.044	-0.8	8.6	169	0.0	0.730	0.0	4.328	0.0
MOMGX	152	0.6	21.6	-37.8	0.106	-0.8	4.0	21	0.0	0.193	0.7	1.181	0.4
MPGFX	192	0.9	21.3	-102.7	0.128	-4.0	29.0	5,926	0.0	1.801	0.0	10.118	0.0
NPRTX	127	1.1	18.5	-33.4	0.092	-1.1	4.5	37	0.0	0.416	0.0	2.450	0.0
NYVTX	148	1.2	23.9	-42.5	0.107	-1.2	5.8	83	0.0	0.251	0.1	1.651	0.0
OEQAX	124	0.8	23.9	-36.8	0.080	-0.9	6.1	66	0.0	0.150	2.4	0.931	1.8
OPPAX	148	1.2	23.4	-60.7	0.107	-1.5	9.3	300	0.0	0.270	0.1	1.611	0.0
OPPEX	144	0.6	22.5	-28.1	0.081	-0.3	4.3	13	0.2	0.347	0.0	1.823	0.0
OPPSX	132	0.6	28.2	-36.2	0.100	-0.6	4.0	14	0.1	0.292	0.0	1.632	0.0
OPTAX	120	0.0	14.9	-18.0	0.040	-0.8	8.4	157	0.0	0.623	0.0	3.664	0.0
PENNX	132	1.0	47.3	-40.7	0.133	-0.5	5.4	36	0.0	0.746	0.0	4.000	0.0
PIODX	148	0.9	18.6	-34.9	0.085	-0.8	4.7	34	0.0	0.217	0.3	1.208	0.4
PIOTX	148	0.9	30.9	-43.1	0.101	-0.7	5.5	50	0.0	0.273	0.1	1.565	0.1
SAVGRFI	136	1.8	33.3	-33.8	0.097	-0.8	5.1	37	0.0	0.366	0.0	2.179	0.0
SIFEX	155	1.0	27.6	-39.2	0.098	-0.9	5.0	48	0.0	0.232	0.2	1.689	0.0
U1IH	160	-0.2	22.1	-50.0	0.102	-1.7	8.5	275	0.0	0.546	0.0	3.344	0.0
UNIFNDS	200	0.8	28.9	-41.0	0.104	-0.7	5.5	71	0.0	0.386	0.0	2.314	0.0
UNIGLOB	160	0.2	22.1	-50.0	0.095	-1.3	7.2	161	0.0	0.376	0.0	2.248	0.0
UNIRNTA	152	-0.2	11.9	-12.5	0.042	-0.3	3.0	2	31.9	0.131	4.2	0.837	3.1
VEXPX	156	0.7	29.2	-79.5	0.135	-1.6	10.2	409	0.0	0.296	0.0	1.877	0.0
VFINX	120	1.8	18.7	-27.1	0.075	-0.7	4.5	21	0.0	0.139	3.4	0.898	2.2
VMRGX	152	0.4	24.9	-52.8	0.118	-1.4	7.2	160	0.0	0.468	0.0	2.677	0.0
VWELX	304	0.1	37.1	-70.4	0.084	-2.0	21.0	4,313	0.0	1.529	0.0	9.197	0.0
VWESX	132	-0.1	15.0	-10.7	0.041	0.2	3.7	4	11.5	0.049	52.3	0.303	57.5
VWINX	144	0.4	14.6	-9.5	0.041	0.0	3.3	1	77.3	0.030	84.2	0.212	85.7
VWNDX	192	0.6	27.5	-42.7	0.100	-1.1	5.7	95	0.0	0.431	0.0	2.602	0.0
VWUSX	180	0.1	20.5	-58.3	0.137	-1.9	7.7	269	0.0	1.253	0.0	7.246	0.0
CAPEX	160	2.1	24.3	-34.7	0.087	-0.9	5.6	68	0.0	0.328	0.0	1.918	0.0

The table presents summary statistics for the quarterly returns series of each fund. The column “Obser.” represents the number of observations considered in each series. The Jarque-Bera, the Cramer-von Mises and the Anderson-Darling statistics are tests for the normality of the distribution. The columns “Mean”, “Max”, “Min” and “Prob.” are in percentage (i.e, 1 represents 1%).

Table 26 – Statistics and results for the normality tests performed in the temporal aggregated series of funds returns: quarterly frequency – semi-annual aggregation

	Obser.	Mean	Max	Min	St. Dev.	Skewness	Kurtosis	Jarque-Bera	Prob.	Cramer-von Mises	Prob.	Anderson - Darling	Prob.
ABALX	62	1.7	16.3	-19.4	0.075	-0.6	3.4	4	17.3	0.226	0.3	1.190	0.4
ABNDX	64	-0.1	10.9	-14.5	0.047	-0.4	4.3	6	4.3	0.130	4.4	0.883	2.4
ACEGX	72	3.4	59.1	-76.9	0.234	-0.6	4.6	12	0.2	0.152	2.3	0.940	1.7
ACEIX	76	0.4	24.8	-29.6	0.106	-0.5	3.4	4	12.6	0.197	0.6	0.992	1.3
ACGIX	78	0.8	31.4	-38.5	0.135	-0.5	3.6	4	13.4	0.082	19.3	0.502	20.6
ADIF	76	1.5	39.0	-71.7	0.172	-1.1	6.2	47	0.0	0.130	4.4	0.815	3.5
ADIRT	64	0.3	12.2	-8.3	0.048	0.3	2.4	2	39.2	0.058	40.6	0.373	41.8
ADIVERF	74	3.4	85.7	-46.5	0.173	1.1	8.9	119	0.0	0.091	14.9	0.795	4.0
AGTHX	66	4.2	32.1	-39.3	0.144	-0.8	3.9	9	1.4	0.144	2.9	0.933	1.8
AGWFX	78	0.9	40.7	-64.5	0.171	-0.8	5.2	25	0.0	0.142	3.1	0.947	1.7
AIVSX	136	0.4	27.8	-87.8	0.151	-2.6	14.9	956	0.0	0.789	0.0	4.950	0.0
ANWPX	66	1.2	26.2	-86.6	0.163	-2.5	14.1	412	0.0	0.378	0.0	2.362	0.0
BENDX	62	-0.1	10.6	-14.8	0.048	-0.7	4.7	12	0.3	0.142	3.1	1.064	0.9
CHTRX	74	2.1	30.5	-47.3	0.155	-0.9	4.3	15	0.1	0.146	2.7	0.900	2.2
CSTGX	60	3.5	51.8	-74.0	0.232	-1.0	5.4	24	0.0	0.237	0.2	1.332	0.2
DELDX	70	0.7	20.0	-30.7	0.108	-0.8	3.9	9	0.9	0.124	5.3	0.821	3.4
DELFX	70	0.4	26.6	-54.6	0.130	-1.2	6.8	58	0.0	0.248	0.1	1.362	0.2
DELTX	70	2.3	43.9	-55.9	0.199	-0.5	3.4	4	14.3	0.083	19.2	0.542	16.5
DETWX	70	-1.5	14.4	-20.4	0.074	-0.5	3.1	3	19.4	0.296	0.0	1.544	0.1
EHSTX	138	1.3	29.4	-48.8	0.115	-1.0	5.8	69	0.0	0.221	0.3	1.428	0.1
ENDIX	62	0.9	21.9	-42.1	0.118	-0.9	4.9	18	0.0	0.109	8.4	0.679	7.6
EVIFX	138	0.3	26.7	-50.4	0.105	-1.3	7.8	172	0.0	0.336	0.0	2.091	0.0
EVSEX	76	1.6	117.5	-62.8	0.227	1.1	11.5	244	0.0	0.329	0.0	2.172	0.0
FBNDX	70	-0.3	10.8	-17.3	0.050	-0.7	4.5	13	0.2	0.107	9.1	0.790	4.1
FCNTX	78	2.2	37.5	-37.9	0.145	-0.4	3.5	3	27.2	0.056	42.4	0.419	32.6
FEQIX	80	2.3	30.3	-38.0	0.130	-0.5	3.6	4	14.3	0.129	4.5	0.647	9.1
FMAGX	86	3.6	56.5	-47.8	0.198	-0.2	3.3	1	67.5	0.082	19.4	0.473	24.3
FNDR	74	0.9	20.8	-37.4	0.111	-0.7	3.9	9	0.9	0.061	37.1	0.450	27.6
FNDS	74	1.2	29.2	-43.8	0.146	-0.5	3.3	4	13.3	0.118	6.3	0.728	5.8
FONDAKI	74	2.3	31.2	-47.1	0.148	-0.7	3.8	7	2.8	0.071	27.5	0.489	22.2
FSTBX	74	0.7	19.1	-33.2	0.079	-0.8	6.6	48	0.0	0.170	1.3	0.989	1.3
FUSGX	74	-0.4	15.5	-19.3	0.049	-0.7	8.5	97	0.0	0.508	0.0	3.046	0.0
HJVC	74	0.6	39.0	-71.7	0.188	-1.2	5.8	41	0.0	0.178	1.0	1.146	0.5
JANSX	72	1.3	36.7	-72.0	0.176	-1.3	6.8	65	0.0	0.313	0.0	1.725	0.0
LAFFX	112	1.1	25.8	-36.3	0.105	-0.8	4.8	26	0.0	0.141	3.1	0.917	2.0
LAGWX	66	0.8	42.9	-99.0	0.231	-1.2	6.9	58	0.0	0.122	5.6	0.791	4.0
LBNDX	70	-0.5	16.4	-19.8	0.066	-0.3	4.3	6	5.7	0.113	7.6	0.715	6.2
LMSFX	60	-0.3	17.1	-30.2	0.064	-1.6	10.8	177	0.0	0.579	0.0	3.273	0.0
MOMGX	76	1.2	32.8	-39.4	0.142	-0.4	3.0	2	29.2	0.084	18.7	0.475	24.0
MPGFX	96	1.7	33.6	-87.5	0.177	-2.3	12.1	417	0.0	0.752	0.0	4.275	0.0
NPRTX	63	2.2	28.6	-37.4	0.130	-0.6	3.8	6	5.3	0.107	9.1	0.619	10.7
NYVTX	74	2.5	33.6	-41.4	0.144	-0.4	3.5	3	22.2	0.108	8.7	0.645	9.2
OEQAX	62	1.6	35.8	-32.1	0.119	-0.2	4.0	3	27.1	0.071	27.0	0.467	25.1
OPPAX	74	2.4	38.4	-52.3	0.164	-0.6	4.2	9	1.3	0.132	4.1	0.786	4.2
OPPEX	72	1.2	36.0	-34.4	0.119	0.1	4.3	5	7.2	0.111	7.9	0.689	7.2
OPPSX	66	1.1	37.2	-61.2	0.157	-0.7	5.8	27	0.0	0.099	11.7	0.644	9.3
OPTAX	60	-0.1	17.2	-27.1	0.062	-1.4	9.7	133	0.0	0.656	0.0	3.693	0.0
PENNX	66	2.1	42.9	-57.2	0.181	-0.5	4.0	5	7.0	0.114	7.1	0.605	11.6
PIODX	74	1.9	27.4	-33.7	0.120	-0.6	4.0	7	3.3	0.107	9.1	0.644	9.3
PIOTX	74	1.9	27.9	-38.7	0.138	-0.7	3.7	7	3.2	0.126	5.0	0.796	3.9
SAVGRFI	68	3.7	30.2	-43.9	0.151	-1.0	4.4	17	0.0	0.220	0.3	1.416	0.1
SIFEX	78	2.0	37.8	-54.0	0.145	-0.8	6.0	39	0.0	0.207	0.4	1.299	0.2
U1IH	80	-0.4	29.4	-42.4	0.138	-0.8	3.9	10	0.5	0.113	7.4	0.854	2.8
UNIFNDS	100	1.6	37.6	-60.4	0.150	-0.6	5.3	29	0.0	0.101	11.0	0.683	7.4
UNIGLOB	80	0.4	31.3	-42.4	0.137	-0.6	4.0	8	1.9	0.083	19.0	0.625	10.4
UNIRNTA	76	-0.4	11.5	-13.4	0.052	-0.1	3.0	0	87.7	0.071	27.1	0.367	43.3
VEXPX	78	1.4	44.5	-68.6	0.187	-0.7	4.8	18	0.0	0.121	5.8	0.734	5.6
VFINX	60	3.6	22.9	-34.1	0.115	-0.7	3.9	7	2.5	0.095	13.4	0.578	13.3
VMRGX	76	0.8	31.7	-55.8	0.164	-1.1	4.8	25	0.0	0.206	0.5	1.377	0.2
VWELX	152	0.2	33.1	-70.0	0.116	-2.0	12.4	655	0.0	0.686	0.0	4.162	0.0
VWESX	66	-0.1	9.8	-16.9	0.054	-0.7	3.6	6	5.1	0.071	26.9	0.511	19.6
VWINX	72	0.8	14.3	-16.8	0.060	-0.5	4.0	6	4.7	0.144	2.9	0.804	3.8
VWNDX	96	1.2	33.6	-37.5	0.134	-0.7	3.9	11	0.5	0.199	0.6	1.205	0.4
VWUSX	89	0.2	35.5	-88.7	0.205	-1.5	6.6	83	0.0	0.483	0.0	2.834	0.0
CAPEX	80	4.1	29.3	-43.0	0.131	-0.6	4.5	12	0.2	0.131	4.3	0.841	3.0

The table presents summary statistics for the semi-annual returns of each fund obtained through a non-overlapping sum of the respective quarterly returns. The table presents summary statistics for the daily series of each fund. The column "Obser." represents the number of observations considered in each series. The Jarque-Bera, the Cramer-von Mises and the Anderson-Darling statistics are tests for the normality of the distribution. The columns "Mean", "Max", "Min" and "Prob." are in percentage (i.e, 1 represents 1%).

Table 27 – Statistics and results for the normality tests performed in the temporal aggregated series of funds returns: quarterly frequency – annual aggregation

	Obser.	Mean	Max	Min	St. Dev.	Skewness	Kurtosis	Jarque-Bera	Prob.	Cramer-von Mises	Prob.	Anderson - Darling	Prob.
ABALX	31	3.4	21.1	-20.2	0.100	-0.3	2.6	0.6	74.6	0.032	82.5	0.188	90.3
ABNDX	32	-0.1	16.0	-14.8	0.073	-0.1	2.7	0.2	91.0	0.038	72.8	0.245	76.0
ACEGX	36	6.9	57.2	-98.8	0.339	-1.3	4.9	14.7	0.1	0.130	4.3	0.912	2.0
ACEIX	38	0.8	31.9	-39.4	0.164	-0.7	3.0	3.0	21.8	0.116	6.9	0.760	4.8
ACGIX	39	1.6	40.0	-54.4	0.203	-0.7	3.0	3.0	22.6	0.213	0.4	1.047	0.9
ADIF	38	2.9	47.3	-64.0	0.212	-0.8	4.5	8.1	1.7	0.075	24.4	0.506	20.2
ADIRT	32	0.6	11.2	-8.4	0.048	-0.1	2.5	0.4	83.5	0.042	64.3	0.252	74.0
ADIVERF	37	6.8	88.7	-42.6	0.237	0.8	5.3	12.2	0.2	0.042	65.2	0.371	42.3
AGTHX	33	8.4	42.4	-53.3	0.214	-1.0	3.5	5.9	5.2	0.210	0.4	1.170	0.5
AGWFX	39	1.7	42.8	-77.8	0.256	-1.0	4.1	8.5	1.4	0.120	6.0	0.790	4.1
AIVSX	68	0.9	31.8	-80.6	0.203	-1.5	6.5	61.1	0.0	0.207	0.4	1.492	0.1
ANWPX	33	2.4	32.9	-88.5	0.241	-1.8	7.3	43.3	0.0	0.222	0.3	1.351	0.2
BENDX	31	-0.2	17.0	-19.1	0.076	-0.4	3.4	0.9	62.5	0.064	33.9	0.414	33.5
CHTRX	37	4.1	32.9	-63.2	0.235	-1.1	3.7	8.0	1.8	0.149	2.5	1.035	1.0
CSTGX	30	7.0	67.4	-91.6	0.348	-0.9	3.8	4.7	9.7	0.084	18.6	0.511	19.6
DELDX	35	1.4	24.6	-35.4	0.155	-0.7	2.7	2.7	26.5	0.095	13.3	0.561	14.7
DELFX	35	0.9	30.8	-45.3	0.178	-0.9	3.7	5.4	6.8	0.122	5.6	0.776	4.4
DELTX	35	4.6	51.6	-67.4	0.300	-0.8	3.1	3.8	15.0	0.128	4.7	0.784	4.2
DETWX	35	-3.1	21.5	-35.8	0.128	-0.5	3.1	1.4	49.2	0.100	11.3	0.547	15.9
EHSTX	69	2.6	33.0	-72.3	0.162	-1.4	7.8	86.8	0.0	0.110	8.1	0.855	2.8
ENDIX	31	1.7	26.3	-68.9	0.167	-2.4	11.4	121.9	0.0	0.234	0.2	1.535	0.1
EVIFX	69	0.6	30.9	-46.7	0.140	-0.9	4.7	16.9	0.0	0.118	6.4	0.746	5.2
EVSEX	38	3.3	122.3	-97.9	0.339	0.0	7.7	35.7	0.0	0.242	0.2	1.720	0.0
FBNDX	35	-0.7	15.3	-19.4	0.074	-0.6	3.4	2.4	29.7	0.117	6.7	0.680	7.6
FCNTX	39	4.4	45.7	-49.3	0.219	-0.5	3.2	1.9	39.1	0.052	48.0	0.378	40.8
FEQIX	40	4.6	51.7	-44.3	0.195	-0.3	3.3	0.9	64.8	0.099	11.8	0.513	19.4
FMAGX	43	7.3	55.6	-74.3	0.278	-0.7	3.1	3.3	19.4	0.152	2.2	0.828	3.3
FNDR	37	1.7	27.1	-27.7	0.129	-0.5	2.6	1.7	42.7	0.143	3.0	0.829	3.3
FNDS	37	2.4	37.5	-51.6	0.207	-0.4	2.8	1.1	56.6	0.041	66.0	0.273	66.9
FONDAKI	37	4.5	36.9	-30.2	0.176	-0.1	2.2	1.1	58.1	0.037	73.2	0.276	65.8
FSTBX	37	1.4	22.1	-43.8	0.121	-1.3	6.6	31.1	0.0	0.143	3.0	0.865	2.6
FUSGX	37	-0.7	28.3	-25.7	0.077	0.4	9.3	63.0	0.0	0.346	0.0	2.071	0.0
HJVC	37	1.2	47.3	-64.0	0.233	-0.8	3.9	5.3	6.9	0.094	13.8	0.626	10.3
JANSX	36	2.6	43.3	-83.0	0.268	-1.3	5.7	21.8	0.0	0.178	1.0	1.183	0.4
LAFFX	56	2.3	32.7	-39.3	0.152	-0.6	3.0	3.1	20.8	0.105	9.8	0.619	10.7
LAGWX	33	1.6	47.2	-56.1	0.264	-0.3	2.2	1.3	52.6	0.047	56.0	0.327	51.9
LBNDX	35	-1.0	18.0	-26.2	0.096	-0.2	3.3	0.4	80.2	0.036	75.4	0.267	68.9
LMSFX	30	-0.6	20.1	-28.6	0.097	-0.9	4.8	8.5	1.4	0.154	2.1	0.986	1.3
MOMGX	38	2.3	39.6	-46.5	0.203	-0.6	3.2	2.5	28.7	0.047	56.0	0.401	36.1
MPGFX	48	3.5	39.7	-80.6	0.260	-1.7	6.4	47.1	0.0	0.350	0.0	2.329	0.0
NPRTX	32	4.4	27.2	-31.7	0.162	-0.7	2.6	3.0	22.3	0.127	4.9	0.824	3.3
NYVTX	37	4.9	34.8	-43.2	0.199	-0.8	2.6	3.9	14.1	0.202	0.5	1.122	0.6
OEQAX	31	3.3	34.4	-38.4	0.167	-0.6	2.9	1.8	40.0	0.091	15.0	0.498	21.1
OPPAX	37	4.9	45.5	-52.2	0.245	-0.8	3.1	3.6	16.9	0.122	5.6	0.769	4.6
OPPEX	36	2.5	36.6	-42.3	0.163	-0.3	3.4	0.8	68.5	0.030	85.0	0.197	88.9
OPPSX	33	2.3	47.9	-72.6	0.236	-1.0	5.1	12.1	0.2	0.148	2.6	0.885	2.4
OPTAX	30	-0.1	20.6	-25.1	0.095	-0.8	4.3	4.9	8.6	0.191	0.7	1.056	0.9
PENNX	33	4.2	68.4	-92.0	0.278	-0.9	6.2	19.2	0.0	0.166	1.5	0.953	1.6
PIODX	37	3.7	29.6	-41.7	0.169	-0.8	3.2	4.1	13.2	0.170	1.3	0.922	1.9
PIOTX	37	3.7	37.9	-41.9	0.197	-0.5	2.8	1.8	41.3	0.090	15.3	0.499	20.9
SAVGRFI	34	7.3	43.4	-75.5	0.241	-1.4	5.5	20.1	0.0	0.207	0.4	1.186	0.4
SIFEX	39	4.0	34.3	-67.8	0.209	-1.4	5.8	25.8	0.0	0.151	2.3	1.123	0.6
U1IH	40	-0.9	37.5	-38.3	0.190	-0.2	2.4	0.8	67.9	0.060	37.6	0.398	36.6
UNIFNDS	50	3.1	49.1	-41.2	0.198	-0.1	2.8	0.2	89.2	0.056	42.8	0.328	51.8
UNIGLOB	40	0.8	38.7	-38.3	0.194	-0.1	2.5	0.5	78.8	0.050	50.6	0.333	51.0
UNIRNTA	38	-0.8	13.2	-11.5	0.059	0.2	2.3	1.0	61.6	0.042	64.7	0.284	63.2
VEXPX	39	2.9	51.1	-60.6	0.264	-0.6	3.1	2.5	29.2	0.086	17.5	0.514	19.3
VFINX	30	7.1	31.7	-32.2	0.159	-0.7	2.9	2.4	30.4	0.096	12.9	0.562	14.6
VMRGX	38	1.6	35.8	-60.8	0.234	-1.0	3.7	7.7	2.1	0.161	1.7	1.074	0.8
VWELX	76	0.5	25.1	-66.4	0.155	-1.6	7.6	101.3	0.0	0.251	0.1	1.733	0.0
VWESX	33	-0.3	15.8	-17.6	0.084	-0.4	2.3	1.7	43.7	0.116	6.7	0.696	6.9
VWINX	36	1.7	16.2	-27.1	0.091	-0.8	4.1	5.4	6.6	0.036	75.8	0.304	57.0
VWNDX	48	2.4	39.5	-49.3	0.190	-0.7	3.5	4.3	11.6	0.090	15.3	0.599	11.8
VWUSX	45	0.4	37.3	-107.7	0.301	-1.6	5.8	35.3	0.0	0.356	0.0	2.071	0.0
CAPEX	40	8.3	43.9	-62.4	0.195	-1.3	5.8	23.3	0.0	0.116	6.9	0.726	5.9

The table presents summary statistics for the annual returns of each fund obtained through a non-overlapping sum of the respective quarterly returns. The column "Obser." represents the number of observations considered in each series. The Jarque-Bera, the Cramer-von Mises and the Anderson-Darling statistics are tests for the normality of the distribution. The columns "Mean", "Max", "Min" and "Prob." are in percentage (i.e, 1 represents 1%).

Table 28 – Statistics and results for the tests performed on presence of serial correlation and autoregressive conditional heteroskedasticity in the residuals of daily returns – no aggregation

Ticker	Ljung-Box Q	Prob	Con. Mean	AR lags	MA lags	ARCH-LM	Prob	Ljung-Box Q2	Prob
ABALX	37.03	0.0	MA		1	31.19	0.2	35.00	0.0
ABNDX	155.78	0.0	ARMA	1	1	9.26	68.1	10.05	43.6
ACEGX	1906.80	0.0	MA		1	154.26	0.0	171.90	0.0
ACEIX	62.40	0.0	MA		1; 2	23.65	2.3	25.44	0.5
ACGIX	80.91	0.0	AR	1		85.00	0.0	94.48	0.0
ADIF	26.75	0.8	ARMA	1; 2	1; 2	1215.74	0.0	3476.66	0.0
ADIRT	4.65	96.9	NONE			1.10	100.0	1.06	100.0
ADIVERF	1692.70	0.0	MA		1	436.36	0.0	476.85	0.0
AGTHX	144.81	0.0	AR	1		233.45	0.0	304.43	0.0
AGWFX	124.28	0.0	MA		1	166.38	0.0	223.97	0.0
AIVSX	24.80	1.6	AR	1		0.04	100.0	0.04	100.0
ANWPX	29.69	0.3	MA		1	0.03	100.0	0.03	100.0
BENDX	59.63	0.0	MA		1	5.78	92.7	5.79	88.7
CHTRX	102.97	0.0	MA		1	23.76	2.2	26.42	0.6
CSTGX	93.29	0.0	MA		1	53.10	0.0	54.79	0.0
DELDX	51.79	0.0	MA		1	78.24	0.0	90.92	0.0
DELFX	199.11	0.0	MA		1	788.31	0.0	847.30	0.0
DELTX	245.40	0.0	MA		1	169.55	0.0	1013.60	0.0
DETWX	258.10	0.0	ARMA	1	1; 2	2940.40	0.0	2124.20	0.0
EHSTX	30.08	0.3	ARMA	4	4	528.37	0.0	582.97	0.0
ENDIX	6.55	88.6	NONE			0.61	100.0	0.62	100.0
EVIFX	412.66	0.0	MA		1	1574.15	0.0	1455.70	0.0
EVSEX	84.65	0.0	AR	1		1.16	100.0	0.23	100.0
FBNDX	54.87	0.0	ARMA	1; 2	1	3333.44	0.0	2096.10	0.0
FCNTX	99.37	0.0	ARMA	1	4	14.26	28.5	14.97	13.3
FEQIX	156.29	0.0	MA		1	97.76	0.0	127.03	0.0
FMAGX	78.60	0.0	MA		1	4.19	98.0	4.34	95.9
FNDR	21.24	4.7	MA		4	167.71	0.0	254.93	0.0
FNDS	86.63	0.0	MA		1	415.32	0.0	669.18	0.0
FONDAKI	34.00	0.1	MA		1; 4	592.68	0.0	1128.60	0.0
FSTBX	83.19	0.0	MA		1	8.66	73.1	8.73	64.6
FUSGX	78.24	0.0	MA		2; 3; 4	1579.63	0.0	5190.90	0.0
HJVC	30.13	0.3	NONE			1.27	100.0	1.20	100.0
JANSX	1692.50	0.0	MA		1	328.11	0.0	361.16	0.0
LAFFX	14.07	29.6	NONE			1110.52	0.0	1001.10	0.0
LAGWX	74.34	0.0	MA		1	0.50	100.0	0.50	100.0
LBNDX	322.09	0.0	ARMA	1	1	82.58	0.0	83.15	0.0
LMSFX	1906.40	0.0	ARMA	1	1	1081.96	0.0	1151.10	0.0
MOMGX	298.03	0.0	MA		1	2776.93	0.0	2080.90	0.0
MPGFX	214.38	0.0	MA		1	868.18	0.0	1323.70	0.0
NPRTX	212.97	0.0	MA		1	1824.28	0.0	1433.70	0.0
NYVTX	61.50	0.0	MA		1	17.23	14.1	17.96	8.3
OEQAX	32.39	0.1	MA		1	384.55	0.0	389.67	0.0
OPPAX	218.16	0.0	MA		1; 3; 4	135.36	0.0	161.80	0.0
OPPEX	98.94	0.0	MA		3	840.52	0.0	772.73	0.0
OPPSX	42.17	0.0	MA		1	15.66	20.7	16.88	11.2
OPTAX	1529.80	0.0	ARMA	1	1	409.43	0.0	701.74	0.0
PENNX	164.63	0.0	ARMA	1	1; 2	1.96	99.9	1.99	99.2
PIODX	8.62	73.5	NONE			1118.32	0.0	1056.90	0.0
PIOTX	94.11	0.0	ARMA	1	1; 2	186.41	0.0	242.47	0.0
SAVGRFI	196.28	0.0	MA		1; 3	1209.77	0.0	34.65	0.0
SIFEX	37.20	0.0	MA		4	2085.52	0.0	1672.50	0.0
U1IH	39.62	0.0	ARMA	1	1	2.90	99.6	2.95	98.3
UNIFNDS	31.29	0.2	MA		1	607.51	0.0	1121.00	0.0
UNIGLOB	66.50	0.0	MA		1	230.08	0.0	323.64	0.0
UNIRNTA	3.07	99.5	NONE			3.42	99.2	3.48	99.1
VEXPX	37.65	0.0	MA		1; 3	6.26	90.2	6.28	79.2
VFINX	50.69	0.0	ARMA	1	1	536.02	0.0	794.33	0.0
VMRGX	65.60	0.0	AR	1		0.73	100.0	0.74	100.0
VWELX	27.13	0.7	MA		1	428.58	0.0	459.42	0.0
VWESX	89.26	0.0	AR	1		170.82	0.0	264.29	0.0
VWINX	75.16	0.0	AR	1		970.36	0.0	1212.10	0.0
VWNDX	2605.60	0.0	MA		1	149.99	0.0	166.07	0.0
VWUSX	51.81	0.0	MA		1	2.62	99.8	2.65	99.5
CAPEX	162.35	0.0	AR	1		772.13	0.0	1202.80	0.0

The table summarizes the tests performed on the presence of serial correlation and autoregressive conditional heteroskedasticity in the residuals of the daily returns of each fund. The Ljung-Box Q-statistic test was performed up to the 12th order serial correlation in the standardized first moment. In the cases were autocorrelation was present, an ARMA model was estimated to account for the specific autocorrelation of the series and, afterwards, the ARCH-LM and the Ljung-Box Q^2-statistic tests were computed. The ARCH-LM and the Ljung-Box Q^2-statistics were computed to assess the null hypothesis of no ARCH effect up to the 12th order in the square residuals. The probability columns are in percentage (i.e, 1 represents 1%).

Table 29 – Statistics and results for the tests performed on presence of serial correlation and autoregressive conditional heteroskedasticity in the residuals of daily returns – weekly aggregation

Ticker	Ljung-Box Q	Prob	Con. Mean	AR lags	MA lags	ARCH-LM	Prob	Ljung-Box Q2	Prob
ABALX	6.19	90.6	NONE			6.75	87.4	7.33	83.5
ABNDX	58.21	0.0	AR	1		143.85	0.0	301.40	0.0
ACEGX	48.49	0.0	AR	3		116.21	0.0	201.21	0.0
ACEIX	15.15	23.3	NONE			13.88	30.9	15.38	22.2
ACGIX	12.10	43.8	NONE			29.26	0.4	34.43	0.1
ADIF	29.42	0.3	AR	2; 3		290.15	0.0	590.73	0.0
ADIRT	3.99	98.4	NONE			5.93	92.0	4.95	96.0
ADIVERF	163.29	0.0	MA		1	162.95	0.0	160.53	0.0
AGTHX	13.26	35.1	NONE			12.06	44.1	13.40	34.1
AGWFX	21.70	4.1	NONE			64.02	0.0	85.52	0.0
AIVSX	6.85	86.7	NONE			0.07	100.0	0.07	100.0
ANWPX	14.73	25.7	NONE			0.02	100.0	0.02	100.0
BENDX	13.68	32.2	NONE			22.55	3.2	26.57	0.9
CHTRX	19.59	7.5	NONE			49.42	0.0	54.81	0.0
CSTGX	35.26	0.0	NONE			90.02	0.0	102.25	0.0
DELDX	6.88	86.6	NONE			88.90	0.0	94.02	0.0
DELFX	46.69	0.0	AR	1; 2		165.90	0.0	174.30	0.0
DELTX	46.20	0.0	MA		1; 3	58.04	0.0	89.05	0.0
DETWX	182.04	0.0	ARMA	1	1	215.64	0.0	527.80	0.0
EHSTX	16.56	16.7	NONE			122.67	0.0	193.58	0.0
ENDIX	8.19	77.0	NONE			0.15	100.0	0.12	100.0
EVIFX	23.01	2.8	NONE			113.99	0.0	169.98	0.0
EVSEX	21.37	4.5	MA		1; 2	0.09	100.0	0.09	100.0
FBNDX	83.34	0.0	AR	1		268.09	0.0	756.99	0.0
FCNTX	20.51	5.8	NONE			2.93	99.6	3.06	99.5
FEQIX	25.44	1.3	ARMA	1	1	53.55	0.0	81.38	0.0
FMAGX	9.46	66.3	NONE			2.72	99.7	2.80	99.7
FNDR	26.27	1.0	MA		2; 3	86.10	900.0	120.90	0.0
FNDS	30.35	0.2	AR	2; 3		152.96	0.0	237.69	0.0
FONDAKI	28.94	0.4	MA		2	207.59	0.0	303.24	0.0
FSTBX	22.19	3.5	NONE			26.75	0.8	37.57	0.0
FUSGX	102.25	0.0	AR	1		413.46	0.0	1355.74	0.0
HJVC	28.64	0.4	NONE			3.05	99.5	3.10	97.9
JANSX	16.54	16.8	NONE			0.17	100.0	0.21	100.0
LAFFX	24.29	1.9	MA		1	198.53	0.0	238.55	0.0
LAGWX	11.13	51.7	NONE			0.02	100.0	0.02	100.0
LBNDX	87.00	0.0	AR	1		26.87	0.8	29.62	0.2
LMSFX	322.42	0.0	AR	1		222.56	0.0	447.03	0.0
MOMGX	15.36	22.2	NONE			3.85	98.6	4.17	98.0
MPGFX	19.43	7.9	MA		1	104.73	0.0	167.61	0.0
NPRTX	5.48	94.0	NONE			0.99	100.0	0.98	100.0
NYVTX	5.35	94.5	NONE			3.16	99.4	3.21	99.4
OEQAX	19.79	7.1	ARMA	1	1	173.32	0.0	178.70	0.0
OPPAX	26.68	0.9	MA		1	224.83	0.0	201.70	0.0
OPPEX	20.07	6.6	NONE			5.88	92.2	6.38	78.2
OPPSX	19.54	7.6	NONE			16.55	16.7	14.94	24.5
OPTAX	219.15	0.0	AR	1		210.62	0.0	434.64	0.0
PENNX	32.53	0.1	AR	1; 2		6.63	88.1	7.32	69.5
PIODX	13.93	30.5	NONE			72.30	0.0	125.40	0.0
PIOTX	35.95	0.0	AR	1		31.48	0.2	38.81	0.0
SAVGRFI	41.98	0.0	AR	1		231.50	0.0	307.88	0.0
SIFEX	22.62	3.1	MA		1	70.60	0.0	104.45	0.0
U1IH	32.52	0.1	MA		1	1.63	100.0	1.68	99.9
UNIFNDS	26.80	0.8	MA		2; 3	200.91	0.0	339.92	0.0
UNIGLOB	29.79	0.3	MA		2; 3	86.69	0.0	108.29	0.0
UNIRNTA	9.04	69.9	NONE			6.76	87.3	5.73	92.9
VEXPX	38.76	0.0	MA		1	1.06	100.0	1.08	100.0
VFINX	11.79	46.3	NONE			70.83	0.0	102.48	0.0
VMRGX	12.52	40.5	NONE			1.90	100.0	1.92	100.0
VWELX	7.41	82.9	NONE			44.07	0.0	67.26	0.0
VWESX	46.23	0.0	MA		1	122.80	0.0	217.27	0.0
VWINX	28.50	0.5	NONE			190.66	0.0	182.73	0.0
VWNDX	18.95	9.0	MA		1	34.21	0.1	43.65	0.0
VWUSX	11.43	49.3	NONE			0.92	100.0	0.94	100.0
CAPEX	11.07	52.3	NONE			97.59	0.0	159.55	0.0

The table summarizes the tests performed on the presence of serial correlation and autoregressive conditional heteroskedasticity in the residuals of the weekly returns of each fund obtained through a non-overlapping sum of the respective daily returns. The Ljung-Box Q-statistic test was performed up to the 12^{th} order serial correlation in the standardized first moment. In the cases were autocorrelation was present, an ARMA model was estimated to account for the specific autocorrelation of the series and, afterwards, the ARCH-LM and the Ljung-Box Q^2-statistic tests were computed. The ARCH-LM and the Ljung-Box Q^2-statistics were computed to assess the null hypothesis of no ARCH effect up to the 12^{th} order in the square residuals. The probability columns are in percentage (i.e, 1 represents 1%).

Table 30 – Statistics and results for the tests performed on presence of serial correlation and autoregressive conditional heteroskedasticity in the residuals of daily returns – monthly aggregation

Ticker	Ljung-Box Q	Prob	Con. Mean	AR lags	MA lags	ARCH-LM	Prob	Ljung-Box Q2	Prob
ABALX	20.60	5.7	NONE			11.72	46.9	11.19	51.3
ABNDX	101.03	0.0	ARMA	1; 3; 4	1; 3	54.03	0.0	96.83	0.0
ACEGX	23.38	2.5	AR	1		30.20	0.3	36.01	0.0
ACEIX	19.42	7.9	NONE			6.54	88.6	6.77	87.2
ACGIX	14.65	26.1	NONE			6.38	89.6	6.76	87.3
ADIF	11.39	49.6	NONE			24.26	1.9	35.39	0.0
ADIRT	224.29	0.0	NONE			256.64	0.0	261.79	0.0
ADIVERF	23.17	2.6	NONE			1.71	100.0	1.75	100.0
AGTHX	7.41	83.0	NONE			4.61	97.0	4.15	98.1
AGWFX	9.41	66.8	NONE			18.66	9.7	21.10	4.9
AIVSX	5.70	93.0	NONE			0.17	100.0	0.19	100.0
ANWPX	7.15	84.8	NONE			0.14	0.0	0.15	100.0
BENDX	119.82	0.0	NONE			49.78	0.0	89.16	0.0
CHTRX	11.88	45.5	NONE			35.36	0.0	41.40	0.0
CSTGX	12.98	37.1	NONE			69.79	0.0	68.42	0.0
DELDX	21.04	5.0	NONE			22.80	2.9	24.04	2.0
DELFX	29.67	0.3	MA		1	51.64	0.0	54.73	0.0
DELTX	15.40	22.0	MA		1	1.20	100.0	1.28	100.0
DETWX	55.87	0.0	ARMA	1	1	67.57	0.0	150.36	0.0
EHSTX	13.67	32.3	NONE			11.13	51.8	20.43	5.9
ENDIX	21.41	4.5	NONE			85.11	0.0	89.15	0.0
EVIFX	36.84	0.0	ARMA	1	1	72.82	0.0	122.64	0.0
EVSEX	12.89	37.7	NONE			3.66	98.9	3.85	98.6
FBNDX	26.22	1.0	MA		1	50.50	0.0	90.08	0.0
FCNTX	19.15	8.5	MA		1	4.74	96.6	4.93	93.5
FEQIX	21.09	4.9	NONE			12.27	42.4	12.05	44.1
FMAGX	13.59	32.8	NONE			10.75	55.0	13.51	33.3
FNDR	33.63	0.1	NONE			7.92	79.1	7.83	79.8
FNDS	28.86	0.4	AR	1		2.23	99.9	2.41	99.6
FONDAKI	13.38	34.2	NONE			8.17	77.2	9.02	70.1
FSTBX	22.82	2.9	NONE			41.83	0.0	65.88	0.0
FUSGX	42.20	0.0	ARMA	1	1	93.20	0.0	172.23	0.0
HJVC	5.42	94.2	NONE			5.56	93.7	5.98	91.7
JANSX	16.04	18.9	MA		2	1.43	100.0	1.47	100.0
LAFFX	15.41	22.0	NONE			30.82	0.2	23.68	0.9
LAGWX	5.13	95.4	NONE			0.27	100.0	0.29	100.0
LBNDX	64.36	0.0	ARMA	1; 2	1; 2	50.12	0.0	67.43	0.0
LMSFX	43.63	0.0	ARMA	1; 2	2	91.41	0.0	161.54	0.0
MOMGX	13.44	33.8	NONE			3.02	99.5	3.12	99.5
MPGFX	10.85	54.2	AR	1		8.55	74.1	8.88	63.3
NPRTX	39.69	0.0	NONE			28.75	0.4	31.87	0.1
NYVTX	22.92	2.8	MA		1	10.27	59.3	10.67	47.1
OEQAX	6.62	88.2	NONE			33.26	0.1	36.61	0.0
OPPAX	8.27	76.4	NONE			0.74	100.0	0.79	100.0
OPPEX	24.14	1.9	NONE			16.00	19.1	16.86	11.2
OPPSX	4.57	97.1	NONE			12.26	42.5	11.54	48.3
OPTAX	42.63	0.0	MA		1	34.65	0.0	121.32	0.0
PENNX	26.09	1.0	MA		1	48.67	0.0	58.99	0.0
PIODX	10.31	58.9	NONE			31.12	0.2	31.79	0.1
PIOTX	24.14	1.9	NONE			14.32	28.1	14.00	30.1
SAVGRFI	20.36	6.1	MA		1	3.85	98.6	3.97	97.1
SIFEX	22.94	2.8	NONE			2.93	99.6	2.68	99.7
U1IH	11.16	51.5	NONE			1.12	100.0	1.16	100.0
UNIFNDS	25.85	1.1	MA		1	20.13	6.5	24.07	1.2
UNIGLOB	18.58	9.9	MA		1	3.39	99.2	3.57	98.1
UNIRNTA	190.55	0.0	NONE			288.36	0.0	314.13	0.0
VEXPX	11.54	48.3	NONE			1.85	100.0	1.96	99.9
VFINX	14.91	24.6	NONE			10.37	58.4	10.80	54.7
VMRGX	9.75	63.8	NONE			0.82	100.0	0.88	100.0
VWELX	23.60	2.3	NONE			19.53	7.6	22.72	3.0
VWESX	21.31	4.6	MA		1	37.86	0.0	53.17	0.0
VWINX	45.98	0.0	NONE			8.38	1.5	35.86	0.0
VWNDX	50.03	0.0	NONE			57.20	0.0	53.69	0.0
VWUSX	7.45	82.7	NONE			0.78	100.0	0.81	100.0
CAPEX	10.26	59.3	NONE			15.88	19.7	16.64	16.4

The table summarizes the tests performed on the presence of serial correlation and autoregressive conditional heteroskedasticity in the residuals of the monthly returns of each fund obtained through a non-overlapping sum of the respective daily returns. The Ljung-Box Q-statistic test was performed up to the 12^{th} order serial correlation in the standardized first moment. In the cases were autocorrelation was present, an ARMA model was estimated to account for the specific autocorrelation of the series and, afterwards, the ARCH-LM and the Ljung-Box Q^2-statistic tests were computed. The ARCH-LM and the Ljung-Box Q^2-statistics were computed to assess the null hypothesis of no ARCH effect up to the 12^{th} order in the square residuals. The probability columns are in percentage (i.e, 1 represents 1%).

Table 31 – Statistics and results for the tests performed on presence of serial correlation and autoregressive conditional heteroskedasticity in the residuals of daily returns – quarterly aggregation

Ticker	Ljung-Box Q	Prob	Con. Mean	AR lags	MA lags	ARCH-LM	Prob	Ljung-Box Q2	Prob
ABALX	12.48	40.8	NONE			5.99	91.7	12.48	40.8
ABNDX	16.02	19.0	NONE			45.31	0.0	59.73	0.0
ACEGX	22.99	2.8	ARMA	2	2	36.86	0.0	42.15	0.0
ACEIX	5.62	93.4	NONE			5.76	92.8	7.40	83.0
ACGIX	7.90	79.3	NONE			4.84	96.3	5.07	95.6
ADIF	10.33	58.7	NONE			19.95	6.8	34.43	0.1
ADIRT	190.44	0.0	AR	4		15.18	23.2	21.33	3.0
ADIVERF	21.45	4.4	AR	3		3.07	99.5	3.35	98.5
AGTHX	9.49	66.0	NONE			10.57	56.6	10.80	54.6
AGWFX	7.14	84.8	NONE			7.57	81.8	9.22	68.4
AIVSX	5.35	94.5	NONE			1.13	100.0	1.11	100.0
ANWPX	10.32	58.8	NONE			0.28	100.0	0.33	100.0
BENDX	15.07	23.8	NONE			18.73	9.5	25.45	1.3
CHTRX	9.22	68.4	NONE			3.73	98.8	4.06	98.2
CSTGX	5.79	92.6	NONE			2.22	99.9	2.95	99.6
DELDX	16.07	18.8	NONE			8.40	75.3	10.83	54.3
DELFX	7.34	83.4	NONE			2.10	99.9	2.36	99.9
DELTX	6.39	89.5	NONE			11.11	52.0	11.59	47.9
DETWX	17.60	12.8	MA		3	23.27	2.6	41.78	0.0
EHSTX	6.52	88.8	NONE			7.29	83.8	9.72	64.0
ENDIX	9.67	64.5	NONE			32.33	0.1	26.12	1.0
EVIFX	6.93	86.2	NONE			16.50	16.9	29.26	0.4
EVSEX	7.80	80.0	NONE			2.10	99.9	2.58	99.8
FBNDX	9.54	65.6	NONE			51.82	0.0	68.27	0.0
FCNTX	7.93	79.1	NONE			2.89	99.6	3.09	99.5
FEQIX	11.51	48.6	NONE			5.24	94.9	7.13	84.9
FMAGX	12.08	44.0	NONE			31.59	0.2	45.41	0.0
FNDR	30.38	0.2	ARMA	4	4	9.11	69.3	14.63	14.6
FNDS	22.83	2.9	NONE			8.77	72.2	11.45	49.1
FONDAKI	12.65	39.5	NONE			7.40	83.0	10.92	53.5
FSTBX	1.54	100.0	NONE			27.02	0.8	33.17	0.1
FUSGX	21.63	4.2	AR	1		47.16	0.0	93.57	0.0
HJVC	7.44	82.7	NONE			14.98	24.3	19.76	7.2
JANSX	18.69	9.6	AR	1		0.64	100.0	0.71	100.0
LAFFX	13.00	36.9	NONE			5.94	91.9	6.43	89.3
LAGWX	11.37	49.8	NONE			0.82	100.0	1.02	100.0
LBNDX	7.18	84.6	NONE			24.84	1.6	31.89	0.1
LMSFX	10.64	56.0	NONE			41.19	0.0	72.41	0.0
MOMGX	7.58	81.7	NONE			16.00	19.1	16.21	18.2
MPGFX	5.75	92.8	NONE			9.80	63.4	11.42	49.3
NPRTX	14.64	26.2	NONE			5.00	95.8	5.66	93.2
NYVTX	17.03	14.8	NONE			10.08	60.9	4.54	97.2
OEQAX	10.55	56.8	NONE			3.53	99.1	4.69	96.8
OPPAX	16.55	16.8	NONE			1.55	100.0	1.91	100.0
OPPEX	16.58	16.6	NONE			17.70	12.5	23.83	2.1
OPPSX	10.10	60.7	NONE			11.14	51.7	12.71	39.0
OPTAX	14.01	30.0	NONE			27.85	0.6	46.70	0.0
PENNX	14.75	25.5	NONE			31.30	0.2	35.63	0.0
PIODX	6.82	86.9	NONE			6.34	89.8	7.43	82.8
PIOTX	27.73	0.6	ARMA	3	3	10.50	57.2	12.54	25.1
SAVGRFI	45.36	0.0	ARMA	3	3	12.79	38.4	16.02	9.9
SIFEX	11.34	50.0	NONE			4.58	97.1	4.37	97.6
U1IH	8.62	73.5	NONE			3.76	98.7	4.79	96.5
UNIFNDS	24.94	1.5	ARMA	4	4	10.49	57.3	13.60	19.2
UNIGLOB	14.00	30.0	NONE			8.18	77.1	10.20	59.9
UNIRNTA	160.61	0.0	NONE			27.35	0.7	35.95	0.0
VEXPX	7.82	79.9	NONE			3.55	99.0	4.42	97.5
VFINX	5.22	95.0	NONE			14.19	28.9	14.32	28.1
VMRGX	13.53	33.2	NONE			3.53	99.1	3.92	98.5
VWELX	7.85	79.6	NONE			9.05	69.9	10.11	60.6
VWESX	10.50	57.2	NONE			34.01	0.1	33.65	0.1
VWINX	11.10	52.0	NONE			18.41	10.4	17.91	11.8
VWNDX	27.20	0.7	ARMA	4	4	8.09	77.8	6.13	80.5
VWUSX	13.30	34.8	NONE			6.78	87.2	6.22	90.5
CAPEX	4.56	97.1	NONE			11.65	47.4	14.16	29.0

The table summarizes the tests performed on the presence of serial correlation and autoregressive conditional heteroskedasticity in the residuals of the quarterly returns of each fund obtained through a non-overlapping sum of the respective daily returns. The Ljung-Box Q-statistic test was performed up to the 12^{th} order serial correlation in the standardized first moment. In the cases were autocorrelation was present, an ARMA model was estimated to account for the specific autocorrelation of the series and, afterwards, the ARCH-LM and the Ljung-Box Q^2-statistic tests were computed. The ARCH-LM and the Ljung-Box Q^2-statistics were computed to assess the null hypothesis of no ARCH effect up to the 12^{th} order in the square residuals. The probability columns are in percentage (i.e, 1 represents 1%).

Table 32 – Statistics and results for the tests performed on presence of serial correlation and autoregressive conditional heteroskedasticity in the residuals of daily returns – semi-annual aggregation

Ticker	Ljung-Box Q	Prob	Con. Mean	AR lags	MA lags	ARCH-LM	Prob	Ljung-Box Q2	Prob
ABALX	25.36	1.3	AR	3		11.01	52.8	6.52	83.7
ABNDX	24.11	2.0	NONE			15.03	24.0	11.88	45.6
ACEGX	16.06	18.8	NONE			16.45	17.2	29.83	0.3
ACEIX	14.44	27.3	NONE			11.83	45.9	11.15	51.6
ACGIX	18.98	8.9	NONE			15.63	20.9	14.92	24.6
ADIF	6.15	90.8	NONE			13.83	31.2	2.07	99.9
ADIRT	129.25	0.0	ARMA	4	4	8.28	76.3	18.24	5.1
ADIVERF	7.66	81.1	NONE			0.98	100.0	0.59	100.0
AGTHX	19.14	8.5	AR	3		4.23	97.9	3.91	97.3
AGWFX	16.02	19.1	NONE			7.42	82.9	5.28	94.8
AIVSX	17.48	9.4	NONE			8.93	70.9	10.73	55.2
ANWPX	11.68	47.2	NONE			6.63	88.1	0.94	100.0
BENDX	24.40	1.8	ARMA			13.59	32.8	11.76	46.5
CHTRX	22.89	2.9	NONE			8.67	73.1	11.00	52.9
CSTGX	14.44	27.4	NONE			5.53	93.8	7.47	82.5
DELDX	26.73	0.8	ARMA	3	3	5.93	92.0	7.94	63.4
DELFX	14.25	28.5	NONE			6.43	89.3	6.73	87.5
DELTX	18.41	10.4	NONE			12.22	42.8	7.49	82.3
DETWX	10.44	57.7	NONE			9.33	67.5	10.05	61.2
EHSTX	27.02	0.8	NONE			16.74	15.9	19.04	8.8
ENDIX	33.62	0.1	AR	3		14.79	25.3	15.59	15.7
EVIFX	25.01	1.5	ARMA	1	1	7.63	81.3	6.42	77.9
EVSEX	8.29	76.2	NONE			2.11	99.9	2.84	99.7
FBNDX	11.73	46.8	NONE			17.96	11.7	15.07	23.8
FCNTX	13.94	30.4	NONE			18.92	9.0	9.32	67.5
FEQIX	19.62	7.5	NONE			13.62	32.5	12.90	37.6
FMAGX	11.65	47.4	NONE			14.57	26.6	12.66	39.5
FNDR	16.54	16.8	NONE			7.81	80.0	3.66	98.9
FNDS	17.12	14.5	NONE			10.36	58.5	10.17	60.1
FONDAKI	7.30	83.7	NONE			5.38	94.4	2.17	99.9
FSTBX	10.13	60.4	NONE			23.19	2.6	29.56	0.3
FUSGX	16.65	16.3	MA		3	22.30	3.4	25.65	0.7
HJVC	7.18	84.6	NONE			10.13	60.4	11.97	44.8
JANSX	13.03	36.7	NONE			3.37	99.2	4.62	97.0
LAFFX	16.81	15.7	MA		1; 3	13.95	30.4	15.06	13.0
LAGWX	15.54	21.3	NONE			3.01	99.5	4.52	97.2
LBNDX	10.35	58.5	NONE			9.44	66.5	8.97	70.5
LMSFX	11.60	47.8	NONE			29.41	0.3	38.29	0.0
MOMGX	9.15	69.0	NONE			9.25	68.1	11.92	45.2
MPGFX	15.81	20.0	NONE			9.70	64.2	19.82	7.1
NPRTX	22.29	3.4	ARMA	3	3	6.28	90.1	5.37	86.5
NYVTX	13.85	31.0	NONE			5.29	94.7	6.23	90.4
OEQAX	17.04	14.8	MA		3	5.41	94.3	6.03	87.1
OPPAX	13.77	31.6	AR	3		6.12	91.0	9.39	58.6
OPPEX	15.30	22.5	ARMA	4	4	15.69	20.6	12.15	27.5
OPPSX	8.24	76.6	NONE			9.09	69.5	5.62	93.4
OPTAX	12.70	39.1	NONE			11.79	46.3	41.85	0.0
PENNX	17.06	14.8	MA		1	14.69	25.9	15.48	16.2
PIODX	18.20	11.0	NONE			9.83	63.1	15.58	21.1
PIOTX	25.60	1.2	NONE			21.52	4.3	12.33	42.0
SAVGRFI	4.10	98.1	NONE			16.13	18.5	30.29	0.3
SIFEX	12.64	39.6	NONE			6.54	88.6	7.31	83.7
U1IH	19.29	8.2	NONE			5.57	93.6	3.75	98.8
UNIFNDS	16.17	18.4	NONE			5.59	93.6	4.59	97.0
UNIGLOB	26.46	0.9	ARMA	2	2	6.63	88.1	7.33	69.4
UNIRNTA	129.36	0.0	AR	3		3.37	99.2	4.54	95.2
VEXPX	20.33	6.1	NONE			12.62	39.7	15.17	23.2
VFINX	11.53	48.5	NONE			10.38	58.3	18.56	10.0
VMRGX	23.25	2.6	AR	1		8.74	72.5	11.88	37.2
VWELX	11.08	52.2	NONE			12.22	42.8	15.69	20.6
VWESX	7.47	82.5	NONE			11.75	46.6	10.76	55.0
VWINX	13.49	33.5	NONE			5.00	95.8	4.97	95.9
VWNDX	31.20	0.2	MA		1	5.41	94.3	3.71	97.8
VWUSX	20.49	5.8	NONE			8.25	76.6	7.97	78.7
CAPEX	21.59	4.2	NONE			29.46	0.3	30.94	0.2

The table summarizes the tests performed on the presence of serial correlation and autoregressive conditional heteroskedasticity in the residuals of the semi-annual returns of each fund obtained through a non-overlapping sum of the respective daily returns. The Ljung-Box Q-statistic test was performed up to the 12^{th} order serial correlation in the standardized first moment. In the cases were autocorrelation was present, an ARMA model was estimated to account for the specific autocorrelation of the series and, afterwards, the ARCH-LM and the Ljung-Box Q^2-statistic tests were computed. The ARCH-LM and the Ljung-Box Q^2-statistics were computed to assess the null hypothesis of no ARCH effect up to the 12^{th} order in the square residuals. The probability columns are in percentage (i.e, 1 represents 1%).

Table 33 – Statistics and results for the tests performed on presence of serial correlation and autoregressive conditional heteroskedasticity in the residuals of daily returns –annual aggregation

Ticker	Ljung-Box Q	Prob	Con. Mean	AR lags	MA lags	ARCH-LM	Prob	Ljung-Box Q2	Prob
ABALX	16.06	18.8	MA		1	15.4	22.2	9.58	56.8
ABNDX	14.82	25.2	NONE			13.4	33.9	13.54	33.1
ACEGX	9.37	67.1	NONE			12.5	40.5	13.31	34.7
ACEIX	8.46	74.8	NONE			14.6	26.2	4.46	97.4
ACGIX	9.91	62.4	NONE			10.0	61.3	7.20	84.4
ADIF	3.92	98.5	NONE			9.3	68.1	0.50	100.0
ADIRT	16.38	17.4	NONE			14.9	24.6	7.98	78.7
ADIVERF	3.15	99.4	NONE			18.9	9.1	2.35	99.9
AGTHX	5.09	95.5	NONE			8.9	70.9	4.61	97.0
AGWFX	10.55	56.8	ARMA	2	2	9.4	66.8	5.16	88.0
AIVSX	12.26	42.5	NONE			6.1	91.1	1.93	100.0
ANWPX	5.27	94.8	NONE			8.2	76.7	0.60	100.0
BENDX	15.39	22.1	NONE			13.6	32.5	6.05	91.3
CHTRX	11.65	47.5	ARMA	2	2	15.6	21.0	10.94	36.2
CSTGX	7.50	82.3	NONE			14.5	27.0	9.32	67.6
DELDX	12.71	39.1	MA		2	12.6	39.9	4.83	93.9
DELFX	12.97	37.1	NONE			11.6	48.1	3.91	98.5
DELTX	7.86	79.6	NONE			7.6	81.2	7.87	79.5
DETWX	7.56	81.9	NONE			14.4	27.7	5.43	94.2
EHSTX	9.47	66.2	NONE			7.1	85.2	8.44	74.9
ENDIX	10.18	60.1	NONE			9.8	63.4	2.20	99.9
EVIFX	8.13	77.5	NONE			7.9	79.7	5.96	91.8
EVSEX	8.71	72.8	NONE			6.8	87.2	12.48	40.8
FBNDX	14.94	24.5	NONE			11.3	50.5	9.93	62.2
FCNTX	5.80	92.6	NONE			15.5	21.5	3.68	98.9
FEQIX	14.35	27.9	NONE			10.6	56.0	9.02	70.1
FMAGX	7.76	80.3	NONE			18.3	10.8	11.31	50.3
FNDR	5.03	95.7	NONE			8.9	71.2	1.71	100.0
FNDS	4.17	98.0	NONE			15.9	19.5	6.67	87.9
FONDAKI	6.73	87.5	NONE			13.6	33.0	6.19	90.6
FSTBX	10.64	56.0	NONE			18.2	10.9	10.95	53.3
FUSGX	11.45	49.1	NONE			1.5	100.0	4.26	97.8
HJVC	5.22	95.0	NONE			8.6	73.9	1.12	100.0
JANSX	16.40	17.4	NONE			15.8	19.9	3.13	99.5
LAFFX	18.73	9.5	MA		2	16.0	19.2	9.50	57.6
LAGWX	13.48	33.5	NONE			12.8	38.1	5.04	95.7
LBNDX	8.14	77.4	NONE			14.0	29.9	11.27	50.6
LMSFX	4.71	96.7	NONE			13.8	31.4	10.70	55.5
MOMGX	3.33	99.3	NONE			8.9	71.4	5.74	92.9
MPGFX	12.79	38.4	NONE			7.4	83.0	7.97	78.8
NPRTX	13.44	33.8	NONE			10.9	54.1	2.13	99.9
NYVTX	8.58	73.8	NONE			16.7	16.1	8.41	75.2
OEQAX	10.10	60.7	NONE			8.1	77.7	3.05	99.5
OPPAX	7.91	79.2	NONE			5.3	94.9	15.50	21.5
OPPEX	22.82	2.9	ARMA	2	2	12.8	38.3	6.95	73.0
OPPSX	3.77	98.7	NONE			11.1	52.4	4.66	96.8
OPTAX	6.34	89.8	NONE			13.7	31.9	12.71	39.1
PENNX	5.98	91.7	NONE			10.1	60.9	12.00	44.5
PIODX	8.58	73.8	NONE			9.5	66.0	8.16	77.2
PIOTX	6.13	90.9	NONE			4.8	96.4	9.34	67.3
SAVGRFI	1.37	100.0	NONE			9.9	62.5	7.41	68.6
SIFEX	9.13	69.2	NONE			7.4	83.4	3.86	98.6
U1IH	7.97	78.8	NONE			8.3	75.7	11.54	48.3
UNIFNDS	9.00	70.3	NONE			5.5	94.0	2.78	99.7
UNIGLOB	4.75	96.6	NONE			11.5	48.6	10.54	56.9
UNIRNTA	11.15	51.6	NONE			5.8	92.8	5.79	92.6
VEXPX	13.87	30.9	NONE			7.1	84.8	10.90	53.8
VFINX	5.35	94.5	NONE			13.6	32.5	3.87	98.6
VMRGX	5.88	92.2	NONE			6.7	87.5	11.70	47.0
VWELX	8.82	71.9	NONE			11.9	45.7	4.11	98.1
VWESX	10.79	54.7	NONE			8.1	78.0	8.05	78.1
VWINX	7.74	80.5	NONE			7.3	83.5	7.50	82.3
VWNDX	13.19	35.5	ARMA	2	2	8.6	73.6	6.81	74.3
VWUSX	10.24	59.5	NONE			16.6	16.4	10.67	55.7
CAPEX	6.68	87.8	NONE			8.7	73.2	6.08	91.2

The table summarizes the tests performed on the presence of serial correlation and autoregressive conditional heteroskedasticity in the residuals of the annual returns of each fund obtained through a non-overlapping sum of the respective daily returns. The Ljung-Box Q-statistic test was performed up to the 12^{th} order serial correlation in the standardized first moment. In the cases were autocorrelation was present, an ARMA model was estimated to account for the specific autocorrelation of the series and, afterwards, the ARCH-LM and the Ljung-Box Q^2-statistic tests were computed. The ARCH-LM and the Ljung-Box Q^2-statistics were computed to assess the null hypothesis of no ARCH effect up to the 12^{th} order in the square residuals. The probability columns are in percentage (i.e, 1 represents 1%).

Table 34 – Statistics and results for the tests performed on presence of serial correlation and autoregressive conditional heteroskedasticity in the residuals of weekly returns –no aggregation

Ticker	Ljung-Box Q	Prob	Con. Mean	AR lags	MA lags	ARCH-LM	Prob	Ljung-Box Q2	Prob
ABALX	8.22	76.8	NONE			2.8	99.7	2.97	99.6
ABNDX	41.85	0.0	NONE			129.6	0.0	531.98	0.0
ACEGX	41.97	0.0	MA		3	107.6	0.0	156.92	0.0
ACEIX	18.97	8.9	NONE			5.7	93.0	9.72	46.6
ACGIX	19.96	6.8	NONE			12.6	39.9	13.73	18.6
ADIF	19.37	8.0	NONE			404.5	0.0	682.89	0.0
ADIRT	4.47	97.3	NONE			6.2	90.8	5.10	95.5
ADIVERF	157.22	0.0	AR	1		166.7	0.0	165.09	0.0
AGTHX	25.49	1.3	AR	3		19.2	8.5	22.68	2.0
AGWFX	21.79	4.0	MA		3	62.0	0.0	89.44	0.0
AIVSX	6.62	88.2	NONE			0.1	100.0	0.06	100.0
ANWPX	7.69	80.9	NONE			0.0	100.0	0.04	100.0
BENDX	18.03	11.5	NONE			16.5	17.1	24.22	1.2
CHTRX	21.03	5.0	NONE			27.2	0.7	32.02	0.0
CSTGX	16.44	17.2	NONE			46.6	0.0	50.91	0.0
DELDX	23.24	2.6	NONE			30.2	0.3	33.77	0.0
DELFX	43.76	0.0	MA		2	231.1	0.0	242.91	0.0
DELTX	46.53	0.0	MA		1; 3	99.0	0.0	117.11	0.0
DETWX	48.86	0.0	NONE			532.8	0.0	400.90	0.0
EHSTX	23.78	2.2	ARMA	4	4	98.2	0.0	188.62	0.0
ENDIX	7.22	84.2	NONE			0.3	100.0	0.35	100.0
EVIFX	20.18	6.4	ARMA	4	4	27.5	0.6	35.63	0.0
EVSEX	17.85	12.0	MA		2	0.1	100.0	0.11	100.0
FBNDX	67.73	0.0	ARMA	1	1	301.7	0.0	825.57	0.0
FCNTX	21.31	4.6	ARMA	1	1	4.3	97.8	4.52	92.1
FEQIX	33.03	0.1	ARMA	1	1	38.9	0.0	52.18	0.0
FMAGX	18.58	9.9	AR	1		3.1	99.5	3.28	98.6
FNDR	24.93	1.5	AR	1		78.7	0.0	116.09	0.0
FNDS	34.77	0.1	ARMA	1	1	87.9	0.0	139.75	0.0
FONDAKI	27.76	0.6	ARMA	1	1	312.7	0.0	426.65	0.0
FSTBX	38.04	0.0	ARMA	2	2	25.7	1.2	34.40	0.0
FUSGX	89.22	0.0	NONE			606.9	0.0	2221.60	0.0
HJVC	28.60	0.5	MA		1	3.0	99.6	3.24	98.7
JANSX	19.51	7.7	MA		2	0.1	100.0	0.07	100.0
LAFFX	23.84	2.1	NONE			168.1	0.0	220.37	0.0
LAGWX	16.32	17.7	MA		1	0.0	100.0	0.03	100.0
LBNDX	91.48	0.0	AR	1		14.3	28.4	74.33	0.0
LMSFX	296.39	0.0	AR	1		181.8	0.0	329.07	0.0
MOMGX	21.22	4.7	NONE			4.0	98.4	4.28	96.1
MPGFX	7.00	85.8	NONE			0.0	100.0	0.03	100.0
NPRTX	9.30	67.7	NONE			0.6	100.0	0.60	100.0
NYVTX	10.17	60.1	NONE			3.9	98.5	3.98	98.4
OEQAX	15.91	19.5	NONE			86.2	0.0	100.97	0.0
OPPAX	41.62	0.0	MA		1	2.8	99.7	2.85	99.3
OPPEX	21.02	5.0	ARMA	2	2	19.1	8.5	19.56	3.4
OPPSX	10.43	57.8	NONE			23.4	2.4	21.34	4.6
OPTAX	211.20	0.0	AR	1		196.3	0.0	452.16	0.0
PENNX	52.36	0.0	AR	1		4.5	97.1	4.86	93.8
PIODX	16.32	17.7	NONE			36.1	0.0	40.99	0.0
PIOTX	41.95	0.0	AR	1		10.6	56.2	11.12	43.3
SAVGRFI	35.67	0.0	AR	1		194.9	0.0	250.64	0.0
SIFEX	42.85	0.0	MA		1	60.6	0.0	86.85	0.0
U1IH	34.33	0.1	MA		1	2.0	99.9	2.04	99.8
UNIFNDS	25.19	1.4	MA		1	251.5	0.0	400.31	0.0
UNIGLOB	38.35	0.0	MA		1; 3	86.9	0.0	104.69	0.0
UNIRNTA	6.99	85.8	NONE			6.1	91.3	5.32	94.7
VEXPX	20.15	6.4	MA		1	1.1	100.0	1.08	100.0
VFINX	23.45	2.4	MA		1	107.5	0.0	156.45	0.0
VMRGX	19.82	7.1	NONE			0.8	100.0	0.85	100.0
VWELX	25.89	1.1	NONE			37.4	0.0	50.79	0.0
VWESX	27.63	0.6	MA		4	113.2	0.0	184.86	0.0
VWINX	27.02	0.8	NONE			362.6	0.0	346.69	0.0
VWNDX	16.78	15.8	MA		1	16.2	18.2	19.79	4.8
VWUSX	17.72	12.5	AR	1		0.7	100.0	0.75	100.0
CAPEX	26.45	0.9	NONE			165.6	0.0	251.83	0.0

The table summarizes the tests performed on the presence of serial correlation and autoregressive conditional heteroskedasticity in the residuals of the weekly returns of each fund. The Ljung-Box Q-statistic test was performed up to the 12^{th} order serial correlation in the standardized first moment. In the cases were autocorrelation was present, an ARMA model was estimated to account for the specific autocorrelation of the series and, afterwards, the ARCH-LM and the Ljung-Box Q^2-statistic tests were computed. The ARCH-LM and the Ljung-Box Q^2-statistics were computed to assess the null hypothesis of no ARCH effect up to the 12^{th} order in the square residuals. The probability columns are in percentage (i.e, 1 represents 1%).

Table 35 – Statistics and results for the tests performed on presence of serial correlation and autoregressive conditional heteroskedasticity in the residuals of weekly returns –monthly aggregation

Ticker	Ljung-Box Q	Prob	Con. Mean	AR lags	MA lags	ARCH-LM	Prob	Ljung-Box Q2	Prob
ABALX	24.83	1.6	NONE			9.4	67.0	8.90	63.1
ABNDX	129.43	0.0	MA		2; 3	59.8	0.0	133.88	0.0
ACEGX	19.05	8.7	AR	1		29.7	0.3	49.09	0.0
ACEIX	26.46	0.9	NONE			6.6	88.2	4.71	90.9
ACGIX	12.19	43.1	NONE			7.2	84.3	8.01	78.4
ADIF	18.88	9.1	NONE			70.3	0.0	132.57	0.0
ADIRT	220.88	0.0	NONE			260.8	0.0	264.05	0.0
ADIVERF	18.89	9.1	NONE			2.1	99.9	2.16	99.9
AGTHX	12.26	42.5	NONE			5.4	94.3	5.44	86.0
AGWFX	6.64	88.0	NONE			16.7	16.1	23.81	2.2
AIVSX	8.48	74.7	NONE			0.2	100.0	0.14	100.0
ANWPX	8.68	73.0	NONE			0.2	100.0	0.17	100.0
BENDX	105.29	0.0	NONE			51.8	0.0	88.40	0.0
CHTRX	13.85	31.1	NONE			36.6	0.0	36.14	0.0
CSTGX	9.54	65.6	NONE			44.3	0.0	39.05	0.0
DELDX	25.94	1.1	NONE			23.6	2.3	26.68	0.9
DELFX	30.41	0.2	AR	1, 2		72.3	0.0	71.41	0.0
DELTX	12.16	43.3	MA		1	2.1	99.9	2.35	99.7
DETWX	58.24	0.0	MA		1; 3	78.7	0.0	148.38	0.0
EHSTX	15.88	19.7	NONE			12.7	39.1	14.06	29.7
ENDIX	30.64	0.2	NONE			85.4	0.0	89.61	0.0
EVIFX	24.58	1.7	AR	1		52.2	0.0	55.75	0.0
EVSEX	12.99	37.0	NONE			2.1	99.9	2.22	99.9
FBNDX	25.01	1.5	MA		1, 2	38.4	0.0	67.93	0.0
FCNTX	13.15	35.8	NONE			2.9	99.6	3.12	99.5
FEQIX	30.09	0.3	NONE			18.2	11.0	20.33	6.1
FMAGX	13.94	30.4	NONE			18.7	9.7	24.32	1.8
FNDR	33.19	0.1	NONE			25.1	1.4	24.60	1.7
FNDS	31.59	0.2	NONE			29.4	0.3	36.83	0.0
FONDAKI	14.55	26.7	NONE			32.7	0.1	38.06	0.0
FSTBX	19.30	8.2	MA		2	52.2	0.0	79.77	0.0
FUSGX	60.82	0.0	ARMA	1; 2	1; 2	68.8	0.0	119.12	0.0
HJVC	10.74	55.2	NONE			14.3	28.5	16.57	16.7
JANSX	11.40	49.5	NONE			2.1	99.9	2.22	99.9
LAFFX	17.78	12.2	NONE			43.3	0.0	46.83	0.0
LAGWX	5.15	95.3	NONE			0.3	100.0	0.33	100.0
LBNDX	62.68	0.0	ARMA	1; 2	1; 2, 3	36.0	0.0	45.32	0.0
LMSFX	48.69	0.0	NONE			89.1	0.0	245.18	0.0
MOMGX	11.54	48.3	NONE			3.0	99.5	3.09	99.5
MPGFX	4.55	97.1	NONE			0.2	100.0	0.17	100.0
NPRTX	24.85	1.6	NONE			2.3	99.9	2.62	98.9
NYVTX	15.99	19.2	NONE			9.3	67.4	14.40	15.5
OEQAX	13.92	30.6	AR	1		20.0	6.8	19.09	5.9
OPPAX	7.54	82.0	NONE			2.8	99.7	3.07	99.5
OPPEX	27.52	0.6	ARMA	2; 3	2; 3	15.4	22.0	16.50	3.6
OPPSX	5.18	95.2	NONE			34.9	0.0	43.24	0.0
OPTAX	50.02	0.0	ARMA	1; 2	2	83.7	0.0	225.36	0.0
PENNX	28.62	0.4	MA		1	56.9	0.0	72.41	0.0
PIODX	9.77	63.6	NONE			31.9	0.1	33.16	0.1
PIOTX	21.50	4.3	NONE			2.3	99.9	2.26	99.9
SAVGRFI	18.58	9.9	NONE			33.9	0.1	39.53	0.0
SIFEX	16.56	16.7	NONE			10.0	61.5	7.51	67.7
U1IH	17.30	13.9	MA		1	2.6	99.8	2.78	99.3
UNIFNDS	27.17	0.7	NONE			58.1	0.0	82.08	0.0
UNIGLOB	18.22	10.9	NONE			34.9	0.0	36.54	0.0
UNIRNTA	206.95	0.0	NONE			290.8	0.0	13.87	17.9
VEXPX	11.61	47.7	NONE			0.9	100.0	1.11	100.0
VFINX	15.28	22.7	MA		2	4.7	96.7	5.22	92.0
VMRGX	6.05	91.3	NONE			0.6	100.0	0.64	100.0
VWELX	20.22	6.3	NONE			7.9	78.9	7.48	67.9
VWESX	23.26	2.6	MA		1	37.6	0.0	45.55	0.0
VWINX	35.03	0.0	MA		2	2.1	14.4	22.53	2.1
VWNDX	34.13	0.1	NONE			32.9	0.1	33.97	0.0
VWUSX	9.51	65.8	NONE			0.8	100.0	0.80	100.0
CAPEX	7.45	82.6	NONE			9.1	69.0	10.05	61.2

The table summarizes the tests performed on the presence of serial correlation and autoregressive conditional heteroskedasticity in the residuals of the monthly returns of each fund obtained through a non-overlapping sum of the respective weekly returns. The Ljung-Box Q-statistic test was performed up to the 12^{th} order serial correlation in the standardized first moment. In the cases were autocorrelation was present, an ARMA model was estimated to account for the specific autocorrelation of the series and, afterwards, the ARCH-LM and the Ljung-Box Q^2-statistic tests were computed. The ARCH-LM and the Ljung-Box Q^2-statistics were computed to assess the null hypothesis of no ARCH effect up to the 12^{th} order in the square residuals. The probability columns are in percentage (i.e, 1 represents 1%).

Table 36 – Statistics and results for the tests performed on presence of serial correlation and autoregressive conditional heteroskedasticity in the residuals of weekly returns –quarterly aggregation

Ticker	Ljung-Box Q	Prob	Con. Mean	AR lags	MA lags	ARCH-LM	Prob	Ljung-Box Q2	Prob
ABALX	11.89	45.5	NONE			4.9	96.0	6.37	89.6
ABNDX	17.58	12.9	NONE			46.3	0.0	61.90	0.0
ACEGX	15.10	23.6	NONE			27.2	0.7	42.78	0.0
ACEIX	6.65	88.0	NONE			6.3	90.1	7.86	79.6
ACGIX	9.83	63.1	NONE			4.0	98.3	5.19	95.1
ADIF	15.73	20.4	NONE			19.4	8.0	30.63	0.2
ADIRT	182.99	0.0	ARMA	4	4	19.9	6.9	21.82	0.9
ADIVERF	22.07	3.7	ARMA	3; 4	3; 4	5.4	94.5	6.26	61.8
AGTHX	16.62	16.4	NONE			17.8	12.2	15.92	19.5
AGWFX	8.34	75.8	NONE			19.4	7.9	26.28	1.0
AIVSX	6.28	90.1	NONE			1.2	100.0	1.18	100.0
ANWPX	12.44	41.1	NONE			0.3	100.0	0.35	100.0
BENDX	17.82	12.1	NONE			21.1	4.9	18.14	5.3
CHTRX	8.59	73.8	NONE			8.6	73.8	7.64	81.2
CSTGX	10.93	53.5	NONE			5.5	94.0	7.00	85.7
DELDX	16.42	17.3	NONE			6.0	91.7	7.60	81.5
DELFX	6.29	90.1	NONE			2.1	99.9	2.33	99.9
DELTX	10.05	61.1	NONE			12.8	38.1	11.89	45.5
DETWX	19.09	8.6	MA		3	17.5	13.1	30.16	0.1
EHSTX	5.76	92.8	NONE			8.2	76.6	8.82	71.8
ENDIX	13.42	33.9	NONE			30.5	0.2	25.57	1.2
EVIFX	5.54	93.8	NONE			19.4	7.9	20.33	6.1
EVSEX	6.49	88.9	NONE			1.9	100.0	2.23	99.9
FBNDX	10.67	55.7	NONE			56.9	0.0	73.10	0.0
FCNTX	8.61	73.6	NONE			5.8	92.8	4.32	97.7
FEQIX	11.66	47.3	NONE			12.3	42.2	14.59	26.5
FMAGX	9.26	68.1	NONE			20.5	5.8	25.82	1.1
FNDR	39.29	0.0	NONE			6.2	90.8	8.96	70.7
FNDS	32.70	0.1	ARMA	3	3	11.3	50.2	14.21	16.4
FONDAKI	18.37	10.5	NONE			7.6	81.3	9.97	61.8
FSTBX	4.15	98.1	NONE			40.1	0.0	37.83	0.0
FUSGX	27.00	0.8	NONE			52.3	0.0	83.23	0.0
HJVC	6.71	87.6	NONE			15.8	20.1	20.28	6.2
JANSX	32.49	0.1	ARMA	1	1	1.2	100.0	1.35	99.9
LAFFX	12.31	42.2	NONE			5.4	94.4	5.52	93.8
LAGWX	15.43	21.9	ARMA			1.2	100.0	1.31	100.0
LBNDX	8.65	73.3	NONE			20.6	5.7	26.40	0.9
LMSFX	15.62	20.9	NONE			41.7	0.0	83.05	0.0
MOMGX	9.30	67.7	NONE			12.1	43.8	10.98	53.1
MPGFX	6.71	87.6	NONE			7.4	83.3	1.33	100.0
NPRTX	12.96	37.2	NONE			5.2	95.0	5.71	93.0
NYVTX	18.00	11.6	NONE			7.0	85.6	3.13	99.5
OEQAX	12.80	38.4	NONE			10.3	58.8	8.20	76.9
OPPAX	16.39	17.4	NONE			2.2	99.9	2.48	99.8
OPPEX	18.47	10.2	NONE			23.4	2.4	31.29	0.2
OPPSX	9.20	68.6	NONE			12.6	40.2	12.89	37.7
OPTAX	18.03	11.5	NONE			28.5	0.5	54.49	0.0
PENNX	16.80	15.7	NONE			31.3	0.2	32.52	0.1
PIODX	5.60	93.5	NONE			5.6	93.7	6.44	89.2
PIOTX	28.30	0.5	NONE			6.8	87.3	7.64	81.3
SAVGRFI	10.51	57.2	NONE			14.3	27.9	18.47	10.2
SIFEX	9.54	65.6	NONE			5.8	92.6	4.99	95.8
U1IH	7.93	79.0	NONE			3.1	99.5	3.93	98.5
UNIFNDS	31.93	0.1	ARMA	4	4	11.4	49.6	14.15	16.6
UNIGLOB	16.92	15.3	NONE			8.5	74.7	10.79	54.7
UNIRNTA	172.74	0.0	ARMA	4	4	8.7	72.5	9.24	51.0
VEXPX	10.95	53.3	NONE			3.7	98.8	4.78	96.5
VFINX	4.89	96.2	NONE			5.9	91.9	7.45	82.7
VMRGX	12.36	41.7	NONE			6.8	87.3	7.44	82.7
VWELX	10.78	54.8	NONE			8.2	76.6	14.50	27.0
VWESX	13.12	36.0	NONE			38.1	0.0	34.98	0.0
VWINX	8.37	75.5	NONE			27.3	0.7	29.42	0.3
VWNDX	26.39	0.9	NONE			6.0	91.7	6.23	90.4
VWUSX	12.39	41.5	NONE			5.9	92.0	5.75	92.8
CAPEX	4.83	96.3	NONE			15.3	22.5	17.43	13.4

The table summarizes the tests performed on the presence of serial correlation and autoregressive conditional heteroskedasticity in the residuals of the quarterly returns of each fund obtained through a non-overlapping sum of the respective weekly returns. The Ljung-Box Q-statistic test was performed up to the 12^{th} order serial correlation in the standardized first moment. In the cases were autocorrelation was present, an ARMA model was estimated to account for the specific autocorrelation of the series and, afterwards, the ARCH-LM and the Ljung-Box Q^2-statistic tests were computed. The ARCH-LM and the Ljung-Box Q^2-statistics were computed to assess the null hypothesis of no ARCH effect up to the 12^{th} order in the square residuals. The probability columns are in percentage (i.e, 1 represents 1%).

Table 37 – Statistics and results for the tests performed on presence of serial correlation and autoregressive conditional heteroskedasticity in the residuals of weekly returns –semi-annual aggregation

Ticker	Ljung-Box Q	Prob	Con. Mean	AR lags	MA lags	ARCH-LM	Prob	Ljung-Box Q2	Prob
ABALX	22.87	2.9	MA		3	5.5	93.8	7.44	76.2
ABNDX	19.97	6.8	NONE			26.9	0.8	18.31	10.7
ACEGX	16.38	17.4	NONE			14.5	26.8	29.69	0.3
ACEIX	13.36	34.4	NONE			13.1	36.1	11.77	46.5
ACGIX	21.58	4.2	AR	3		15.1	23.8	13.24	27.8
ADIF	12.75	38.7	NONE			16.7	16.0	3.60	99.0
ADIRT	150.04	0.0	ARMA	3; 4	1; 3	8.4	75.5	11.89	15.6
ADIVERF	8.30	76.1	NONE			0.8	100.0	0.39	100.0
AGTHX	31.95	0.1	NONE			8.4	75.4	7.66	81.1
AGWFX	16.01	19.1	NONE			16.6	16.6	10.67	55.7
AIVSX	21.69	4.1	NONE			9.9	62.9	11.77	46.4
ANWPX	20.25	6.3	NONE			5.8	92.4	0.97	100.0
BENDX	19.70	7.3	NONE			22.7	3.1	16.06	18.9
CHTRX	23.28	2.5	NONE			14.2	29.0	21.03	5.0
CSTGX	7.25	84.0	NONE			17.6	13.0	24.00	2.0
DELDX	26.15	1.0	AR	3		2.3	99.9	6.72	82.1
DELFX	16.51	16.9	NONE			6.1	90.9	6.24	90.4
DELTX	25.97	1.1	ARMA	3	3	13.4	34.3	12.69	24.1
DETWX	9.62	64.9	NONE			9.2	68.6	10.37	58.3
EHSTX	22.34	3.4	NONE			17.9	11.8	17.79	12.2
ENDIX	55.78	0.0	MA		3	13.2	35.7	14.74	19.5
EVIFX	8.77	72.2	NONE			5.0	95.8	6.53	88.7
EVSEX	7.80	80.0	NONE			2.1	99.9	2.77	99.7
FBNDX	7.73	80.6	NONE			15.6	20.8	14.66	26.1
FCNTX	14.05	29.7	NONE			24.7	1.6	12.60	39.9
FEQIX	21.60	4.2	NONE			21.4	4.5	22.76	3.0
FMAGX	11.94	45.1	NONE			16.8	15.8	17.26	14.0
FNDR	32.57	0.1	ARMA	3	3	6.8	87.3	7.52	67.6
FNDS	36.33	0.0	ARMA	2	2; 3	10.7	55.9	10.32	32.5
FONDAKI	12.91	37.6	NONE			6.2	90.8	1.83	100.0
FSTBX	9.61	65.0	NONE			6.2	90.4	21.11	4.9
FUSGX	11.50	48.7	NONE			24.9	1.5	23.37	2.5
HJVC	8.66	73.2	NONE			11.7	46.9	13.83	31.2
JANSX	15.66	20.7	NONE			2.0	99.9	2.33	99.9
LAFFX	25.27	1.4	MA		1; 3	11.5	48.9	11.90	29.2
LAGWX	19.54	7.6	NONE			3.8	98.7	5.58	93.6
LBNDX	14.91	24.6	NONE			10.3	59.2	9.41	66.8
LMSFX	10.06	61.1	NONE			26.2	1.0	20.29	6.2
MOMGX	7.68	81.0	NONE			5.7	93.2	6.90	86.4
MPGFX	6.58	88.4	NONE			2.3	99.9	0.64	100.0
NPRTX	29.31	0.4	ARMA	3	3	9.1	69.2	11.06	35.3
NYVTX	16.79	15.8	NONE			7.8	79.7	7.74	80.5
OEQAX	15.28	22.6	MA		3	6.0	91.7	8.07	70.7
OPPAX	17.56	13.0	NONE			8.0	78.6	10.30	59.0
OPPEX	11.48	48.8	NONE			25.1	1.4	18.62	9.8
OPPSX	11.24	50.9	NONE			8.9	71.4	5.57	93.6
OPTAX	11.59	47.9	NONE			23.0	2.8	30.17	0.3
PENNX	16.38	17.5	MA		1	13.7	32.3	14.19	22.3
PIODX	18.72	9.6	NONE			11.1	52.0	19.59	7.5
PIOTX	38.23	0.0	AR	1		3.0	99.6	4.47	95.4
SAVGRFI	6.03	91.4	NONE			14.7	25.8	27.92	0.6
SIFEX	17.14	14.4	NONE			7.9	79.1	10.56	56.7
U1IH	27.26	0.7	NONE			4.7	96.7	3.38	99.2
UNIFNDS	24.66	1.7	NONE			6.1	91.2	3.80	98.7
UNIGLOB	40.21	0.0	ARMA	2	2	7.4	83.4	6.65	75.8
UNIRNTA	148.59	0.0	ARMA	4	4	9.2	68.4	7.04	72.1
VEXPX	20.54	5.8	ARMA	3	3	21.3	4.6	16.33	9.1
VFINX	12.37	41.7	NONE			11.9	45.6	18.53	10.1
VMRGX	15.76	20.3	NONE			15.7	20.7	16.87	15.5
VWELX	28.37	0.5	AR	3		12.0	44.5	12.59	32.1
VWESX	6.69	87.8	NONE			10.7	55.4	9.98	61.8
VWINX	13.01	36.9	NONE			4.9	96.0	5.20	95.1
VWNDX	39.18	0.0	AR	1		8.0	78.4	2.94	99.2
VWUSX	22.04	3.7	NONE			7.7	80.7	7.48	82.5
CAPEX	20.98	5.1	NONE			26.4	0.9	26.70	0.9

The table summarizes the tests performed on the presence of serial correlation and autoregressive conditional heteroskedasticity in the residuals of the semi-annual returns of each fund obtained through a non-overlapping sum of the respective weekly returns. The Ljung-Box Q-statistic test was performed up to the 12th order serial correlation in the standardized first moment. In the cases were autocorrelation was present, an ARMA model was estimated to account for the specific autocorrelation of the series and, afterwards, the ARCH-LM and the Ljung-Box Q^2-statistic tests were computed. The ARCH-LM and the Ljung-Box Q^2-statistics were computed to assess the null hypothesis of no ARCH effect up to the 12th order in the square residuals. The probability columns are in percentage (i.e, 1 represents 1%).

Table 38 – Statistics and results for the tests performed on presence of serial correlation and autoregressive conditional heteroskedasticity in the residuals of weekly returns – annual aggregation

Ticker	Ljung-Box Q	Prob	Con. Mean	AR lags	MA lags	ARCH-LM	Prob	Ljung-Box Q2	Prob
ABALX	17.02	14.9	MA		1	11.3	50.7	7.54	75.4
ABNDX	14.33	28.0	NONE			9.6	64.8	8.19	77.0
ACEGX	10.56	56.7	NONE			10.0	61.6	12.49	40.8
ACEIX	11.72	46.8	AR	2		7.2	84.5	10.45	49.1
ACGIX	11.96	44.9	NONE			14.1	29.5	14.09	29.5
ADIF	4.36	97.6	NONE			8.9	71.0	1.31	100.0
ADIRT	17.16	14.4	NONE			15.3	22.6	8.42	75.2
ADIVERF	2.99	99.6	NONE			18.2	10.8	1.59	100.0
AGTHX	8.52	74.3	NONE			9.0	70.2	4.96	95.9
AGWFX	13.51	33.3	ARMA	2	2	11.5	48.7	5.08	88.6
AIVSX	13.02	36.8	NONE			6.9	86.4	2.66	99.8
ANWPX	5.36	94.5	NONE			8.4	75.5	0.51	100.0
BENDX	12.96	37.2	NONE			12.6	39.9	6.99	85.8
CHTRX	12.50	40.7	NONE			16.5	1713.2	12.33	41.9
CSTGX	7.43	82.8	NONE			17.2	14.1	9.47	66.3
DELDX	7.84	79.8	ARMA	2	2	13.3	35.1	6.07	80.9
DELFX	11.66	47.3	NONE			10.6	56.5	3.73	98.8
DELTX	9.17	68.8	NONE			9.5	65.9	8.73	72.6
DETWX	8.45	74.9	NONE			13.2	35.3	4.25	97.8
EHSTX	12.37	41.7	NONE			11.6	47.9	12.70	39.1
ENDIX	12.89	37.7	NONE			8.5	74.3	2.46	99.8
EVIFX	7.17	84.6	NONE			8.8	72.1	5.70	93.0
EVSEX	8.79	72.1	NONE			5.3	94.5	9.70	64.2
FBNDX	11.70	47.0	NONE			8.9	70.9	9.14	69.1
FCNTX	6.86	86.7	NONE			8.9	70.8	2.38	99.9
FEQIX	17.59	12.9	ARMA	2	2	6.0	91.9	6.51	77.1
FMAGX	10.28	59.1	NONE			20.2	6.3	10.43	57.8
FNDR	5.44	94.2	NONE			8.7	73.1	2.74	99.7
FNDS	4.23	97.9	NONE			12.3	41.8	8.40	75.3
FONDAKI	7.33	83.5	NONE			13.0	36.6	8.00	78.5
FSTBX	10.35	58.6	MA		2	19.1	8.6	10.65	47.3
FUSGX	13.46	33.6	NONE			4.5	97.2	7.17	84.6
HJVC	6.18	90.7	NONE			8.1	77.6	2.09	99.9
JANSX	15.65	20.8	NONE			13.7	31.7	1.51	100.0
LAFFX	23.95	2.1	MA		2	11.6	47.5	10.30	50.4
LAGWX	12.50	40.7	NONE			11.8	46.0	3.81	98.7
LBNDX	9.72	64.0	NONE			14.6	26.2	10.64	56.0
LMSFX	4.95	96.0	NONE			13.5	33.7	7.14	84.8
MOMGX	4.82	96.4	NONE			7.4	83.3	2.67	99.7
MPGFX	7.49	82.3	NONE			27.4	0.7	10.58	56.5
NPRTX	9.73	63.9	NONE			7.4	83.1	5.92	92.0
NYVTX	10.01	61.5	NONE			10.8	54.4	9.12	69.3
OEQAX	15.63	20.9	NONE			17.3	13.8	8.28	76.3
OPPAX	7.81	80.0	NONE			7.1	84.9	15.97	19.3
OPPEX	17.73	12.4	ARMA	2	2	11.8	45.9	6.31	78.9
OPPSX	3.81	98.7	NONE			8.7	73.0	5.40	94.3
OPTAX	6.52	88.8	NONE			9.6	64.8	6.75	87.4
PENNX	5.86	92.3	NONE			12.1	43.7	11.82	46.0
PIODX	11.06	52.4	NONE			12.9	37.6	8.71	72.7
PIOTX	7.80	80.0	NONE			6.2	90.5	5.68	93.1
SAVGRFI	1.66	100.0	NONE			13.4	34.4	10.87	54.0
SIFEX	12.23	42.7	ARMA	2	2	8.2	76.8	5.55	85.1
U1IH	8.29	76.2	NONE			9.1	69.6	12.59	40.0
UNIFNDS	10.95	53.3	NONE			6.4	89.6	4.81	96.4
UNIGLOB	5.16	95.2	NONE			11.2	51.0	8.43	75.0
UNIRNTA	11.85	45.8	NONE			5.6	93.6	5.33	94.6
VEXPX	9.22	68.4	NONE			6.6	88.6	10.19	59.9
VFINX	5.98	91.7	NONE			12.8	38.5	3.28	99.3
VMRGX	5.73	92.9	NONE			7.6	81.9	12.66	39.4
VWELX	12.19	43.1	NONE			10.9	53.8	2.35	99.9
VWESX	8.13	77.5	NONE			9.1	69.3	6.21	90.5
VWINX	8.09	77.8	NONE			10.0	61.9	5.59	93.5
VWNDX	15.19	23.1	NONE			10.6	56.2	11.89	45.4
VWUSX	11.77	46.5	NONE			16.9	15.2	12.41	41.4
CAPEX	10.24	59.5	NONE			7.0	85.5	7.43	82.8

The table summarizes the tests performed on the presence of serial correlation and autoregressive conditional heteroskedasticity in the residuals of the annual returns of each fund obtained through a non-overlapping sum of the respective weekly returns. The Ljung-Box Q-statistic test was performed up to the 12^{th} order serial correlation in the standardized first moment. In the cases were autocorrelation was present, an ARMA model was estimated to account for the specific autocorrelation of the series and, afterwards, the ARCH-LM and the Ljung-Box Q^2-statistic tests were computed. The ARCH-LM and the Ljung-Box Q^2-statistics were computed to assess the null hypothesis of no ARCH effect up to the 12^{th} order in the square residuals. The probability columns are in percentage (i.e, 1 represents 1%).

Table 39 – Statistics and results for the tests performed on presence of serial correlation and autoregressive conditional heteroskedasticity in the residuals of monthly returns – no aggregation

Ticker	Ljung-Box Q	Prob	Con. Mean	AR lags	MA lags	ARCH-LM	Prob	Ljung-Box Q2	Prob
ABALX	20.82	5.3	NONE			13.85	31.0	8.69	56.2
ABNDX	92.93	0.0	NONE			81.02	0.0	139.72	0.0
ACEGX	29.17	0.4	AR	1		35.56	0.0	56.68	0.0
ACEIX	25.61	1.2	AR	2		8.39	75.4	7.41	76.5
ACGIX	13.73	31.8	NONE			11.64	47.5	11.15	34.6
ADIF	14.51	26.9	NONE			54.58	0.0	87.33	0.0
ADIRT	225.19	0.0	NONE			262.74	0.0	95.71	0.0
ADIVERF	20.83	5.3	NONE			2.16	99.9	2.38	99.7
AGTHX	6.88	86.5	NONE			2.75	99.7	2.82	99.7
AGWFX	9.32	67.6	NONE			24.20	1.9	27.68	0.6
AIVSX	14.36	27.8	NONE			0.18	100.0	0.16	100.0
ANWPX	4.96	93.3	MA		2	0.06	100.0	0.07	100.0
BENDX	132.43	0.0	NONE			62.21	0.0	112.93	0.0
CHTRX	13.11	36.1	NONE			33.52	0.1	40.88	0.0
CSTGX	7.75	80.4	AR	1		37.22	0.0	39.55	0.0
DELDX	22.79	3.0	NONE			24.59	1.7	26.86	0.8
DELFX	32.18	0.1	MA		1	97.18	0.0	107.01	0.0
DELTX	13.05	36.6	MA		1	2.89	99.6	3.20	98.8
DETWX	61.88	0.0	MA		1	76.08	0.0	181.22	0.0
EHSTX	13.70	32.0	NONE			23.07	2.7	33.86	0.1
ENDIX	19.40	7.9	NONE			77.74	0.0	81.51	0.0
EVIFX	17.89	11.9	ARMA	2	2	48.01	0.0	70.15	0.0
EVSEX	10.39	58.2	NONE			1.63	100.0	1.73	100.0
FBNDX	20.23	6.3	MA		1	58.74	0.0	126.39	0.0
FCNTX	16.54	16.8	MA		1	4.80	96.4	4.91	93.6
FEQIX	24.71	1.6	NONE			9.02	70.1	5.93	82.1
FMAGX	12.80	38.3	NONE			11.43	49.3	13.15	35.8
FNDR	32.51	0.1	NONE			30.53	0.2	37.91	0.0
FNDS	34.64	0.1	AR	1		3.93	98.5	4.12	96.6
FONDAKI	15.41	22.0	NONE			24.23	1.9	24.21	0.7
FSTBX	22.17	3.6	NONE			47.14	0.0	82.01	0.0
FUSGX	46.51	0.0	AR	2		88.61	0.0	213.20	0.0
HJVC	11.06	52.4	NONE			6.97	86.0	7.79	80.1
JANSX	16.74	16.0	NONE			1.36	100.0	1.40	100.0
LAFFX	19.60	7.5	NONE			61.14	0.0	68.14	0.0
LAGWX	7.19	84.5	NONE			0.33	100.0	0.34	100.0
LBNDX	72.34	0.0	ARMA	1; 2	1; 2; 3	30.93	0.2	39.02	0.0
LMSFX	43.48	0.0	AR	1; 2		100.95	0.0	193.24	0.0
MOMGX	13.98	30.2	NONE			3.91	98.5	4.36	97.6
MPGFX	6.31	89.9	NONE			0.10	100.0	0.09	100.0
NPRTX	41.87	0.0	NONE			30.63	0.2	33.29	0.1
NYVTX	21.23	4.7	NONE			5.22	95.0	5.36	94.5
OEQAX	6.76	87.3	NONE			27.32	0.7	28.91	0.4
OPPAX	10.83	54.3	NONE			1.07	100.0	1.11	100.0
OPPEX	41.63	0.0	NONE			19.03	8.8	20.91	5.2
OPPSX	6.31	90.0	NONE			17.72	12.5	17.26	14.0
OPTAX	40.52	0.0	MA		1	65.18	0.0	108.65	0.0
PENNX	33.54	0.1	AR	1		44.33	0.0	55.77	0.0
PIODX	11.44	49.2	NONE			35.01	0.0	36.49	0.0
PIOTX	25.85	1.1	NONE			2.32	99.9	2.46	99.8
SAVGRFI	17.93	11.8	MA		1	5.27	94.8	5.78	88.7
SIFEX	22.33	3.4	NONE			3.74	98.8	3.65	98.9
U1IH	15.04	23.9	MA		1	1.55	100.0	1.61	99.9
UNIFNDS	25.80	1.1	NONE			51.51	0.0	62.05	0.0
UNIGLOB	18.72	9.6	MA		1	9.81	63.2	2.48	99.6
UNIRNTA	189.93	0.0	NONE			282.68	0.0	308.81	0.0
VEXPX	13.72	31.9	NONE			2.52	99.8	2.64	99.8
VFINX	13.18	35.6	NONE			18.32	10.6	20.22	6.3
VMRGX	9.75	63.8	NONE			0.75	100.0	0.79	100.0
VWELX	23.11	2.7	NONE			24.32	1.8	29.15	0.4
VWESX	16.92	15.3	ARMA	1	1; 2	38.32	0.0	55.03	0.0
VWINX	83.14	0.0	ARMA	2, 3	2, 3	27.11	0.7	38.65	0.0
VWNDX	53.28	0.0	NONE			66.53	0.0	65.26	0.0
VWUSX	14.19	28.9	NONE			1.38	100.0	1.46	100.0
CAPEX	7.86	79.6	NONE			16.61	16.5	18.57	9.9

The table summarizes the tests performed on the presence of serial correlation and autoregressive conditional heteroskedasticity in the residuals of the monthly returns of each fund. The Ljung-Box Q-statistic test was performed up to the 12^{th} order serial correlation in the standardized first moment. In the cases were autocorrelation was present, an ARMA model was estimated to account for the specific autocorrelation of the series and, afterwards, the ARCH-LM and the Ljung-Box Q^2-statistic tests were computed. The ARCH-LM and the Ljung-Box Q^2-statistics were computed to assess the null hypothesis of no ARCH effect up to the 12^{th} order in the square residuals. The probability columns are in percentage (i.e, 1 represents 1%).

Table 40 – Statistics and results for the tests performed on presence of serial correlation and autoregressive conditional heteroskedasticity in the residuals of monthly returns – quarterly aggregation

Ticker	Ljung-Box Q	Prob	Con. Mean	AR lags	MA lags	ARCH-LM	Prob	Ljung-Box Q2	Prob
ABALX	26.65	0.9	ARMA	1	1	4.8	96.3	5.27	87.3
ABNDX	14.61	26.3	NONE			26.0	1.1	40.47	0.0
ACEGX	7.60	81.6	NONE			35.0	0.0	58.03	0.0
ACEIX	12.23	42.7	NONE			5.8	92.7	6.39	89.5
ACGIX	16.68	16.2	NONE			3.9	98.5	2.93	99.6
ADIF	10.46	57.6	NONE			14.5	27.1	17.98	11.6
ADIRT	198.14	0.0	ARMA	4	4	13.6	33.0	13.41	20.2
ADIVERF	14.20	28.8	AR	4		1.4	100.0	1.66	99.9
AGTHX	7.86	79.6	NONE			9.7	64.4	9.44	66.5
AGWFX	12.04	44.3	NONE			6.1	91.2	6.04	91.4
AIVSX	8.23	76.7	NONE			0.1	95.3	0.78	100.0
ANWPX	7.02	85.6	NONE			0.4	100.0	0.42	100.0
BENDX	41.18	0.0	NONE			4.3	11.5	29.84	0.3
CHTRX	11.35	49.9	NONE			4.1	98.1	3.75	98.8
CSTGX	5.43	94.2	NONE			9.9	62.2	7.34	83.4
DELDX	16.84	15.6	NONE			3.0	99.6	3.11	99.5
DELFX	17.82	12.1	NONE			2.3	99.9	2.62	99.8
DELTX	12.55	40.2	NONE			2.7	26.3	8.51	74.4
DETWX	20.20	6.3	AR	2		16.1	18.7	20.65	3.7
EHSTX	9.41	66.8	NONE			10.2	59.8	9.54	65.6
ENDIX	40.69	0.0	AR	3		18.1	11.3	15.44	16.3
EVIFX	15.85	19.8	NONE			15.5	21.3	38.99	0.0
EVSEX	12.66	39.4	NONE			2.8	99.7	3.16	99.4
FBNDX	17.70	12.5	NONE			46.1	0.0	75.99	0.0
FCNTX	7.56	81.9	NONE			2.5	99.8	1.74	100.0
FEQIX	11.21	51.1	NONE			4.2	98.0	4.80	96.4
FMAGX	12.79	38.4	NONE			12.2	43.0	11.55	48.3
FNDR	25.04	1.5	NONE			5.9	92.0	7.03	85.6
FNDS	17.15	14.4	NONE			11.8	46.2	12.53	40.4
FONDAKI	9.70	64.2	NONE			4.7	96.7	4.22	97.9
FSTBX	6.90	86.4	NONE			19.1	8.6	19.82	7.1
FUSGX	30.26	0.3	MA		1	54.9	0.0	150.11	0.0
HJVC	6.17	90.7	NONE			5.0	95.9	5.62	93.4
JANSX	7.96	78.8	NONE			4.2	98.0	4.85	96.3
LAFFX	26.26	1.0	NONE			2.8	99.7	2.94	99.6
LAGWX	12.80	38.4	NONE			0.6	100.0	0.77	100.0
LBNDX	14.20	28.8	NONE			14.9	24.5	10.03	61.3
LMSFX	33.91	0.1	MA		2	36.5	0.0	54.55	0.0
MOMGX	4.63	96.9	NONE			12.1	43.8	11.84	45.8
MPGFX	6.37	89.6	NONE			2.1	99.9	0.69	100.0
NPRTX	23.75	2.2	NONE			5.5	93.8	5.70	93.0
NYVTX	16.44	17.2	NONE			2.3	99.9	2.34	99.9
OEQAX	18.42	10.3	NONE			7.7	80.6	7.95	78.9
OPPAX	21.30	4.6	NONE			1.6	100.0	1.71	100.0
OPPEX	16.80	15.7	NONE			14.1	29.6	17.96	11.7
OPPSX	13.00	36.9	NONE			18.5	10.1	19.30	8.1
OPTAX	21.03	5.0	MA		2	19.9	6.9	17.32	9.9
PENNX	12.59	40.0	NONE			25.8	1.1	34.42	0.1
PIODX	7.65	81.2	NONE			2.7	99.7	2.98	99.6
PIOTX	27.08	0.8	ARMA	3	3	4.5	97.2	4.41	92.7
SAVGRFI	8.97	70.5	NONE			4.3	97.8	15.70	20.6
SIFEX	10.26	59.3	NONE			4.0	13.4	14.96	24.4
U1IH	14.12	29.3	NONE			1.2	100.0	1.14	100.0
UNIFNDS	24.38	1.8	ARMA	4	4	8.0	78.8	10.87	36.8
UNIGLOB	21.40	4.5	NONE			4.3	97.8	4.23	97.9
UNIRNTA	207.83	0.0	ARMA	4	4	6.0	91.7	6.80	74.4
VEXPX	9.96	62.0	NONE			2.4	99.8	2.56	99.8
VFINX	11.51	48.6	NONE			3.0	99.6	3.42	99.2
VMRGX	10.45	57.7	NONE			2.0	99.9	2.74	99.7
VWELX	19.49	7.7	NONE			6.5	88.8	6.05	91.3
VWESX	16.52	16.9	ARMA	1	1	12.5	40.5	13.15	21.6
VWINX	15.33	22.4	NONE			5.0	95.9	6.73	87.5
VWNDX	44.86	0.0	MA		3	6.5	88.7	6.38	84.7
VWUSX	12.11	43.7	NONE			15.4	22.2	17.02	14.9
CAPEX	8.69	73.0	NONE			6.7	87.7	6.14	90.9

The table summarizes the tests performed on the presence of serial correlation and autoregressive conditional heteroskedasticity in the residuals of the quarterly returns of each fund obtained through a non-overlapping sum of the respective monthly returns. The Ljung-Box Q-statistic test was performed up to the 12^{th} order serial correlation in the standardized first moment. In the cases were autocorrelation was present, an ARMA model was estimated to account for the specific autocorrelation of the series and, afterwards, the ARCH-LM and the Ljung-Box Q^2-statistic tests were computed. The ARCH-LM and the Ljung-Box Q^2-statistics were computed to assess the null hypothesis of no ARCH effect up to the 12^{th} order in the square residuals. The probability columns are in percentage (i.e, 1 represents 1%).

Table 41 – Statistics and results for the tests performed on presence of serial correlation and autoregressive conditional heteroskedasticity in the residuals of monthly returns – semi-annual aggregation

Ticker	Ljung-Box Q	Prob	Con. Mean	AR lags	MA lags	ARCH-LM	Prob	Ljung-Box Q2	Prob
ABALX	22.27	3.5	MA		2; 3	8.1	78.0	10.33	41.2
ABNDX	17.35	13.7	NONE			14.5	27.2	13.72	31.9
ACEGX	18.58	9.9	NONE			15.3	22.6	38.70	0.0
ACEIX	13.04	36.6	NONE			17.2	14.2	15.88	19.7
ACGIX	22.63	3.1	NONE			21.5	4.4	16.00	19.1
ADIF	12.45	41.0	NONE			28.6	0.4	6.83	86.9
ADIRT	152.01	0.0	ARMA	3	3; 4	12.3	42.3	9.70	37.6
ADIVERF	8.84	71.7	NONE			2.0	99.9	1.88	100.0
AGTHX	13.88	30.9	AR	3		10.4	57.7	12.50	32.7
AGWFX	19.83	7.0	ARMA	4	4	19.6	7.4	18.39	4.9
AIVSX	13.87	30.9	NONE			7.6	81.3	8.72	72.6
ANWPX	8.06	78.1	NONE			17.6	12.7	0.33	100.0
BENDX	13.38	34.2	NONE			6.9	86.4	6.88	86.6
CHTRX	22.11	3.6	ARMA	4	4	10.2	59.8	11.19	34.3
CSTGX	9.80	63.4	NONE			23.9	2.1	23.66	2.3
DELDX	14.36	27.9	NONE			9.8	63.5	10.37	58.4
DELFX	10.81	54.6	NONE			4.1	98.2	4.86	96.2
DELTX	26.26	1.0	ARMA	3	3	14.9	24.7	18.98	4.0
DETWX	13.23	35.3	MA		1	6.0	91.8	5.82	88.5
EHSTX	16.46	17.1	NONE			13.5	33.4	10.37	58.4
ENDIX	8.56	74.0	NONE			13.1	36.5	16.09	18.7
EVIFX	18.57	10.0	NONE			10.7	55.4	18.63	9.8
EVSEX	6.19	90.6	NONE			3.4	99.2	3.90	98.5
FBNDX	5.29	94.8	NONE			14.2	28.7	12.42	41.2
FCNTX	12.57	40.1	NONE			20.7	5.5	10.12	60.6
FEQIX	21.62	4.2	ARMA	4	4	6.4	89.2	7.69	65.9
FMAGX	10.86	54.1	NONE			15.0	23.9	22.14	3.6
FNDR	31.64	0.2	NONE			16.4	17.5	7.83	79.8
FNDS	30.46	0.2	ARMA	2	2	17.0	14.8	13.91	17.7
FONDAKI	11.07	52.3	NONE			14.8	25.4	4.66	96.8
FSTBX	13.29	34.8	NONE			5.5	94.1	28.13	0.5
FUSGX	8.33	75.9	NONE			26.3	1.0	30.35	0.2
HJVC	5.69	93.1	NONE			9.7	64.1	12.69	39.2
JANSX	10.84	54.3	NONE			3.9	98.5	4.48	97.3
LAFFX	53.85	0.0	ARMA	3	3	7.6	81.6	9.17	51.6
LAGWX	11.13	51.8	NONE			1.1	100.0	1.53	100.0
LBNDX	10.10	60.7	NONE			14.8	25.1	19.06	8.7
LMSFX	15.24	22.9	MA		1	21.5	4.4	13.47	26.4
MOMGX	9.14	69.1	NONE			8.0	78.8	9.98	61.7
MPGFX	10.12	60.5	NONE			1.7	100.0	0.60	100.0
NPRTX	30.57	0.2	ARMA	3	3	14.0	29.9	10.35	41.0
NYVTX	13.43	33.9	NONE			9.6	64.9	10.99	52.9
OEQAX	18.17	11.1	MA		3	8.9	70.8	11.50	40.2
OPPAX	17.27	14.0	AR	3		9.4	66.9	13.23	27.8
OPPEX	15.10	23.6	NONE			20.4	6.1	19.05	8.7
OPPSX	18.83	9.3	MA		3	6.0	91.8	9.49	57.7
OPTAX	17.99	11.6	MA		1	11.8	46.1	15.45	16.3
PENNX	20.22	6.3	NONE			37.1	0.0	10.38	58.2
PIODX	13.75	31.7	NONE			11.9	45.6	8.09	77.8
PIOTX	20.33	6.1	AR	1		3.5	99.1	3.01	99.1
SAVGRFI	4.69	96.8	NONE			11.1	51.6	23.35	2.5
SIFEX	16.33	17.7	NONE			6.1	91.0	7.77	80.3
U1IH	12.08	43.9	NONE			4.6	97.0	3.32	99.3
UNIFNDS	27.04	0.8	NONE			16.0	19.1	5.19	95.1
UNIGLOB	22.48	3.3	NONE			9.7	64.5	12.26	42.5
UNIRNTA	170.38	0.0	ARMA	1; 2; 3	1; 2; 3	7.4	83.2	10.13	11.9
VEXPX	19.92	6.9	NONE			18.4	10.5	17.36	13.7
VFINX	12.25	42.6	NONE			11.0	52.9	14.78	25.3
VMRGX	14.76	25.5	NONE			14.0	29.8	13.31	34.7
VWELX	8.36	75.7	NONE			9.0	70.3	9.83	63.1
VWESX	5.07	95.6	NONE			6.2	90.7	7.01	85.7
VWINX	7.52	82.1	NONE			16.4	17.6	20.79	5.4
VWNDX	14.54	26.8	NONE			7.5	82.5	6.88	86.6
VWUSX	14.08	29.5	NONE			4.1	98.1	3.80	98.7
CAPEX	15.45	21.8	NONE			15.3	22.6	9.65	64.7

The table summarizes the tests performed on the presence of serial correlation and autoregressive conditional heteroskedasticity in the residuals of the semi-annual returns of each fund obtained through a non-overlapping sum of the respective monthly returns. The Ljung-Box Q-statistic test was performed up to the 12th order serial correlation in the standardized first moment. In the cases were autocorrelation was present, an ARMA model was estimated to account for the specific autocorrelation of the series and, afterwards, the ARCH-LM and the Ljung-Box Q^2-statistic tests were computed. The ARCH-LM and the Ljung-Box Q^2-statistics were computed to assess the null hypothesis of no ARCH effect up to the 12th order in the square residuals. The probability columns are in percentage (i.e, 1 represents 1%).

Table 42 – Statistics and results for the tests performed on presence of serial correlation and autoregressive conditional heteroskedasticity in the residuals of monthly returns –annual aggregation

Ticker	Ljung-Box Q	Prob	Con. Mean	AR lags	MA lags	ARCH-LM	Prob	Ljung-Box Q2	Prob
ABALX	24.72	1.6	MA		1	11.1	52.1	10.49	48.7
ABNDX	10.55	56.8	NONE			14.9	24.8	5.92	92.0
ACEGX	7.32	83.6	NONE			9.8	63.5	7.93	79.0
ACEIX	13.84	31.1	AR	2		5.2	95.2	8.16	69.9
ACGIX	14.47	27.1	ARMA	2	2; 3	12.4	41.6	7.06	63.1
ADIF	6.69	87.7	NONE			10.5	56.8	2.77	99.7
ADIRT	17.63	12.7	NONE			11.9	45.4	6.85	86.7
ADIVERF	4.00	98.3	NONE			16.7	16.0	1.82	100.0
AGTHX	6.59	88.3	NONE			10.4	58.2	5.00	95.8
AGWFX	15.31	22.5	MA		2	6.9	86.4	3.03	99.0
AIVSX	11.26	50.7	NONE			8.8	72.1	3.11	99.5
ANWPX	4.75	96.6	NONE			9.9	62.5	0.38	100.0
BENDX	10.72	55.3	NONE			4.7	96.9	6.54	88.6
CHTRX	16.69	16.2	AR	2		10.8	54.5	7.47	76.0
CSTGX	7.52	82.2	NONE			12.0	44.8	6.16	90.8
DELDX	9.55	65.6	ARMA	2	2	13.9	30.8	11.64	31.0
DELFX	11.66	47.3	NONE			3.3	99.3	3.37	99.2
DELTX	7.84	79.8	NONE			11.9	45.2	9.82	63.2
DETWX	7.81	80.0	NONE			12.0	44.7	3.51	99.1
EHSTX	12.15	43.4	NONE			9.1	69.4	11.28	50.5
ENDIX	4.11	98.1	NONE			13.1	36.5	0.50	100.0
EVIFX	7.43	82.8	NONE			4.0	98.4	5.14	95.3
EVSEX	8.42	75.2	NONE			3.1	99.5	6.56	88.5
FBNDX	11.33	50.1	NONE			9.1	69.1	6.41	89.4
FCNTX	6.53	88.7	NONE			6.2	90.5	3.16	99.4
FEQIX	16.46	17.1	NONE			9.2	68.5	11.20	51.2
FMAGX	8.16	77.3	NONE			26.0	1.1	9.17	68.8
FNDR	7.14	84.8	NONE			7.4	83.0	4.88	96.2
FNDS	8.71	72.8	NONE			15.3	22.5	11.11	51.9
FONDAKI	8.69	72.9	NONE			9.6	65.0	10.97	53.2
FSTBX	12.26	42.5	ARMA	2	2	10.0	61.9	12.37	26.1
FUSGX	22.32	3.4	NONE			10.7	55.9	12.01	44.5
HJVC	5.94	91.9	NONE			14.5	26.7	6.69	87.7
JANSX	13.87	30.9	NONE			5.9	91.9	2.95	99.6
LAFFX	28.50	0.5	ARMA	2	2	7.9	79.5	6.74	75.0
LAGWX	12.01	44.5	NONE			18.3	10.8	2.94	99.6
LBNDX	6.90	86.4	NONE			13.7	32.1	11.42	49.3
LMSFX	6.36	89.7	NONE			13.2	35.3	9.10	69.4
MOMGX	3.91	98.5	NONE			7.3	83.7	4.47	97.3
MPGFX	20.65	5.6	ARMA	2	2	9.8	62.9	11.72	30.4
NPRTX	11.51	48.6	NONE			6.8	86.8	15.26	22.8
NYVTX	11.69	47.1	NONE			11.7	46.7	9.32	67.5
OEQAX	18.16	11.1	NONE			8.0	78.2	3.98	98.4
OPPAX	12.53	40.4	MA		2	9.3	67.6	13.33	27.2
OPPEX	15.61	21.0	ARMA	2	2	12.4	41.8	6.85	74.0
OPPSX	5.32	94.6	NONE			7.0	85.6	7.73	80.6
OPTAX	7.52	82.1	NONE			8.3	76.3	12.21	42.9
PENNX	5.26	94.9	NONE			13.3	35.0	10.77	54.9
PIODX	10.75	55.0	ARMA	2	2	12.4	41.2	24.24	0.7
PIOTX	8.71	72.7	NONE			8.6	73.3	3.97	98.4
SAVGRFI	2.41	99.8	NONE			8.8	71.8	3.17	99.4
SIFEX	12.75	38.7	ARMA	2	2	4.2	97.9	2.49	99.1
U1IH	8.08	77.9	NONE			12.5	40.9	17.31	13.8
UNIFNDS	12.95	37.3	NONE			9.0	70.4	4.60	97.0
UNIGLOB	8.23	76.7	NONE			15.3	22.7	14.83	25.1
UNIRNTA	13.36	34.3	NONE			6.7	87.8	9.83	63.1
VEXPX	11.98	44.8	NONE			18.1	11.3	6.99	85.8
VFINX	10.59	56.5	NONE			7.6	81.9	5.61	93.5
VMRGX	6.88	86.5	NONE			12.8	38.4	15.28	22.7
VWELX	8.83	71.8	NONE			9.4	66.6	4.47	97.3
VWESX	7.24	84.2	NONE			11.4	49.1	7.77	80.3
VWINX	8.81	71.9	NONE			8.0	78.3	5.16	95.2
VWNDX	19.13	8.5	AR	4		6.4	89.2	9.19	60.5
VWUSX	7.78	80.2	NONE			4.6	97.1	4.54	97.2
CAPEX	9.43	66.6	NONE			14.1	29.6	8.04	78.2

The table summarizes the tests performed on the presence of serial correlation and autoregressive conditional heteroskedasticity in the residuals of the annual returns of each fund obtained through a non-overlapping sum of the respective monthly returns. The Ljung-Box Q-statistic test was performed up to the 12^{th} order serial correlation in the standardized first moment. In the cases were autocorrelation was present, an ARMA model was estimated to account for the specific autocorrelation of the series and, afterwards, the ARCH-LM and the Ljung-Box Q^2-statistic tests were computed. The ARCH-LM and the Ljung-Box Q^2-statistics were computed to assess the null hypothesis of no ARCH effect up to the 12^{th} order in the square residuals. The probability columns are in percentage (i.e, 1 represents 1%).

Table 43 – Statistics and results for the tests performed on presence of serial correlation and autoregressive conditional heteroskedasticity in the residuals of quarterly returns –no aggregation

Ticker	Ljung-Box Q	Prob	Con. Mean	AR lags	MA lags	ARCH-LM	Prob	Ljung-Box Q2	Prob
ABALX	14.67	26.0	NONE			5.20	95.1	6.42	89.3
ABNDX	15.75	20.3	NONE			42.41	0.0	61.10	0.0
ACEGX	16.28	17.9	AR	2		17.15	14.4	20.80	3.5
ACEIX	5.12	95.4	NONE			5.58	93.6	7.27	83.9
ACGIX	8.73	72.6	NONE			5.32	94.6	5.46	94.1
ADIF	12.94	37.3	NONE			24.30	1.8	32.31	0.1
ADIRT	182.15	0.0	NONE			42.36	0.0	59.48	0.0
ADIVERF	19.50	7.7	AR	3		3.72	97.7	3.72	97.7
AGTHX	10.15	60.3	NONE			7.88	79.4	8.14	77.4
AGWFX	6.73	87.5	NONE			7.93	79.0	9.81	63.3
AIVSX	7.35	83.4	NONE			1.21	100.0	1.12	100.0
ANWPX	9.79	63.4	NONE			0.31	100.0	0.33	100.0
BENDX	16.40	17.4	NONE			17.23	14.1	23.84	2.1
CHTRX	9.05	69.9	NONE			3.76	98.7	4.03	98.3
CSTGX	6.17	90.7	NONE			2.22	99.9	2.87	99.6
DELDX	15.88	19.7	NONE			7.80	80.1	8.94	70.8
DELFX	8.72	72.6	NONE			2.14	99.9	2.49	99.8
DELTX	5.82	92.5	NONE			10.89	53.9	11.52	48.5
DETWX	19.27	8.2	MA		3	20.40	6.0	36.68	0.0
EHSTX	10.54	56.9	NONE			11.42	49.4	20.09	6.5
ENDIX	9.17	68.9	NONE			34.38	0.1	27.60	0.6
EVIFX	7.51	82.2	NONE			13.35	34.4	61.54	0.0
EVSEX	8.35	75.7	NONE			2.20	99.9	2.52	99.8
FBNDX	8.16	77.3	NONE			56.84	0.0	73.63	0.0
FCNTX	8.11	77.7	NONE			4.79	96.5	3.44	99.2
FEQIX	10.33	58.7	NONE			5.63	93.4	8.03	78.3
FMAGX	9.92	62.3	NONE			16.98	15.0	22.65	3.1
FNDR	30.40	0.2	ARMA	4	4	11.11	52.0	13.45	19.9
FNDS	19.77	7.2	NONE			10.53	57.0	12.22	42.8
FONDAKI	13.27	35.0	NONE			9.42	66.7	11.85	45.8
FSTBX	2.07	99.9	NONE			27.88	0.6	31.76	0.2
FUSGX	18.10	11.3	NONE			60.44	0.0	97.91	0.0
HJVC	9.07	69.7	NONE			14.38	27.7	17.32	13.8
JANSX	10.10	60.7	NONE			0.72	100.0	0.87	100.0
LAFFX	11.74	46.7	NONE			5.93	92.0	6.50	88.9
LAGWX	10.74	55.1	NONE			1.08	100.0	1.24	100.0
LBNDX	8.30	76.1	NONE			22.11	3.6	30.93	0.2
LMSFX	11.03	52.6	NONE			37.59	0.0	67.00	0.0
MOMGX	7.20	84.4	NONE			14.73	25.6	14.44	27.4
MPGFX	5.60	93.5	NONE			4.59	97.0	0.88	100.0
NPRTX	25.06	1.5	NONE			5.41	94.3	6.95	86.1
NYVTX	17.31	13.8	NONE			10.52	57.0	4.58	97.1
OEQAX	10.30	59.0	NONE			3.34	99.3	4.20	98.0
OPPAX	14.86	24.9	NONE			1.64	100.0	1.96	99.9
OPPEX	21.19	4.8	NONE			22.67	3.1	26.78	0.8
OPPSX	13.43	33.9	NONE			8.63	73.4	10.76	54.9
OPTAX	13.03	36.7	NONE			25.87	1.1	43.59	0.0
PENNX	16.21	18.2	NONE			14.73	25.7	29.01	0.4
PIODX	6.73	87.5	NONE			7.30	83.7	8.21	76.9
PIOTX	18.45	10.3	NONE			5.90	92.1	6.69	87.8
SAVGRFI	9.55	65.5	NONE			11.72	46.8	16.81	15.7
SIFEX	10.69	55.6	NONE			5.82	92.5	6.28	90.2
U1IH	7.77	80.3	NONE			4.64	96.9	5.48	94.0
UNIFNDS	26.36	1.0	ARMA	4	4	13.32	34.7	14.13	16.7
UNIGLOB	11.47	48.9	NONE			8.66	73.1	10.11	60.6
UNIRNTA	160.63	0.0	NONE			28.07	0.5	37.69	0.0
VEXPX	7.16	84.7	NONE			2.80	99.7	3.24	99.4
VFINX	6.60	88.3	NONE			13.85	31.1	12.38	41.6
VMRGX	15.23	22.9	NONE			3.58	99.0	3.72	98.8
VWELX	38.63	0.0	NONE			0.31	100.0	5.62	93.4
VWESX	10.39	58.2	NONE			39.95	0.0	34.44	0.1
VWINX	11.65	47.5	NONE			23.03	2.7	24.54	1.7
VWNDX	21.25	4.7	ARMA	2	2	7.16	84.7	8.07	62.2
VWUSX	13.58	32.8	NONE			14.87	24.9	15.59	21.1
CAPEX	4.39	97.5	NONE			11.13	51.8	13.21	35.4

The table summarizes the tests performed on the presence of serial correlation and autoregressive conditional heteroskedasticity in the residuals of the quarterly returns of each fund. The Ljung-Box Q-statistic test was performed up to the 12th order serial correlation in the standardized first moment. In the cases were autocorrelation was present, an ARMA model was estimated to account for the specific autocorrelation of the series and, afterwards, the ARCH-LM and the Ljung-Box Q^2-statistic tests were computed. The ARCH-LM and the Ljung-Box Q^2-statistics were computed to assess the null hypothesis of no ARCH effect up to the 12th order in the square residuals. The probability columns are in percentage (i.e, 1 represents 1%).

Table 44 – Statistics and results for the tests performed on presence of serial correlation and autoregressive conditional heteroskedasticity in the residuals of quarterly returns – semi-annual aggregation

Ticker	Ljung-Box Q	Prob	Con. Mean	AR lags	MA lags	ARCH-LM	Prob	Ljung-Box Q2	Prob
ABALX	17.02	14.9	NONE			5.0	95.8	7.11	85.0
ABNDX	11.07	52.3	NONE			27.5	0.7	17.11	14.6
ACEGX	8.34	75.8	NONE			6.9	86.2	8.79	72.1
ACEIX	9.58	65.3	NONE			6.5	88.6	10.20	59.8
ACGIX	13.45	33.7	NONE			2.3	99.9	2.99	99.6
ADIF	15.11	23.6	NONE			19.2	8.3	13.50	33.4
ADIRT	197.48	0.0	ARMA	1	1	10.8	54.2	22.75	1.2
ADIVERF	13.30	34.8	MA		2	4.4	97.4	5.28	91.7
AGTHX	11.07	52.3	NONE			9.0	70.1	8.79	72.0
AGWFX	12.23	42.8	NONE			9.1	69.5	11.42	49.3
AIVSX	5.73	92.9	NONE			8.6	73.6	10.74	55.1
ANWPX	5.47	94.0	NONE			6.3	89.9	1.26	100.0
BENDX	15.48	21.6	NONE			7.3	83.9	8.53	74.2
CHTRX	8.79	72.1	NONE			4.0	98.3	3.76	98.7
CSTGX	11.67	47.3	NONE			3.2	99.4	3.67	98.9
DELDX	8.96	70.6	NONE			5.0	95.8	4.32	97.7
DELFX	6.46	89.1	NONE			2.4	99.9	3.29	99.3
DELTX	18.77	9.4	NONE			12.2	42.8	10.34	58.6
DETWX	17.68	12.6	AR	1		16.8	15.8	27.91	0.3
EHSTX	12.39	41.5	NONE			17.6	12.8	14.78	25.4
ENDIX	11.22	51.0	NONE			7.423	82.8	11.06	52.4
EVIFX	12.64	39.6	NONE			5.050	95.6	6.06	91.3
EVSEX	12.37	41.6	NONE			2.0	99.9	2.20	99.9
FBNDX	7.86	79.6	NONE			2.0	16.1	25.05	1.5
FCNTX	12.09	43.8	NONE			13.4	34.3	20.28	6.2
FEQIX	8.39	75.4	NONE			7.8	80.3	8.61	73.6
FMAGX	8.36	75.6	NONE			5.6	93.7	4.95	96.0
FNDR	32.86	0.1	NONE			8.2	77.1	7.45	82.6
FNDS	11.13	51.7	NONE			11.2	51.2	9.05	69.9
FONDAKI	15.37	22.2	NONE			11.4	49.6	9.86	62.8
FSTBX	7.16	84.7	NONE			8.9	71.4	7.53	82.1
FUSGX	8.02	78.4	NONE			21.0	5.0	37.01	0.0
HJVC	16.66	16.3	NONE			27.3	0.7	24.70	1.6
JANSX	12.10	43.7	NONE			4.4	97.5	5.02	95.7
LAFFX	14.59	26.5	NONE			5.5	93.9	5.37	94.4
LAGWX	30.61	0.2	NONE			5.1	95.5	7.24	84.1
LBNDX	10.97	53.1	NONE			21.2	4.8	19.11	8.6
LMSFX	6.38	89.6	NONE			38.8	0.0	12.53	40.4
MOMGX	15.33	22.4	NONE			10.5	57.3	13.35	34.4
MPGFX	8.91	71.1	NONE			3.0	99.5	2.24	99.9
NPRTX	13.64	32.4	MA		1	9.2	68.9	7.35	77.0
NYVTX	13.92	30.6	NONE			9.8	63.4	8.09	77.8
OEQAX	19.73	7.2	NONE			10.2	60.1	13.66	32.3
OPPAX	12.72	39.0	MA		2	8.0	78.6	7.55	75.3
OPPEX	19.13	8.5	NONE			1.5	46.4	3.97	98.4
OPPSX	6.20	90.5	NONE			5.0	95.9	6.31	90.0
OPTAX	10.21	59.8	NONE			35.8	0.0	15.83	19.9
PENNX	12.39	41.5	NONE			28.0	0.5	39.00	0.0
PIODX	8.30	76.1	NONE			8.3	75.9	7.90	79.3
PIOTX	13.91	30.7	NONE			5.6	93.7	5.97	91.7
SAVGRFI	6.60	88.3	NONE			6.3	89.8	7.52	82.1
SIFEX	7.82	79.9	NONE			6.8	87.3	6.53	88.7
U1IH	18.70	9.6	NONE			6.0	91.6	7.78	80.2
UNIFNDS	11.02	52.7	NONE			12.2	42.8	10.72	55.3
UNIGLOB	8.76	72.3	NONE			5.6	93.7	6.91	86.3
UNIRNTA	136.80	0.0	ARMA	2; 3	2	4.9	96.2	6.37	70.2
VEXPX	15.52	21.4	NONE			12.6	39.6	12.95	37.3
VFINX	11.86	45.7	NONE			9.4	66.6	10.17	60.1
VMRGX	11.58	48.0	NONE			7.6	81.3	8.26	76.5
VWELX	12.44	41.1	NONE			1.4	100.0	2.34	99.9
VWESX	5.81	92.5	NONE			6.1	91.2	7.68	81.0
VWINX	7.84	79.7	NONE			21.1	5.0	20.31	6.1
VWNDX	10.40	58.1	ARMA	1	1	5.3	94.8	6.28	79.1
VWUSX	7.29	83.8	NONE			5.0	95.7	5.36	94.5
CAPEX	9.11	69.3	NONE			5.4	94.2	6.93	86.2

The table summarizes the tests performed on the presence of serial correlation and autoregressive conditional heteroskedasticity in the residuals of the semi-annual returns of each fund obtained through a non-overlapping sum of the respective quarterly returns. The Ljung-Box Q-statistic test was performed up to the 12th order serial correlation in the standardized first moment. In the cases were autocorrelation was present, an ARMA model was estimated to account for the specific autocorrelation of the series and, afterwards, the ARCH-LM and the Ljung-Box Q^2-statistic tests were computed. The ARCH-LM and the Ljung-Box Q^2-statistics were computed to assess the null hypothesis of no ARCH effect up to the 12th order in the square residuals. The probability columns are in percentage (i.e, 1 represents 1%).

Table 45 – Statistics and results for the tests performed on presence of serial correlation and autoregressive conditional heteroskedasticity in the residuals of quarterly returns – annual aggregation

Ticker	Ljung-Box Q	Prob	Con. Mean	AR lags	MA lags	ARCH-LM	Prob	Ljung-Box Q2	Prob
ABALX	17.54	13.0	MA		1	12.7	39.1	7.20	78.2
ABNDX	19.31	8.1	NONE			10.9	53.9	5.77	92.7
ACEGX	5.61	93.5	NONE			3.0	99.5	2.44	99.8
ACEIX	10.24	59.5	NONE			8.7	72.9	11.06	52.4
ACGIX	12.28	42.4	ARMA	4	4	5.4	94.5	13.19	21.3
ADIF	5.11	95.4	NONE			16.3	17.8	8.67	73.1
ADIRT	16.52	16.9	NONE			13.4	34.1	8.32	75.9
ADIVERF	5.40	94.3	NONE			13.4	34.1	4.25	97.8
AGTHX	4.29	97.8	NONE			8.8	71.9	2.10	99.9
AGWFX	11.24	50.9	ARMA	2	2	9.7	64.2	16.81	7.9
AIVSX	7.77	80.3	NONE			10.4	58.4	6.95	86.1
ANWPX	11.78	46.3	NONE			9.6	65.1	1.12	100.0
BENDX	18.57	9.9	NONE			6.4	89.4	7.59	81.6
CHTRX	6.63	88.1	NONE			9.6	65.0	1.51	100.0
CSTGX	7.01	85.7	NONE			0.1	72.6	1.85	100.0
DELDX	7.36	83.3	NONE			1.4	24.3	8.82	71.8
DELFX	8.24	76.6	NONE			2.2	99.9	4.29	97.8
DELTX	9.56	65.4	NONE			10.1	60.8	5.94	91.9
DETWX	10.34	58.6	NONE			7.9	79.4	5.63	93.4
EHSTX	11.41	49.5	ARMA	4	4	1.4	100.0	1.83	99.8
ENDIX	9.36	67.2	NONE			3.0	99.5	0.63	100.0
EVIFX	5.13	95.4	NONE			3.8	98.7	2.94	99.6
EVSEX	6.47	89.0	NONE			9.1	69.5	2.35	99.9
FBNDX	22.93	2.8	NONE			13.3	34.7	12.44	41.1
FCNTX	12.02	44.4	NONE			12.5	41.0	5.18	95.2
FEQIX	10.69	55.5	NONE			10.0	61.3	12.93	37.4
FMAGX	9.19	68.7	NONE			12.5	40.9	6.72	87.5
FNDR	5.74	92.9	NONE			15.7	20.3	7.29	83.8
FNDS	6.15	90.8	NONE			8.6	73.5	3.38	99.2
FONDAKI	5.59	93.5	NONE			13.6	32.8	5.85	92.3
FSTBX	7.90	79.3	NONE			22.9	2.8	3.34	99.3
FUSGX	12.55	40.2	NONE			12.5	40.3	15.00	24.2
HJVC	4.34	97.7	NONE			13.7	31.9	13.68	32.2
JANSX	10.29	59.0	NONE			3.3	99.3	3.29	99.3
LAFFX	17.94	11.8	ARMA	4	4	13.2	35.5	4.66	91.3
LAGWX	11.37	49.7	NONE			12.2	43.3	16.09	18.7
LBNDX	9.74	63.9	MA		2	6.6	88.3	6.83	81.3
LMSFX	7.53	82.1	NONE			12.5	40.6	14.27	28.4
MOMGX	6.50	88.9	NONE			7.8	80.1	4.91	96.1
MPGFX	18.34	10.6	NONE			21.4	4.5	10.52	57.1
NPRTX	5.26	94.9	NONE			4.6	97.1	7.23	84.2
NYVTX	8.58	73.8	NONE			11.3	50.4	14.73	25.6
OEQAX	13.00	36.9	NONE			10.8	54.6	3.09	99.5
OPPAX	14.20	28.8	NONE			8.9	71.3	3.52	99.1
OPPEX	9.28	67.9	NONE			8.5	74.8	9.12	69.3
OPPSX	6.99	85.8	NONE			15.1	23.4	2.93	99.6
OPTAX	7.56	81.8	NONE			10.0	61.6	16.49	17.0
PENNX	8.05	78.1	NONE			9.6	65.3	6.70	87.7
PIODX	8.13	77.5	NONE			11.4	49.6	6.75	87.4
PIOTX	9.94	62.2	NONE			10.7	55.2	5.69	93.1
SAVGRFI	3.83	98.6	NONE			10.3	58.7	1.80	100.0
SIFEX	6.69	87.7	NONE			5.8	92.8	1.98	99.9
U1IH	7.19	84.4	NONE			6.0	91.7	6.86	86.6
UNIFNDS	9.68	64.4	NONE			14.9	24.8	8.86	71.4
UNIGLOB	5.36	94.5	NONE			7.3	83.4	6.51	88.8
UNIRNTA	8.29	76.2	NONE			9.0	70.3	11.25	50.8
VEXPX	11.38	49.7	NONE			3.8	98.6	8.95	70.7
VFINX	4.66	96.8	NONE			11.0	52.6	3.77	98.7
VMRGX	6.15	90.8	NONE			4.1	98.2	4.83	96.3
VWELX	11.03	52.6	NONE			2.3	99.9	1.86	100.0
VWESX	19.00	8.9	NONE			9.2	68.2	6.31	90.0
VWINX	12.31	42.1	NONE			13.2	35.2	3.28	99.3
VWNDX	18.04	11.5	NONE			13.2	35.7	3.27	97.4
VWUSX	8.80	72.0	NONE			4.4	97.6	1.40	100.0
CAPEX	8.19	77.0	NONE			11.8	46.2	2.69	99.7

The table summarizes the tests performed on the presence of serial correlation and autoregressive conditional heteroskedasticity in the residuals of the annual returns of each fund obtained through a non-overlapping sum of the respective quarterly returns. The Ljung-Box Q-statistic test was performed up to the 12^{th} order serial correlation in the standardized first moment. In the cases were autocorrelation was present, an ARMA model was estimated to account for the specific autocorrelation of the series and, afterwards, the ARCH-LM and the Ljung-Box Q^2-statistic tests were computed. The ARCH-LM and the Ljung-Box Q^2-statistics were computed to assess the null hypothesis of no ARCH effect up to the 12^{th} order in the square residuals. The probability columns are in percentage (i.e, 1 represents 1%).

Table 46 – LR and ADF tests performed on each daily returns series of the 65 sample funds

Ticker	Log GARCH	Log IGARCH	LR	Prob	ADF	Prob
ABALX	21,029	20,597	865	0.0	-83.6	0.0
ABNDX	30,329	30,328	2	12.4	-57.8	0.0
ACEGX	-155,111	-155,112	3	9.2	-48.1	0.0
ACEIX	33,726	33,714	24	0.0	-65.3	0.0
ACGIX	30,472	30,320	304	0.0	-92.3	0.0
ADIF	28,968	28,875	186	0.0	-94.6	0.0
ADIRT	23,452	40,577	34,250	0.0	-87.5	0.0
ADIVERF	32,429	7,984	48,890	0.0	-64.3	0.0
AGTHX	26,307	26,274	66	0.0	-81.4	0.0
AGWFX	29,003	28,946	112	0.0	-91.8	0.0
AIVSX	59,604	45,580	28,050	0.0	-125.9	0.0
ANWPX	21,039	21,004	69	0.0	-86.7	0.0
BENDX	30,515	30,457	115	0.0	-81.5	0.0
CHTRX	29,650	29,638	24	0.0	-89.6	0.0
CSTGX	22,100	22,098	4	5.1	-80.1	0.0
DELDX	28,705	28,571	269	0.0	-88.0	0.0
DELFX	29,004	28,926	154	0.0	-26.8	0.0
DELTX	26,525	26,456	137	0.0	-80.6	0.0
DETWX	-673,556	-673,557	2	15.7	-36.7	0.0
EHSTX	57,523	57,113	820	0.0	-132.3	0.0
ENDIX	23,523	18,949	9,150	0.0	-88.1	0.0
EVIFX	61,040	61,038	4	3.6	-152.5	0.0
EVSEX	30,539	21,813	17,453	0.0	-91.8	0.0
FBNDX	38,004	38,003	2	16.0	-64.9	0.0
FCNTX	30,588	30,462	253	0.0	-90.5	0.0
FEQIX	33,968	33,897	142	0.0	-89.1	0.0
FMAGX	34,548	31,050	6,997	0.0	-96.5	0.0
FNDR	31,982	31,782	399	0.0	-95.2	0.0
FNDS	30,396	30,289	213	0.0	-88.2	0.0
FONDAKI	29,996	29,900	192	0.0	-93.2	0.0
FSTBX	34,893	34,715	357	0.0	-90.4	0.0
FUSGX	-299,054	41,134	680,377	0.0	-41.6	0.0
HJVC	28,242	28,057	369	0.0	-95.6	0.0
JANSX	30,618	18,374	24,488	0.0	-57.1	0.0
LAFFX	49,907	49,856	103	0.0	-121.9	0.0
LAGWX	22,032	21,973	118	0.0	-85.0	0.0
LBNDX	36,921	36,815	211	0.0	-47.7	0.0
LMSFX	35,254	35,244	20	0.0	-28.5	0.0
MOMGX	28,766	28,718	95	0.0	-78.0	0.0
MPGFX	31,081	31,038	86	0.0	-83.8	0.0
NPRTX	22,710	22,314	791	0.0	-104.2	0.0
NYVTX	28,943	28,901	84	0.0	-90.1	0.0
OEQAX	25,094	25,035	118	0.0	-86.3	0.0
OPPAX	29,910	29,893	33	0.0	-43.8	0.0
OPPEX	30,371	30,371	0	89.2	-53.3	0.0
OPPSX	24,671	24,639	64	0.0	-87.1	0.0
OPTAX	35,037	35,028	18	0.0	-37.1	0.0
PENNX	25,894	25,827	135	0.0	-81.1	0.0
PIODX	30,786	30,705	162	0.0	-97.6	0.0
PIOTX	31,265	31,128	274	0.0	-89.4	0.0
SAVGRFI	29,628	29,592	71	0.0	-49.3	0.0
SIFEX	31,768	31,760	16	0.0	-99.4	0.0
U1IH	32,152	32,107	91	0.0	-72.2	0.0
UNIFNDS	39,085	39,029	112	0.0	-109.5	0.0
UNIGLOB	34,763	32,400	4,725	0.0	-92.9	0.0
UNIRNTA	44,739	9,542	70,394	0.0	-97.1	0.0
VEXPX	21,863	21,827	72	0.0	-53.7	0.0
VFINX	24,455	24,429	52	0.0	-88.6	0.0
VMRGX	28,189	27,428	1,523	0.0	-91.2	0.0
VWELX	32,449	30,598	3,702	0.0	-91.2	0.0
VWESX	33,975	33,956	36	0.0	-83.0	0.0
VWINX	34,500	34,399	203	0.0	-92.7	0.0
VWNDX	18,882	18,842	79	0.0	-51.9	0.0
VWUSX	32,923	32,865	116	0.0	-103.3	0.0
CAPEX	33,658	33,640	35	0.0	-89.6	0.0

The columns "Log GARCH" and "Log IGARCH" exhibit the value of the log likelihood value obtained when estimating a GARCH(1,1) and a IGARCH(1,1) model for the daily return series. The Augmented Dikey-Fuller test is estimated to assess the presence of unit roots in the series and the LR test to assess if the IGARCH model is statistically more efficient than the GARCH model. The probability columns are in percentage (i.e, 1 represents 1%).

Appendix B - Concepts

Concept 1 – Strong, Semi-strong and weak GARCH processes

The distinction between strong, semi-strong and weak GARCH processes is introduced with Drost and Nijman (1993). According to the authors, strong GARCH requires that rescaled innovations are independent (standardized errors are i.i.d. with zero mean and unit variance); semi-strong GARCH assumes that innovations are uncorrelated (conditional mean equal to zero and variance equal to the GARCH model); and weak GARCH only needs that differences between expected and realized first and second moments of the residuals are uncorrelated.

Concept 2 – Ergoticity

An ergotic process is one such that for any events F and G, F and T^tG are independent on average in the limit. Thus, ergodicity can be thought of as a form of "average asymptotic independence". Formally, according to White (2001, page 44):

Let $(\Omega, \mathcal{F}, P)$ be a probability space. Let $\{\mathcal{Z}_t\}$ be a stationary sequence and let T be a measure preserving transformation such that:

$$\mathcal{Z}_1(w) = \mathcal{Z}_1(w), \mathcal{Z}_2(w) = \mathcal{Z}_1(Tw), \mathcal{Z}_3(w) = \mathcal{Z}_1(T^2 w), \ldots, \mathcal{Z}_n(w) = \mathcal{Z}_1(T^{n-1} w)$$

for all w in Ω. Then $\{\mathcal{Z}_t\}$ is ergotic if $\lim_{n \to \infty} n^{-1} \sum_{t=1}^{n} P(F \cap T^t G) = P(F)P(G)$, for all events $F, G \in \mathcal{F}$.

Concept 3 – Restrictions on the memory of the process

In addition to ergodicity, which is a restriction on the "memory" of the sequence, White (2001 and 1984) also imposed that $\mathcal{Z}_t = \sum_{j=o}^{\infty} \mathcal{R}_{tj}$, where $\mathcal{Z}_t$ is a random scalar and $\mathcal{R}_{tj}$ is the revision made in forecasting $\mathcal{Z}_t$ when information becomes available at time *t-j*:

$\mathcal{R}_{tj} \equiv E(\mathcal{Z}_t|\mathcal{F}_{t-j}) - E(\mathcal{Z}_t|\mathcal{F}_{t-j-1})$ ($\mathcal{F}_t$ can be think as being the σ-algebra generated by the entire current and past history of $\mathcal{Z}_t$ as well as other random variables, say $\mathcal{Y}_t$). In theory $\mathcal{Z}_t = \sum_{j=0}^{m-1} \mathcal{R}_{tj} + E(\mathcal{Z}_t|\mathcal{F}_{t-m}), m = 1,2,\ldots$, thus, the validity of White's restriction requires that $E(\mathcal{R}_t|\mathcal{F}_{t-m})$ tends to zero as $m \to \infty$, that is, as $\mathcal{Z}_t$ is forecasted based only on the information available at more and more distant points in the past, the forecast approaches zero. Therefore, as the forecast is based in less and less information, it approaches the forecast we would make with no information, i.e., the unconditional expectation $E(\mathcal{Z}_t)$.

Concept 4 – Skewness

Skewness is a measure of asymmetry of the distribution of a series around its mean (a symmetric distribution has mean=mode=median). A common measure of skewness is:

$$S = \frac{\left[E(X-\mu)^3\right]^2}{\left[E(X-\mu)^2\right]^3}$$

Where $E(X-\mu)^3$ is the third moment of a distribution around its mean and $E(X-\mu)^2$ is the second moment of a distribution around its mean or, simply, the variance of the distribution.

The skewness of a symmetric distribution, such as the normal distribution, is zero. A negative skewness implies that the distribution is spread more to the left of the mean; if skewness is positive, data is spread more to the right of the distribution mean.

Concept 5 – Kurtosis

Kurtosis is a measure of the peakedness or flatness of a distribution and is one of the ways to quantify the deviation from the normal distribution (the kurtosis of a normal distribution is 3). A common measure of kurtosis is:

$$K = \frac{E(X-\mu)^4}{\left[E(X-\mu)^2\right]^2}$$

Where $E(X-\mu)^4$ is the fourth moment of a distribution around its mean and $E(X-\mu)^2$ is the second moment of a distribution around its mean or, simply, the variance of the distribution.

Distributions with higher kurtosis (leptokurtic) are more peaked and have more probability in the tails than the normal distribution; distributions with lower kurtosis (platykurtic) are flatter than the normal distribution

Concept 6 – Stationarity

The definition of stationarity used by White (2001) (and consequentially Lo (2002)) is that the joint probability distribution $F(y_{t_1+k}, y_{t_2+k}, \ldots, y_{t_n+k})$ of an arbitrary set of returns $y_{t_1}, y_{t_2}, \ldots, y_{t_n}$ does not change by the same number of periods, that is: $F(y_{t_1+k}, y_{t_2+k}, \ldots, y_{t_n+k}) = F(y_{t_1}, y_{t_2}, \ldots, y_{t_n})$ for all k. White (2001) distinguishes "stationarity" from "covariance stationarity". A series can be "Covariance stationary" if it has a constant finite variance and has covariances that depend only on the time lag between two sequences. According to the author "covariance stationarity" is weaker than "stationarity" because a sequence can be covariance stationary without being stationary. In the thesis we often use the expressions "weak stationarity" to refer to "covariance stationarity" and "strict stationarity" to refer to "stationarity".

Concept 7 – Mutual Fund

A mutual fund is an open-end fund operated by an investment company which raises money from a group of investors to pool their capital together and invest it in a group of assets in accordance with a stated set of objectives. When an investor invests in a fund, he is buying shares (or portions) of the fund and becomes shareholder of the fund. Being open-ended means that, at the end of every day, the fund issues new fund's shares to investors and buys back shares from investors wishing to leave the fund.