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ETFS VS. MUTUAL FUNDS: EVIDENCE FROM THE GREEK MARKET

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Abstract
This paper expands the debate on "Exchange Traded Funds vs. Traditional Mutual Funds" using for the first time data from the emerging Greek ETF market. In particular, trading and business data of the first ETF launched in Greek market, namely the ALPHA ETF FTSE ATHEX 20 are employed along with the respective data of its mutual funds counterparts (one index fund and 3 active mutual funds) so that we will examine various issues concerning return, risk and expense features of these competitive investment vehicles. Four different open-ended mutual funds are used in the study, each of which has the same benchmark as the ETF considered. The applied empirical analysis provides various interesting findings. At first, the classic mutual funds are more expensive than the ETF but they perform better and are less volatile. Going further, the ETF is more conservative that the open-ended mutual funds. Moreover, the relevant performance of the ETF in respect of the return of the tracking index is better than the corresponding performance of the funds. Finally, the tracking error of the ETF is reasonably found to be lower than the tracking error of the actively managed funds but it is greater than the tracking error of the index fund.

Jel Classification: G12, G15
Keywords: ETFs, Mutual Funds, Performance, Risk, Expenses, Tracking Error

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1. Introduction

There is a lively debate in academic literature concerning the competition between the traditional open-ended mutual funds and the Exchange Traded Funds (hereafter ETFs) and the effects the emergence of ETFs has caused on mutual funds. ETFs are baskets of shares listed on stock exchanges which aim at closely replicating the performance and risk levels of specific indexes. The tracking indexes may belong to various investment categories such as equities, fixed income and commodities.

ETFs combine various features of ordinary corporate stocks and open-ended mutual funds and are subject to exchange trading rules offering flexibility to investors along with the ability to buy or sell the entire market with a single transaction at any time during the day while the classic mutual funds do not offer investors the option of intraday trading as they are only traded at the end of the day. The intraday trading provides investors with significant trading flexibility while all the active trading strategies that can be used with traditional stocks can also be applied with ETFs. Market timing and sector rotation are included in these strategies. In addition, an ETF enables investors to purchase on margin, trade using limit and stop orders as well as short-sell while ETFs are exempted from the "up-tick" and "down-tick" rules. ETFs also offer institutional investors opportunities to execute arbitrage strategies when the trading price of ETF deviates from the net asset value; index funds provide no arbitrage opportunities.

1993 was the year of introduction for ETFs. More specifically, the well-known "SPDRs", which invests in the 500 shares of the Standard and Poor's 500 Index, was the first ETF to be traded in the U.S. market. On the other hand, ETFs reached the European continent (XTRA board in Germany) at the beginning of the new century.

In the context of the competition between ETFs and mutual funds, Boney *et al*. (2006) report that SPDRs has a negative impact on the flow of funds allocated in indexed mutual funds. In other words there have been assets which abandoned traditional index funds in favor of the ETF. Agapova (2009) also uses fund flows into conventional index funds and ETFs in order to examine implications of substitutability of these two similar investments vehicles - finding that these products are substitutes, but not perfect ones.

In the literature, a number of articles study issues concerning the performance, risk, tracking error and expenses of ETFs and index funds traded in the U.S. market [e.g. Dellva (2001), Bernstein (2002), Elton *et al*. (2002), Poterba and Shoven (2002), Rompotis (2008a, 2008b and 2009)]. The main inference of these articles is that ETFs do not outperform their mutual funds counterparts but there is a well-established cost advantage of ETFs over the actively managed mutual funds and, in most of the cases, over the corresponding index funds when management costs and purchase and redemption fees are taken into account. However, investors in ETFs

are shouldered with brokerage commissions whereas mutual fund investors are not charged with such expenses.

In this study, we address the debate of "ETFs vs. Mutual Funds" using data of an infantile ETF market, namely the Greek stock market. The first ETF was introduced to the Greek market on January 23, 2008 under the name "ALPHA ETF FTSE ATHEX 20". This ETF invests in the shares of the FTSE Athens 20 Index of the twenty biggest firms (in terms of capitalization) traded on the board of the Athens Exchange. Another ETF managed by the NBG Asset Management, which invests in the shares of the General Index of the Athens Exchange, is the second (and for the moment the last) ETF listed in the Greek exchange.

The relevant delay in the launch of ETFs in the Greek market basically relates to some legislation issues (such as the restriction which did not allow a fund to invest more than 10% of its total assets in a specific entity), which made the creation of a Greek ETF impossible. The stagnation in Greek market of collective investments after the collapse in stock values in 1999 has also contributed to the delay in the introduction of ETFs.

The data used in this study concerns the ALPHA ETF FTSE ATHEX 20 and four open-ended mutual funds (one passively and three actively managed), which all have the same benchmark (the FTSE ATHENS/ASE 20 Index). Various issues regarding the return, risk and cost characteristics of these investment products are investigated and interesting findings are provided. In particular, the mutual funds burden investors with more expenses than the ETF. On the other hand, the funds compensate their investors with greater performance and less risk than the ETF. Moreover, the ETF is found to be more conservative that the classic mutual funds as its systematic risk (beta) is inferior to funds' betas. When it comes to the relevant return of funds (fund return - index return), the performance of the examined ETF is better than the respective performance of the competitive mutual funds. In the last step, the examination of funds' tracking error indicates that the tracking error records of the ETF are lower than those of the actively managed funds but they are greater than the tracking error estimates of the index fund.

We believe that the contribution of our study to the literature is significant for several reasons. First, to the best of our knowledge, this is the first time that the topic of "ETFs vs. Mutual Funds" has been examined using Greek market data, while additionally we are not aware of a relevant study with non-U.S. data. Therefore, the findings of our study should be of great interest for Greek professional and private investors on the one hand and the non-Greek investors who are interested in the Greek market on the other. Moreover, a comparison of the results of our study to those from the U.S. market already available in the finance literature would enable us to infer whether the findings of the existing literature as briefly described above have a universal application or are country-specific. Finally, an investigation of the

proliferation and performance of ETFs in a young market such as the Greek one may provide interesting indications for other emerging markets that do not have ETFs but are currently thinking of launching them.

The remainder of this paper is organized as follows. In Section 2, we develop the methodology used in investigating the performance, risk and expenses of the Greek ETF and mutual funds. Section 3 describes the data used in this study and provides some trading statistics of the sample. The empirical findings are presented in Section 4 and the summary and conclusions are discussed in Section 5.

2. Methodology

2.1 Descriptive Statistics

We first calculate the average daily percentage return and risk of the examined Greek ETF and its corresponding mutual funds and the tracking index. We compute percentage return by subtracting the trading price (net asset value in the case of mutual funds) on day t-1 from the trading price on day t and dividing by the trading price on day t-1. The risk of funds and the index is calculated as the standard deviation of returns.

We also estimate the risk/return ratio by dividing the standard deviation of returns by the average percentage return. The same calculation is repeated using median return instead of the average return. This ratio calculates the risk per unit of return, a useful measure when making comparisons across funds. The extreme scores (minimum and maximum returns) are the last descriptive statistics considered.

2.2 Regression Analysis

In this section, in order to examine the performance of Greek ETF and mutual funds, we follow the approach of Frino and Gallagher (2001), who investigated the performance of index funds tracking the S&P 500 Index by applying a single market model regressing the return of index funds on the return of the benchmark. The choice of the single index model is basically justified by the passive investment strategy adopted by the ETF and the corresponding index fund, whose beta risk should be close to the market systematic risk, i.e. a beta of 1. On the other hand, we use the same model for the actively managed mutual funds for consistency purposes between the passive and active funds examined by this study. The single index model we apply is presented in equation (1):

$$R_{pt} = \alpha_t + \beta_t R_{bt} + \varepsilon_{pt} \qquad (1)$$

where: R_{pt} indicates the raw return of the ETF or mutual funds on day t, R_{bt} presents the return of the FTSE Athens 20 Index on day t, and ε_{pt} is the residual error on that day. In this regression, the alpha (α) coefficient estimates the return the examined

ETF or its mutual funds counterparts could achieve above the return of the index. However, as the ETF pursues a passive investment approach, its alpha is not expected to be statistically significant. The same assumption applies to the passively managed index fund of the sample. On the other hand, the actively managed mutual funds are supposed to achieve above market returns and, thus, their alpha estimates are expected to be positive and significant.

The beta (β) coefficient in equation (1) is an estimate for the systematic risk an ETF or a fund is exposed to and reflects the aggressiveness of management strategy. Moreover, in the case of the passively managed ETFs and index funds, beta estimations are also viewed as indicators of the adopted replication strategy. A beta of unity suggests a full replication strategy whereby the ETF or the index fund invests in all the components of the tracking index in the same weights. On the contrary, a beta coefficient which significantly differs from unity, represents a departure from a full replication strategy. In this case, the ETF or index fund manager probably implements selection techniques choosing stocks that are expected to outperform.

2.3 Tracking Error

The last issue examined in this study concerns the deviation between the performance of funds and the performance of the corresponding index. This deviation is defined as "tracking error" and has attracted great interest in the literature of passively managed investment products, such as ETFs and index funds. We should note however that the tracking error framework is basically an efficient performance comparison among passively managed investing products, whose investing target is to replicate the performance of the index. On the other hand, the tracking error context is less applicable to actively managed mutual funds, which seek to achieve returns that will exceed the market performance.

In our study of tracking error, we first calculate the relevant performance of the ETF and mutual funds by subtracting the daily return of the FTSE Athens 20 Index from the return of funds and report statistics with respect to the average underperformance and outperformance and the days of under/out-performance.

Subsequently, we adopt the tracking error estimation methodology described in Milonas and Rompotis (2010). In particular, the first method, $TE_{1,P}$, computes tracking error as the standard deviation of return differences between the funds and the index. The second one, $TE_{2,P}$, computes the tracking error by calculating the average of absolute differences between the returns of the ETF and funds and the index. The absolute value of performance deviation is considered because either a positive or a negative difference reflects a performance declination between the funds and the index. The third method, $TE_{3,P}$, estimates tracking error as the standard error of performance regression (1).

The three tracking error measurements just described are the standard methods used in the literature and treat tracking errors in the same way irrespective of whether

they are positive or negative. However, positive tracking errors are not disliked by investors whereas negative tracking errors are certainly undesirable. We reckon with this reasoning by employing a semi-variance analysis to estimate tracking error. This analysis is described as follows:

We first isolate for each fund the daily observations which concern negative relative returns in regard to the return of the index, discarding observations equal to zero or positive. We then sum up all the squared negative excess returns and divide the sum by the number of observations with negative excess returns minus 1. In the last step, we estimate $TE_{4,P}$ as the positive square root of the above computation. This tracking error relates to the so-called semi-deviation or semi-standard deviation and represents the downside risk ETF and mutual fund investors run. If $TE_{4,P}$ is found to be higher than $TE_{1,P}$, we will infer that the first method underestimates the actual tracking error of the funds.

3. Data and Statistics

The sample of our study consists of one ETF, that is the ALPHA ETF FTSE ATHEX 20 and four traditional mutual funds. These four mutual funds are the ALICO FTSE20 index fund, HSBC TOP 20, ATE Domestic Equity and the Millennium Blue Chips. The ETF and the index fund of the sample are passively managed and aim at replicating the performance of the FTSE Athens 20 Index while the other three mutual funds are actively managed and try to deliver greater returns than the aforementioned index. In our empirical analysis we use daily trading data for the approximately two year period which ranges from 24 January 2008 to 31 December 2009. Data were found on the website of Greek Institutional Investors (www.agii.gr).

Table 1 provides some trading statistics on the sample. More specifically, the net asset value (NAV), the assets and the number of shares of the funds at the beginning and the end of the study period are presented. According to the data in Table 1, the ETF of the sample has lost approximately 52% of its NAV during the examined interval. In other words, the ETF has recorded a significantly negative performance over the two prior years. On the other hand, the open-ended mutual funds have also achieved negative accumulated returns but their performance is better than that of the ETF. When it comes to assets invested in the sample's funds, there has been a 53% decline in the assets managed by the ETF while the magnitude of the assets held by the mutual funds has also decreased but at a lower level. Finally, the number of shares issued by the ETF has slightly decreased by 1.44%, while the shares of the mutual funds have increased with the exception of HSBC TOP 20, whose shares have declined by 24.18%.

Table 2 reports information on the expenses charged by the sample's funds. In particular, this table presents the nominal fees derived from the funds' published bulletins and the actual costs incurred in the purchase/redemption and the management

of the examined Greek ETF and mutual funds over the study period. We present the nominal and the actual purchase and redemption fees, the nominal management and custody fees, and the actual total expense ratio. The actual purchase fee is calculated as the percentage difference between the published daily net asset values and purchase prices. The actual redemption fee is calculated as the percentage difference between the published daily net asset values and redemption prices. The actual total expense ratio includes costs relating to auditor fees, transaction commissions, contributions to Hellenic Capital Commission and taxes and fees paid to other authorities, accounting services, promotional services and publication expenses. The actual total expense ratio is the average term of the corresponding ratios found in the published annual financial statements available on agii.gr.

Panel A presents the nominal costs and Panel B reports the actual ones. In nominal terms, the ETF is in general cheaper than its mutual fund counterparts. More specifically, the purchase fee of this fund is significantly lower than those of mutual funds but its nominal redemption fee is greater by 50 b.p. than those of mutual funds. The management fee of ETF is equal to 1% being equal to that of the sample's index funds but being notably inferior to the management fee of the active mutual funds, whose average term is equal to 2.42%. Finally, the custody fee of the ETF, is equal to 20 b.p., being higher than that of the index fund by 1 b.p. and lower by 7 b.p. than the respective average fee of the actively managed mutual funds.

When the fees actually paid are considered, the ETF is still cheaper than the mutual funds on average. In particular, the actual acquisition fee is equal to 50 b.p., being significantly lower than the actual purchase fees either of the index fund or the active funds. One exception concerns the ATE Domestic Equity fund, whose purchase fee is nil. The actual redemption fee of the ETF equals 80 b.p. whereas the corresponding fee of the mutual funds (but not of HSBC Top 20 which charges no redemption fee) is equal to 1%. Finally, the actual total expense ratio of the ETF is equal to 0.28% and is much lower than the 0.68% total expense ratio of the index fund and the average expense ratio of active funds, which is equal to 2.75%.

The whole analysis of expenses indicates that the well-advertised cost advance of ETFs over mutual funds worldwide applies to the Greek case too. On the other hand, the analysis of net asset values points out that there is not any significant performance superiority of the ETF over its competitors from the class of traditional open-ended mutual funds.

4. Empirical Results

4.1 Descriptive Statistics

The descriptive statistics of the examined sample of the Greek ETF and its peers from the bulk of mutual funds are presented in Table 3. Presented in the table are the average and median daily return of the funds, the risk expressed in daily return's standard

deviation terms, the risk to average return and risk to median return ratios and the extreme scores.

The average return of the tracking index is equal to -0.12%. This is also the average return of the ETF while the corresponding index fund performs, on average, slightly better than the index and the ETF. On the other hand, the average return of the active mutual funds is significantly better that that of the index and its trackers. In particular, the average daily return of these funds is equal to -0.088% indicating that during the examined period, which is a period characterized by significant declines in prices both in Greece and international stock markets, the active managers succeed in giving their investors relative protection against the recession in stock values. This inference is also supported by the estimations of median return.

On the question of risk, the results in Table 3 show that the ETF is slightly less volatile than the benchmark but is more risky than all the mutual funds. Therefore, we infer that in the case of the Greek ETF and its mutual funds competitors the common belief that the high risk usually compensates investors with higher returns on an *ex ante* basis, does not hold *ex post*. The higher volatility of the ETF with respect to mutual funds is partially verified by the estimations of the average return to risk ratio. More specifically, while being essentially equal to that of the index, the average return to risk ratio of the ETF is higher than that of the index fund and the HSBC Top 20 mutual fund and lower than those of the other two actively managed mutual funds. When the median return to risk ratio is considered, the figure of the ETF is greater than all the respective calculations of mutual funds. Finally, the range of extreme scores also indicates that the ETF is more volatile than the funds.

4.2 Regression Analysis

The results of the performance regressions analysis are presented in Table 4. Presented are the alpha and beta estimates of model (1), the values of t-statistics, which assess the significance of the difference from zero and unity in the case of alpha and beta, respectively, the R-square and the number of trading observations.

The alphas of the two passively managed portfolios (ETF and index fund) are slightly negative but insignificant at any acceptable level. This is a reasonable result as these funds do not aim at achieving any excess returns but just at replicating the return of the selected benchmark. On the other hand, the average alpha of the active mutual funds is slightly positive but all the individual estimates (one negative and two positive) are statistically insignificant. Therefore, we infer that the active managers, even though they seek to achieve above market returns, fail to do so.

When it comes to the estimations of funds' systematic risk, Table 4 reports that the beta of the ETF is significantly lower than the unity while the respective estimate of the index fund is significantly higher than the unity. Both of these estimates imply a departure from the full replication strategy adopted by the aforementioned funds. Moreover, these betas indicate that the ETF is more conservative that its index fund

peer. Going further, the average beta of the active funds is approximately equal to 1.5 whereas all the single betas of these three funds are significantly greater than the unity. This finding comes as no surprise as the active mutual fund managers are supposed to implement more or less aggressive investment strategies so as to achieve above the market returns.

Finally, on the question of the explanatory ability of the applied regression analysis, the R-squares presented in Table 4 suggest that the adopted single-index model is quite capable of explaining the performance of the sample's funds. In the case of the ETF, the model explains 97% of its performance while the corresponding percentage of the index fund is about 99%. On the other side, the average R-squares of the active funds are slightly inferior to those of the passive funds but, in any case, they exceed 90% while the average R-square of the active funds is equal to 92%.

4.3 Tracking Error

Table 5 reports the relevant performance of the sample's funds. In particular, the average relevant performance is shown in the table along with the average underperformance and the number and percentage (days of underperformance to total trading observations) of days of underperformance. The corresponding figures of outperformance are also presented in Table 5.

The average relevant performance of the ETF is equal to 0.001, which implies that, on average, the ETF perfectly replicates the return of the underlying index. The respective performance of the index fund is equal to 0.016 and denotes the existence of a relevantly substantial tracking error (in terms of relevant performance) for this fund. Moreover, the average relevant performance of the active open-ended mutual funds approximates 3 b.p. while their individual relevant performance figures range from 0.019 to 0.049 signaling the existence of significant tracking error for these funds. When the underperformance of funds is taken into consideration, Table 5 reports an average underperformance for the ETF that approximates 13 b.p. occurring in 189 days or 39.5% of the study period. The records of the index fund are 16 b.p., 221 days and 46.2%., respectively. Furthermore, the average underperformance of the active funds is equal to 86 b.p. and occurs in 222 days or 46.4% of the whole examined period.

On the other hand, the average outperformance of the ETF is roughly equal to 9 b.p. while it outperforms its benchmark in 289 days or 60.5% of total days. Correspondingly, the outperformance of the index fund is equal to 0.168% and concerns 257 or 53.8% of total days. Finally, the average outperformance of the actively managed mutual funds is equal to 0.81% and occurs in 53.% of the whole trading observations.

In essence, the results relating to under/out-performance are in line with the results relating to the average relevant performance and verify the more efficient replication of the benchmark's return by the ETF with respect to the replication of the traditional

mutual funds and the existence of substantial tracking error (in terms of relevant performance) for the mutual funds. However, we should point out that the existence of tracking error for the active funds is consistent with their investment philosophy and preferred by investors, provided that the sign of tracking error is positive.

After examining the relevant performance of the sample's funds which is used as a proxy for tracking error, we now turn our attention to the analysis derived from more standard methods used by the literature in estimating the tracking error. The results of the applied methods are presented in Table 6. For each fund of the sample, the outcome of each method is reported as well as the average tracking error calculated by combining all the four methods together.

According to the results in Table 6, the TE_1, TE_2, TE_3 and TE_4 of the ETF is equal to 0.46%, 0.001%, 0.45% and 0.55%, respectively while its average tracking error is equal to 0.36%. The corresponding estimates of the index fund are 0.44%, 0.016%, 0.28%, 0.45% and 0.30%. By comparing the results of the ETF and index fund, we infer that, on average, the former is a less efficient tracker that the latter (this inference does not hold only when the results of the second method, which coincide with the average relevant performance of funds presented in Table 5, are considered). This is an interesting finding and may be explained by the combination of total expense ratio and risk of these funds (among other possible factors). In this respect, the literature designates these two elements as significant determinant factors of tracking error [e.g. Milonas and Rompotis (2010)]. In particular, in our case the ETF has lower expense ratio but greater risk than the index fund. The portion of each factor's influence on tracking error could be evaluated via a cross-sectional regression analysis, yet the small number of the available funds do not allow us to perform such a regression analysis.

Finally, Table 6 reports an average tracking error for the active mutual funds that is equal to 0.76%. The comparison of this figure with the average tracking error of the ETF (and the index fund) indicates a clear tracking error advantage of the passively managed portfolio over its active counterparts. However, we should report that for active mutual fund investors tracking error is undesirable only if it is negative.

5. Summary and Conclusions

Despite the keen debate in the academic literature, the competition between the relevant new ETFs and the open-ended mutual funds has not been studied yet with data concerning emerging ETF markets such as the Greek one. In this article, we employ trading data covering the two year period 2008-2009 (from early January 2008 up to 31 December 2009) of the first ETF launched on the Greek exchange at the beginning of 2008 and its four counterparts from the bulk of traditional mutual funds (one index fund and 3 active funds) and study various issues concerning performance, risk and

tracking error. A cost comparison between these competitive investment products is also performed.

In regards of the latter, the available statistical data denote a clear expense advantage of the ETF over the mutual funds, either passively or actively managed. This finding is in line with prior findings of the literature on ETFs and funds traded in the U.S. market. For instance, Dellva (2001) compares the cost features of the SPDRs and Barclay's iShares S&P from the bundle of ETFs and the Vanguard index fund, which all track the S&P 500 Index, and reveals a significant benefit of ETFs in terms of annual expenses, even though ETFs bear transaction costs and commissions paid to brokerage firms and they are also subject to the bid/ask spread. Rompotis (2008a and 2008b) in two surveys conducted with the use of two different samples of ETFs and index funds tracking the same benchmarks and during different study periods also reports a cost advantage of ETFs over index funds in terms of management expense ratios.

With respect to performance, the ETF has displayed a poorer return than its mutual fund peers. This poor performance is verified both by the magnitude of the aggregate performance for the whole period and the average daily return calculations. This finding is consistent with the results of Elton *et al*. (2002), who report that the SPDRs underperform both the benchmark and the mutual funds competitors. This is also the case with the study of Gastineau (2004).

Going further, our findings indicate that the return of the ETF is also more volatile than that of mutual funds when the standard deviation of returns is the proxy for risk. This is a pattern that has also been revealed by Rompotis (2008a and 2008b) with data from the U.S. market. However, the systematic risk of the ETF is lower than the respective risk of funds. This finding is in contrast to the results concerning the U.S. ETFs and index funds obtained by Rompotis (2008a and 2008b). In the U.S. case, the ETFs have greater systematic risk than their index fund peers.

Finally, with respect to tracking error the results show that the ETF is a more efficient tracker when the relevant performance of the funds against the performance of the benchmark is taken into account. However, the tracking advantage of the ETF over its index fund peer (but not the active funds) vanishes when more standard methods for tracking error measurement are employed. The latter is in agreement with the relevant findings of Rompotis (2008a and 2008b), which reveal that the decline of U.S ETFs' return from the return of the tracking indexes is greater than the corresponding decline of U.S. index funds.

Overall, the results of our research support the findings that have already been provided by the literature via the examination of the developed U.S. ETF and mutual fund market. However, this study provides some insights into the emerging Greek ETF market and might be very useful to investors that are considering or will be considering entering the Greek stock market by either choosing to directly invest

in individual shares listed on the Athens Exchange or picking a managed portfolio (either an ETF or a mutual fund). Data concerning the sales and redemption charges, overall expense ratio, return and risk, the tracking ability of the passively managed funds along with the ability or not of the active mutual funds to outperform the market can be combined with the special characteristics of each individual investor and help investors make their choices.

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Table 1. Trading Statistics

This table reports the trading statistics of Greek ETF and the competing mutual funds during the period 24/01/2008- 31/12/2009. Trading statistics considered are the net asset value, the assets under management and the number of shares outstanding at the beginning and the end of the study period.

Name	NAV 24/1/2008	NAV 31/12/2009	Variation	Assets 24/1/2008	Assets 31/12/2009	Variation	Shares 24/1/2008	Shares 31/12/2009	Variation
ALPHA ETF FTSE ATHEX 20	23.53	11.31	-51.93%	142,213,636.55	67,376,873.33	-52.62%	6,043,361	5,956,041	-1.44%
ALICO INDEX FUND FTSE20	10.94	5.71	-47.80%	28,355,103.32	26,384,341.65	-6.95%	2,592,737	4,622,052	78.27%
Actively Managed Mutual Funds									
HSBC TOP 20	14.65	9.79	-33.17%	9,938,091.52	5,035,714.35	-49.33%	678,260	514,274	-24.18%
ATE DOMESTIC EQUITY	9.31	5.63	-39.54%	130,662,616.07	82,421,413.79	-36.92%	14,035,750	14,644,725	4.34%
MILLENNIUM BLUE CHIPS	3.44	2.08	-39.37%	28,758,915.79	27,943,956.49	-2.83%	7,869,480	13,410,367	70.41%
Active Funds Average	**9.13**	**5.80**	**-37.36%**	**56,453,207.79**	**38,467,028.21**	**-29.69%**	**7,527,830**	**9,523,122**	**16.86%**

Table 2. Expenses and Fees

This table presents the nominal and the actual expenses involved in the acquisition and management of the selected Greek ETF and mutual funds during the period 24/01/2008- 31/12/2009. Panel A presents the official percentages of the maximum charges and costs payable by investors directly and indirectly. Direct costs are the purchase and redemption fees while the indirect costs concern the management and custody fees subtracted from the assets of each fund on an annual basis.[1] Panel B presents the actual charges and fees imposed on investors, which are the actual purchase fee,[2] actual redemption fee,[3] and the published total expense ratio for 2008.[4]

Panel A: Contractual Expenses and Charges						
Variable	**ETF**	**INDEX FUND**	**ACTIVELY MANAGED MUTUAL FUNDS**			
	ALPHA ETF FTSE ATHEX 20	ALICO INDEX FUND FTSE20	HSBC TOP 20	ATE DOMESTIC EQUITY	MILLENNIUM BLUE CHIPS	Active Funds Average
Purchase Fee	1.50%	5.00%	3.00%	4.00%	5.00%	4.00%
Redemption Fee	1.50%	1.00%	1.00%	1.00%	1.00%	1.00%
Management Fee	1.00%	1.00%	2.00%	2.25%	3.00%	2.42%
Custody Fee	0.20%	0.19%	0.20%	0.30%	0.30%	0.27%
Panel B: Actual Expenses and Charges						
Actual Purchase Fee	0.50%	5.00%	1.75%	0.00%	5.00%	2.25%
Actual Redemption Fee	0.80%	1.00%	0.00%	1.00%	1.00%	0.67%
Total Expense Ratio	0.28%	0.68%	2.30%	2.58%	3.36%	2.75%

Notes:

[1] Both the percentages of the direct and indirect costs are published in the funds' regulation bulletin.

[2] The purchase fee is calculated as the percentage difference between the published daily net asset values and purchase prices.

[3] The redemption fee is calculated as the percentage difference between the published daily net asset values and redemption prices.

[4] The total expense ratio includes costs relating to auditor fees, transaction commissions, contributions to Hellenic Capital Commission or other authorities, accounting services, promotional services and publication expenses. Total expense ratio is the average expense ratio for 2008 and 2009 derived from the corresponding published financial statements.

Table 3. Descriptive Statistics

This table reports the descriptive statistics of FTSE ATHEX 20 Index, the corresponding Greek ETF and the competing mutual funds during the period 24/01/2008- 31/12/2009. Descriptive statistics considered are the average return, median return, risk calculated as the standard deviation of daily returns, risk to average return and risk to median return ratios, and the extreme return scores.

Name	Average	Median	Standard Deviation (Risk)	Risk to Average Return Ratio	Risk to Median Return Ratio	Minimum	Maximum
FTSE ATHEX 20 INDEX	-0.120	-0.123	2.610	-21.717	-21.198	-9.332	10.821
ALPHA ETF FTSE ATHEX 20	-0.119	-0.098	2.599	-21.772	-26.517	-9.328	10.823
ALICO INDEX FUND FTSE20	-0.105	-0.022	2.504	-23.939	-114.986	-9.097	10.538
Actively Managed Mutual Funds							
HSBC TOP 20	-0.071	0.000	1.641	-23.182	-	-6.247	6.978
ATE DOMESTIC EQUITY	-0.091	-0.021	1.658	-18.128	-79.897	-7.834	7.368
MILLENNIUM BLUE CHIPS	-0.101	-0.019	1.814	-17.959	-94.602	-8.440	8.575
Active Funds Average	**-0.088**	**-0.013**	**1.704**	**-19.756**	**-87.250**	**-7.507**	**7.640**

Table 4. Performance Regression Results

This table presents the results of the performance regression during the period 24/01/2008-31/12/2009. The funds' daily return is regressed on the return of the FTSE ATHEX 20 Index. Alpha coefficient reflects the return that can be achieved by funds independently to the index return. Beta counts for the systematic risk of funds. T-tests on alphas estimate the statistical significance of the difference of these coefficients from zero. T-tests on betas indicate the significance of the difference of estimates from the unity. R-square assesses the explanatory power of the regression.

Name	α	t-test#0	β	t-test#1	R^2	Obs.
ALPHA ETF FTSE ATHEX 20	-0.002	-0.074	0.981	-2.436**	0.970	478
ALICO INDEX FUND FTSE20	-0.011	-0.894	1.032	6.236*	0.988	478
Actively Managed Mutual Funds						
HSBC TOP 20	-0.013	-0.342	1.504	14.388*	0.903	478
ATE DOMESTIC EQUITY	0.020	0.029	1.520	20.490*	0.941	478
MILLENNIUM BLUE CHIPS	0.020	0.033	1.377	13.061*	0.923	478
Active Funds Average	**0.009**	**-0.093**	**1.467**	**15.980**	**0.922**	**478**

*significant at the 1% level; ** significant at the 5% level.

Table 5. Relevant Performance

This table presents the relevant performance of funds during the period 24/01/2008- 31/12/2009. Relevant performance refers to the return of funds minus the return of the FTSE ATHEX 20 Index. Presented are the average relevant performance, the average underperformance (negative relevant performance), the number of days on which the funds underperform the benchmark both in nominal and percentage terms, the average outperformance (positive relevant performance), and the number of days on which the funds outperform the benchmark both in nominal and percentage terms.

Variable	ETF	INDEX FUND	ACTIVELY MANAGED MUTUAL FUNDS			
	ALPHA ETF FTSE ATHEX 20	ALICO INDEX FUND FTSE20	HSBC TOP 20	ATE DOMESTIC EQUITY	MILLENNIUM BLUE CHIPS	Active Funds Average
Average Relevant Performance	0.001	0.016	0.049	0.029	0.019	0.032
Average Underperformance	-0.134	-0.162	-0.892	-0.887	-0.811	-0.863
Days of Underperformance	189	221	219	221	225	222
% of Underperformance	39.54%	46.23%	45.82%	46.23%	47.07%	46.44%
Average Outperformance	0.089	0.168	0.845	0.816	0.757	0.806
Days of Outperformance	289	257	259	257	253	256
% of Outperformance	60.46%	53.77%	54.18%	53.77%	52.93%	53.56%

Table 6. Tracking Error

This table presents the estimations of tracking error, which reflects the deviation between the return of funds and the referenced benchmark FTSE ATHEX 20 Index during the period 24/01/2008-31/12/2009. We apply four distinct methods in tracking error estimating, labeling them as TE1, TE2, TE3 and TE4. TE1 is the standard deviation of return differences between funds and index. TE2 is the absolute average return difference between funds and index. TE3 is the standard errors of funds' performance regression. TE4 derives from a semivariance analysis of return differences between funds and index.

Name	TE_1 (%)	TE_2 (%)	TE_3 (%)	TE_4 (%)	Average $TE_{(1+2+3+4)}$ (%)
ALPHA ETF FTSE ATHEX 20	0.456	0.001	0.453	0.553	0.366
ALICO INDEX FUND FTSE20	0.445	0.016	0.279	0.452	0.298
Actively Managed Mutual Funds					
HSBC TOP 20	1.188	0.049	0.811	1.243	0.823
ATE DOMESTIC EQUITY	1.104	0.029	0.633	1.161	0.732
MILLENNIUM BLUE CHIPS	1.034	0.019	0.721	1.109	0.721
Active Funds Average	**1.109**	**0.032**	**0.722**	**1.171**	**0.759**