Fund Performance Evaluation in Greece Revisited: Evidence from the Impact of Operational Attributes

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Fund Performance Evaluation in Greece Revisited: Evidence from the Impact of Operational Attributes

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Abstract

The present study, employing a survivorship-bias free dataset, assesses the performance of Greek domestic equity funds during the period June 2001-December 2009 controlling for the thin trading risk that is inherent in the Greek stock market. Augmenting Carhart's multi benchmark model (1997) with a stock–level liquidity factor we document the absence of skills among domestic equity fund managers. However, at a fund level, we detect evidence of a statistically and economically significant outperformance that might be related to a conjectured incentive effect. In a second stage analysis, we examine the relationship between fund performance and a series of cost and operational attributes employing the robust quantile regression method. Cross sectional results demonstrate a significant inverse relationship between fund performance and expenses. Moreover, our findings show that the larger the fund the lower the performance.

Keywords: Mutual funds; multi-factor models; liquidity; incentive effect; quantile regression

JEL Classification:G14;G15; G21; G23

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1. Introduction

Despite the rapid growth of the delegated asset management industry in the last four decades with trillions of dollars under management- worldwide assets of traditional mutual funds were $ 24.7 trillion at the end of Q4 of 2010, the question of whether professional fund managers add value to their portfolios remains central to our perception of efficient capital markets. Open-end mutual funds are the most preferable of all collective schemes due to their unique advantages of professional management and risk diversification at a very low cost. A typical evaluation process consists of comparing the realized returns of a fund to the returns of a passive benchmark with comparable risk level. In fact, performance evaluation techniques reflect the evolution of financial theory incorporating either advanced measurement technology or contemporary datasets. However, the early performance measures that were introduced during first stages of financial theory are still widely employed.

It is fairly interesting to note that the majority of the empirical studies conducted to date share a common finding that is portfolio managers underperform relative to the market. A direct and natural implication of the funds' systematical underperformance would be a shift of the investors to passive investing preferring products like index funds or exchange traded funds. This conjecture, however, is contradicted by the size and growth of active management industry that in turn constitutes what Gruber (1996) describes as a puzzle.

The various performance metrics can roughly be classified to the reward to variability ratios such as Sharpe ratio (1966), Treynor ratio (1965) or information ratio and to regression-based measures of abnormal return with Jensen's alpha being the most common of them. Notwithstanding, Carhart (1997) in his seminal paper pinpointed the already known[2] major conceptual and econometric inefficiencies of Jensen's model suggesting a multi factor evaluation model that incorporates important, omitted risk factors related to stock's size, value (Fama & French 1993) and momentum effects (Jegadeesh & Titman 1993). As a consequence, it is standard in the academic literature to employ Carhart four-factor model and the Fama-French three-factor model as the customary benchmarks for performance evaluation.

[2] Roll 1977, Ross 1976

With respect to multi factor performance evaluation models, their objective is to decompose the predictable component of portfolio's performance which could be easily reproduced by a naïve investor from the part that stems from pure manager's skills. As it has already been mentioned, since Jensen (1968) who documented the absence of abnormal performance, evidence regarding active management track record remain still controversial with a tendency of funds to underperform compared to passive benchmarks. Studies focusing on US mutual funds utilizing these measures are voluminous, from Treynor (1965) and Sharpe (1966) to the most recent by Fama & French (2010) and Glode (2011). However, studies regarding non US funds are substantially fewer and concentrate mainly on the developed fund markets inter alia Blake & Timmermann (1998), Cuthbertson et al (2008) and Kostakis (2009) for UK funds, Otten & Bams (2002) for 5 European fund markets, Deaves (2004) for Canada, Holmes & Faff (2008) for a sample of Australian multi sector trusts and Bessler et al (2009) for the German funds market. With respect to less developed markets the evidence is rather limited. Philippas (2002) and Philippas & Tsionas (2002) have provided mixed evidence of managerial skills among Greek equity fund managers utilizing single index model and the non-linear extension of Treynor & Mazuy (1966). Exploring market timing and selectivity skills of Portuguese funds was the objective of Romacho & Cortez (2006), while Leite & Cortez (2009) analyzed performance of Portuguese funds in terms of conditional performance models. Recently, Lai & Lau (2010) examined performance in terms of single and multi factor models for a sample of Malaysian funds.

There is considerable empirical evidence (see inter alia Elton et al 1993, Carhart 1997, Fama & French 2010) documenting that the inclusion of several strategy mimicking portfolios into the fund performance evaluation process could lead to substantially more robust inferences regarding funds' abnormal return. Numerous asset pricing studies (Amihud 2002, Lam & Tam 2011) have pinpointed the significance of stock-level liquidity as a factor in determining stocks' expected returns. Moreover, Lee (2011) concluded that liquidity is priced in international financial markets though the price of risk varies across countries according to geographic, economic, and political environments. Therefore, liquidity is an important consideration during the investment process both for individual and institutional investors. Trading illiquid stocks could lead to significant implicit and explicit costs for fund managers especially in regional and small capital markets and should be accounted for in the process of funds' performance evaluation.

The motivation of the present study is straightforward. We contribute to the international literature providing original results regarding equity funds' performance for a relatively unexplored market with unique institutional characteristics. To the best of our knowledge, the present study represents the first extensive research employing multi factor performance evaluation models on Greek equity funds. We believe that our results could be relevant for other markets too, that share similar features with the domestic capital market. In particular, the microstructure of the Greek stock market that is characterized by substantial thin trading effects for many stocks make the results of the present analysis rather appealing. Moreover, the Greek stock market is a regional market, part of the EMU since 2001,that is characterized by relatively small capitalization and illiquidity. Responding to Carhart (1997)[3], we augment his four factor model with a stock-level liquidity factor in order to account for the additional risk of thinly traded funds' stock holdings and a bond factor accounting for funds' non-stock holdings. To address this issue, we calculate a zero-cost liquidity portfolio that mimics a significant risk factor in markets plagued with substantial trading frictions. We regard the intercept of a 6-factor performance evaluation model as the appropriate performance measure in cases of non-synchronous trading in the relevant capital market. Finally, it should be mentioned that in order to overcome potential market portfolio misspecification problems we utilize for the first time, the Athens Stock Exchange Total Return Index interchangeably with the simple index and report both estimations.

One of the main findings in the majority of studies in this area is not only the existence of a significant underperformance of active funds compared to passive benchmarks but also a negative impact of funds' expenses on reported performance. Motivated by these findings and in order to shed more light on this issue and to account for the significant heterogeneity observed across domestic equity funds, we digress from previous literature and employ the quantile regression analysis, proposed by Koenker and Bassett (1978) to perform a second stage sensitivity analysis of fund performance with respect to a series of operational and cost attributes.

Previewing our results we document a neutral performance at an overall level for equity funds by means of either Jensen's alpha or liquidity-augmented Carhart model. However, at a fund level managerial skill appears to be present resulting in an economically and statistically significant abnormal return. In the latter case, our evidence

[3] page 70, footnote 6

point to the existence of an incentive effect that is most common in the hedge funds' industry. Utilizing Total Return Index leads to a more pronounced underperformance especially in the case of the single index model while asset factor evaluation model is deemed superior over single index model in terms of explanatory power both at a fund level and overall. In general, domestic equity funds demonstrate a significant exposure to small size effect whereas they tend to follow past winners stocks (momentum effect). Furthermore, our results suggest that funds load significantly and positively on the liquidity risk factor which reveals the presence of illiquid stock holdings in their portfolio. Sensitivity analysis of fund performance through a non-parametric estimation technique reveals intriguing findings regarding funds performance. A first glimpse at the results reveals a significant inverse relationship between fund performance and expenses particularly in cases of underperformance (0.05 quantile), a result which would be overlooked in the classical OLS estimations. With respect to the rest variables, fund size seems to affect negatively performance only in low order quantile of returns distribution (0.05). Dividing our sample on the basis of fund size we document a significant positive relationship between fund performance and size for smaller funds. The latter finding confirms the difficulty faced by larger domestic equity funds to deliver high risk-adjusted returns. Our study spans the period June 2001- December 2009 and includes 69 domestic equity funds that are in operation for at least 36 months during the period of analysis.

The rest of the paper is structured as follows. Section 2 discusses the features of Greek fund industry. We describe the employed data and methodology in Section 3. Section 4 provides the empirical results while Section 5 concludes.

2. The case of Greece

Greek mutual fund industry is a quite interesting case to examine because it is oligopolistic and bnk-dominated while the Athens Stock Exchange (ASE) is relatively small in total capitalization and characterized by illiquidity. Nevertheless, during the period we examine, Greece was an emerging market growing to maturity, now part of EMU and fully integrated in the international financial system. The growth of the mutual fund industry was remarkable. While there were only two stately controlled funds managing 4 billion drachmas in 1985, by December 2004, there existed 262 funds of all types managing more than 31.65 billion Euros (an equivalent of 10.7 trillion drachmas). Regarding the domestic equity funds, there existed only 27 funds in 1998, while in 2004 their number rose to 60 managing 4.32 billion euros. It should also be noted that the extraordinary demand for equity fund investments in 1999 resulted in the average fund size increasing to 266 million Euros, up from only 40 million euros the previous year. The decline in asset prices combined with the prolonged volatility in the stock market led to significant outflows from equity funds. Therefore, by the end of December 2009 there were 47 equity funds[4] with 2 billion euros under management.

Table 1 presents some interesting figures regarding the evolution of domestic equity fund industry such as number of funds, total assets under management and fund median size.

Table 1
Evolution of domestic equity fund industry

Year	No of funds	Total Assets (billion €)	Fund Median Size (million €)
2001	69	4.82	18.26
2002	69	3.05	8.04
2003	66	3.85	12.27
2004	63	3.94	15.84
2005	55	4.40	23.14
2006	57	4.65	25.64
2007	51	4.15	33.95
2008	52	1.54	12.41
2009	46	1.87	17.02

Note: This table reports domestic equity fund industry figures such as number of funds, total assets and median size. Data are reported for each year during the period January 2001-December 2009. Index funds and equity funds domiciled in Luxembourg are excluded.

3. Methodology and data description

[4] From our analysis we exclude domestic equity funds that are domiciled in Luxembourg

3.1 Data description

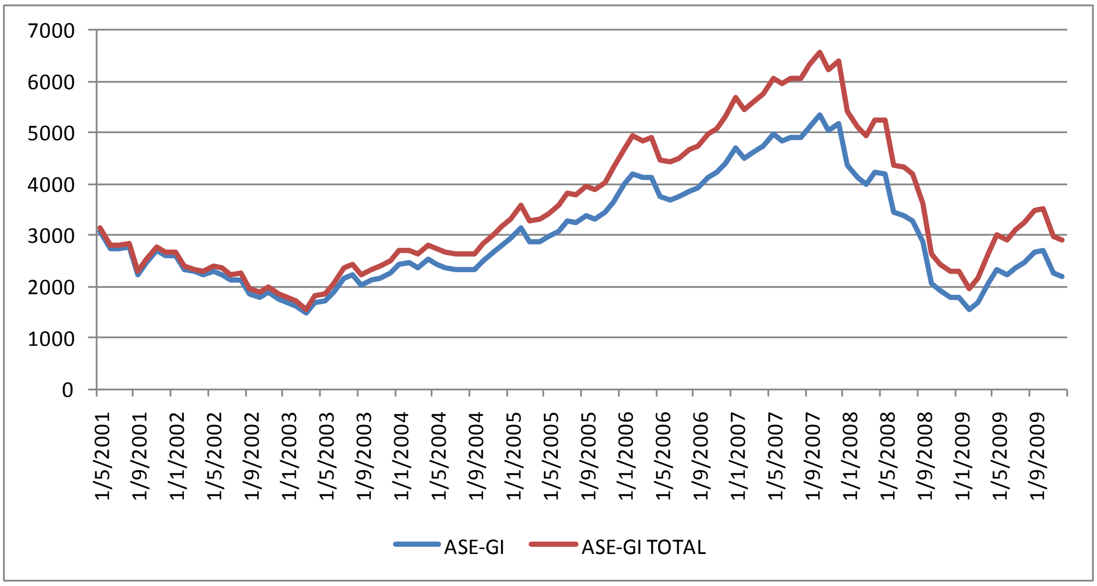
Our sample includes all domestic equity mutual funds which are in operation for at least 36 months during the period June 2001- December 2009. The number of funds included in our analysis ranges from 36 to 69. Index funds and funds that are not domiciled in Greece are excluded from our analysis. Net asset value (NAV) of the domestic equity funds is employed whereas market portfolio is proxied either by the simple General Index (ASE-GI) returns or the total return General Index (ASE-GI Total) that is inclusive of dividends distributions[5]. We employ Datastream's Greek government bond index and the risk-free rate as proxied by the three-month government zero-coupons. Funds' monthly NAVs were obtained from the Association of the Greek Institutional Investors (AGII), while the other series were obtained from Datastream. Returns of all the employed series are calculated on a monthly basis while the benchmark portfolios were rebalanced annually.

Figure 1 highlights the behavior of the employed market indices whereas in Table 1 annual returns of both indices are displayed. Starting from late of 2003, there is a consistent spread between the indices reflecting the effect of dividends distributions of the stocks. It is obvious that the returns of the simple ASE General Index can result in a substantial underestimation of the true market portfolio returns (difference between two stock market indices ranges between 37 and 1245 units) that could severely bias inferences of fund managers' performance.

Figure 1

[5] Total return Index is available through June 2001

Evolution of ASE-GI Index and ASE-GI Total Return Index for period 5/2001-12/2009



Source: Blomberg, Datastream

Table 2

Annual returns of employed market portfolio indices

Year	ASE-GI	ASE-GI TOTAL
2002	-32.53%	-30.20%
2003	29.46%	34.63%
2004	23.09%	27.14%
2005	31.50%	35.89%
2006	19.93%	23.13%
2007	17.86%	20.77%
2008	-65.50%	-64.33%
2009	22.93%	26.37%

Source: Bloomberg, Datastream

Our strategy mimicking portfolios were constructed in the spirit of Otten and Bams (2002) while all stocks included in the list of Worldscope for Greece were employed. Ranking stocks with respect to the previous year's size, we assign the top 30% by market capitalization to the big portfolio and the bottom 30% to the small portfolio. Their return difference yields the size strategy (SMB) returns. Similarly, we rank stocks according to last year's returns. The difference between the top 30% winners by market capitalization and the bottom 30% losers provides us with the momentum (MOM) portfolio returns. Finally, the 30% of stocks with the highest book to-market-value ratio were assigned to the High portfolio, while the 30% of stocks with the lowest such ratio were assigned to the Low portfolio. Their return difference provided us with the book-to-market value (HML) strategy returns.

As already noted, managers of equity mutual funds to small and regional markets with low trading volume for a large number of shares face another risk factor, that is liquidity risk. We construct an additional risk factor using the daily number of traded shares[6]. For each stock we calculated a daily average turnover volume and then stocks are ranked according to this measure. We assign the bottom 10 stocks with the lowest volume to the portfolio of illiquid stocks (low volume) and the top 10 stocks to the portfolio of liquid stocks (high volume). Their return difference provided us with the low minus high volume (LHVO) strategy returns. It should be mentioned that when we construct benchmark portfolios we apply an additional filter excluding stocks that fall in the lowest 25% percentile of total market value of the available stocks that usually lie outside domestic fund managers' investment universe.

3.2 An asset factor performance evaluation model

Raw returns of the funds were calculated employing the standard formula[7]:

$$R_{pt} = \frac{(NAV_{pt} - NAV_{pt-1})}{NAV_{pt-1}} \qquad (1)$$

In the present study we examine funds' performance using two different measures that adjust fund returns for exposure to known sources of investment risk. The first measure we employ is Jensen's alpha (1968) given by:

$$R_p - R_f = \alpha_{JENSEN} + \beta_M (R_M - R_f) + \varepsilon_t \qquad (2)$$

[6] Datastream VO data item

[7] Dividends are not included in funds' return calculation since domestic equity funds do not distribute dividends separately to their shareholders

where R_f is the risk-free rate and R_M is the stock market return

However, CAPM-rooted performance measures like Jensen's alpha are mostly static ignoring important aspects of managers' investment behavior. Stated differently, when we evaluate investment performance of actively managed funds our main concern is to distinguish between managers that possess pure skill and those that just bet on the price movements of certain market sectors or stocks. As Elton et al. (1996) and Gruber (1996) suggest, we include the bond returns in our regressions in order to capture the fund return created by bond holdings. Finally, following a series of papers documenting the importance of stock-level liquidity for expected stock returns (Amihud 2002, Lee 2011 etc) we incorporate a liquidity-mimicking risk factor. Therefore, we employ the intercept from a 6-factor performance evaluation model incorporating all known risk factors derived from:

$$R_p - R_f = \alpha_p + \beta_M (R_M - R_f) + \beta_1 SMB + \beta_2 HML + \beta_3 MOM + \beta_4 (R_B - R_f) + \beta_5 LHVO + \varepsilon_t \quad (3)$$

where SMB (Small Minus Big) is the return generated by the size strategy,
HML (High Minus Low) is the return generated by the book-to-market value ratio strategy
MOM (Momentum) represents the returns of the momentum strategy
R_B represents the Bond Index returns and
LHVO represents the liquidity factor returns.

Since our liquidity-risk factor may be correlated to the other regressors we conducted an orthogonalization of the liquidity-risk factor. Orthogonalization consists of regressing the returns of the liquidity portfolio on the returns of the rest benchmark factors such as the market returns, the SMB, HML and MOM returns, that is:

$$LHVO_t = \alpha_p + \beta_1 R_{mt} + \beta_2 SMB_t + \beta_3 HML_t + \beta_4 MOM_t + \varepsilon_{LHVO} \quad (4)$$

Then, the residuals of the first step regression are employed in place of the liquidity factor returns. This adjustment helps us alleviate any potential biased inferences resulting from multicollinearity in our regression.

3.3 Definition of variables

The various costs incurred by fund investors are used to cover the different administrative, operating, advertising or marketing expenses. Usually, fund expenses include the management fee, the custodian's and auditors' fees, stock transaction costs and other costs that are related to research or customer support. It is worth to note that the different types of loads (front or back-end, deferred sales) are excluded from the calculation of the expense ratio. Total expense ratio can measure the ability of a fund to keep its total costs at a low level, hence delivering higher net returns to its shareholders. Consistent with the Grossman & Stiglitz (1980) hypothesis, a negative relationship between fund performance and total expense ratio would suggest that superior funds are more operationally efficient and can process all available information better than the rest funds.

Fund age measures its ability to survive in a highly competitive environment, its prestige or in other words the dedication that receives from its investors. Funds' total assets reflect its popularity and its past growth. A positive relationship between fund size and performance would be indicative of economies of scale. On the other hand, there is a belief that a large fund size may have a detrimental effect on fund performance due to trading costs associated with liquidity or price impact (Andre Perold & Robert S. Salomon 1991, Roger Lowenstein 1997) especially in thinly traded markets. The exploration of the relationship between performance and fund assets would be useful for investors, particularly in light of the large inflows that usually increase the mean fund size during bull stock markets. The fund size could also be related to problems that may arise due to asymmetric information between the shareholders and the fund manager. Fund managers are likely to be engaged into moral hazard actions by expropriating wealth from investors through charging higher asset based expenses. Moreover, the issue of the fund performance persistence depends crucially on the scale ability of fund investments (see among others Berk & Green 2004).

The impact of cash holdings' on fund's performance is twofold. The portion of fund assets that held in cash is associated with the open end structure of funds. In order to meet investor redemptions, funds must either liquidate securities or hold cash. Liquidating stock holdings entails transaction costs while holding cash results in lower gross expected returns especially during rising stock markets. According to some researchers[8] cash holdings are the predominant tool for money managers to time the market. A positive relationship between performance and cash might indicate that managers that hold more cash to satisfy investors' withdrawals generate larger excess returns than those that hold less cash and liquidate securities holdings to meet investors' redemptions. Similarly, a positive relationship might be indicative of market timing ability possessed by fund managers.

3.4 Determinants of fund performance under quantile regression

In order to address the sensitivity of fund performance to various operational and cost characteristics in different quantiles of returns dispersion we employ the quantile regression method proposed by Koenker and Bassett (1978) and Koenker (2005). Quantile regression is a very useful and robust tool in cases that distribution of the dependent variable departs from normality. It can provide an accurate estimate of the relationship between the dependent and the independent variable at prespecified areas of the distribution of the dependent variable.

In particular, quantile regression alleviates one of the fundamental constraints of the traditional conditional-mean regression models and permits the estimation of various quantile functions, helping to analyze the relationship between the variables in the tails of the distribution.[9] Given that the quantile analysis does not rely on any assumption with respect to the conditional distribution of funds' performance it is

[8] Wermers (2000) reported that on average only 83% of a fund's assets is in equity. He claimed that 'the substantial portion of the underperformance of mutual funds versus stock indices can be traced to fund investments in non stock securities.' His findings reveal that non stock holdings result in 70 b.p. per year lower returns.

[9] Generally, each quantile regression defines a particular, centre or tail, point of a conditional distribution. This approach also allows the estimation of the median (0.5^{th} quantile) function as a special case, which can be thought of the mean function of the conditional distribution of funds' performance.

particularly suitable in the context of our study that is plagued with significant return dispersion. As a result the quantile analysis deviates from conditional-mean models, as it allows for fund performance heterogeneity.

Stated differently, quantile regression is an advanced technique designed to provide a thorough statistical analysis of the implicit variety of dependence among variables by supplying efficient estimations of conditional quantile functions along with the conditional mean functions.

The τ-th conditional quantile function of a distribution is defined as:

$$Q_{y_i}(\tau / x) = x_i^T \beta \tag{5}$$

where y_i is a dependent variable and x_i is a vector of independent variables and β is a vector of coefficients to be estimated. The estimator of $\hat{\beta}(\tau)$ results from the solution of the following weighted minimization problem:

$$\hat{\beta}(\tau) = \arg\min_{\beta \in R^p} \sum_{i=1}^{n} \rho_\tau (y_i - x_i^T \beta) \tag{6}$$

where ρ_τ is a weighting function. For any $\tau \in (0,1)$ a weighting function takes the form:

$$\rho_\tau(u_i) = \begin{cases} \tau u_i & \text{if } u_i \geq 0 \\ (\tau - 1) u_i & \text{if } u_i \prec 0 \end{cases} \quad \text{where } u_i = y_i - x_i^T \beta \tag{7}$$

Combining equations (6) and (7) we get the following expression:

$$\hat{\beta}(\tau) = \arg\min \{ \sum_{\substack{i=1 \\ i: y_i \geq x^T \beta}}^{n} \tau \left| y_i - x_i^T \beta \right| + \sum_{\substack{i=1 \\ i: y_i \prec x^T \beta}}^{n} (1 - \tau) \left| y_i - x_i^T \beta \right| \} \tag{8}$$

Observing equation (8) we conclude that the quantile regression estimator is obtained by minimizing the weighted sum of absolute errors where the relative weights depend on the specified quantile.

Therefore, quantile regressions for estimating funds' performance and a set of explanatory variables, X_t, for τ quantiles are characterized as:

$$Q_\tau(\tau / X_t) = \alpha_\tau + \beta_1 Exp_t + \beta_2 \ln Assets_t + \beta_3 Age_t + \beta_4 Cash_t + \varepsilon_\tau \tag{9}$$

where

the dependent variable is funds' abnormal return measured by augmented Carhart alpha calculated in previous section

Exp_t measures total expense ratio of fund i which is calculated as the ratio of funds' total expenses to the average of total net assets during every year.

$Assets_t$ which equals fund year-end assets measured in euros.

Age_t which is measured by the number of years since fund's inception

$Cash_t$ which measures the portion of fund assets that is invested in cash or cash equivalents

In the context of the present analysis we conduct a simultaneous quantile regression analysis, that is, we will simultaneously derive parameter estimates for various quantile regressions namely 0.05, 0.25, 0.5, 0.75 and 0.95. It should be noted that simultaneous quantile regression analysis is of particular importance since standard errors are obtained by employing the bootstrap method (see Gould, 1997). Also, this kind of analysis results in consistent and robust inferences in cases when the error term is assumed to be heteroscedastic and non-normally distributed.

4. Empirical results

Table 3 contains descriptive statistics on the monthly return distributions of the 69 funds and benchmark portfolios for the period June 2001-December 2009. It illustrates the first two moments (mean & standard deviation) the minimum and the maximum of the monthly returns.

Table 3

Descriptive statistics of funds and benchmark portfolios

	All funds	Surviving funds	SMB	HML	MOM	LHVO	ASE-GI	ASE-GI Total Return
Mean	-0.22%	-0.15%	-0.40%	0.60%	-0.11%	-0.20%	-0.29%	-0.03%
Median	0.76%	0.83%	-0.80%	0.06%	0.88%	-0.19%	0.41%	0.60%
Max.	15.98%	15.94%	20.83%	16.09%	12.73%	23.00%	21.78%	21.78%
Min.	-23.47%	-23.27%	-12.65%	-6.05%	-30.10%	-21.17%	-28.31%	-28.26%
Std. Dev.	6.50%	6.50%	5.80%	3.90%	6.20%	6%	7.70%	7.70%

Note: This table presents some summary statistics for monthly raw returns of the equally weighted portfolios of domestic equity funds and for the benchmark factors computed for the period of June 2001 to December 2009. "All" includes both surviving and non-surviving funds.

4.1 Jensen's (1968) model

We start our analysis by examining overall performance according to the first performance measure. Panel A of Table 4 displays average estimates of funds' abnormal return employing ASE-GI along with the distribution of positive and negative performance. For the overall period, average fund exhibits slightly negative performance. In fact, the average estimate of fund performance is -0.05% while there are only 3 funds exhibiting statistically significant positive performance at 5% level and 7 funds statistically significant negative performance. These results are suggestive for the absence of selectivity skills among fund managers, confirming most studies on performance evaluation which lend support to the efficient market hypothesis. Moreover, this finding is consistent with the absence of performance persistence documented by Babalos et al (2008) for the domestic equity fund industry. Of course, it should be noted that this finding does not preclude the existence of a manager possessing significant stock picking ability.

Next, if we consider an equal weighted portfolio of all funds in our sample we observe an almost similar performance as in the previous case whereas the portfolio including only surviving funds exhibits a higher abnormal return. The latter might somewhat indicative of the presence of a survivorship bias effect documented extensively in the literature[10].

[10] Brown et al 1992

However, as it has already been mentioned, the ASE-GI is not inclusive of the various dividends distributions of the stocks which in turn might result in a serious underestimation of market portfolio true return. Therefore, results of estimating equation (3) utilizing ASE-GI Total Return in place of the simple index are presented in Panel B of Table 4. The main finding is that there is a significant shift of fund performance towards negative levels as it is reflected by the average estimate of alpha (-0.27%) and the number of statistical significant negative performance (21 funds). Underperformance is more pronounced considering abnormal return of the equal weighted portfolio namely -0.19%.

Table 4

Fund performance: Jensen's alpha

Panel A						
Jensen's alpha		**Mean**			**No. of funds with**	
		α_p	β_M	R^2 Adj.	$\alpha_p>0$	$\alpha_p<0$
Individual funds		-0.05%	0.836	0.916	33 (3**)	36 (7**)
		α_p	β_M	R^2 Adj.		
	All	0.02%	0.827***	0.964		
Whole sample	Surviving funds	0.08%	0.826***	0.964		

Panel B Jensen's alpha total		Mean			No. of funds with	
		α_p	β_M	R^2 Adj.	α_p>0	α_p<0
Individual funds		-0.27%	0.833	0.917	11	58 (21**)
		α_p	β_M	R^2 Adj.		
Whole sample	All	-0.19%	0.826***	0.966		
	Surviving funds	-0.13%	0.825***	0.966		

Note: This table summarizes the results from the estimation of equation (3) for domestic equity funds and for the period June 2001-December 2009. Panel A of the table presents average abnormal return when market is proxied by ASE-General Index for individual funds and for the equal weighted portfolio of our funds while Panel B depicts results employing ASE-General Index Total Return respectively. *All* refers to both surviving and non-surviving funds during the period of analysis. The number of funds with positive and negative estimates of selectivity as well as the number of funds with statistically significant coefficients, adjusted for autocorrelation and heteroscedasticity according to Newey and West (1987), are also presented.
***, ** and * indicate statistical significance at the 1% , 5%) and 10% level respectively.

4.2 Estimates of asset factor performance evaluation model

Table 5 reports average equity funds' performance and risk exposures under the augmented Carhart model that incorporates ASE-General Total Return Index. Average fund performance still remains negative though slightly improved compared to the performance derived from total return Jensen model. A possible explanation may lie in the inherent weakness of the Jensen that fails to account for the dynamic strategies employed by fund managers. It is interesting to observe that the distribution of funds with positive or negative performance has not changed dramatically except for 2 funds exhibiting positive and statistical significant performance at 5%. However, a significant difference between the two evaluation approaches lies in the explanatory power as it is reflected in the values of adjusted R^2. In particular, the asset factor model is superior in terms of adjusted R^2 with an average of 0.946 compared to 0.916 in the single index model. It is even interesting to note that at fund level, liquidity-augmented evaluation model outranks its single index counterpart in all of the estimated regressions. In general, in terms of the explanatory power of evaluation models we can also infer that the level of funds' non-systematic risk is particularly low for the period under analysis. With respect to the latter finding, portfolios of domestic equity funds appear sufficiently diversified.

Asset factor evaluation models allow robust inferences when considering stock picking ability of fund managers. Regressing a fund's realized returns on the returns of zero investment factor mimicking portfolios decomposes pure ability from passive exposure to common risk factors. Therefore, examining the estimated coefficients of funds' returns relative to the benchmark factors we can draw conclusions regarding fund managers' incentives and the resulting performance. For the purposes of our study we will focus on the exposures of the equal weighted portfolio either including all or only the surviving funds.

Observing the coefficients of the augmented Carhart model we document a substantial exposure of domestic equity funds' to specific risk factors. Firstly, it is clear that domestic equity funds exhibit a highly significant exposure (0.170) to the size factor during our period of analysis. Thus, we infer that domestic equity fund managers show a significant tilt toward small-cap stocks. Regarding the momentum factor we document a tendency of domestic fund managers to follow stocks that have good track record in the past i.e., buying stocks that were past winners and selling past losers. Our findings are in line with US evidence such as Carhart (1997) reporting that fund managers tend to follow momentum and small cap strategies. In light of the new stock level liquidity factor, the preliminary results are fairly interesting. Particularly, the coefficient of the liquidity factor is positive and statistically significant at 1% indicating the presence of relatively illiquid stocks in funds' portfolio holdings.

Table 5

Estimates of asset factor evaluation model

Augmented Carhart total alpha	**Mean**							**No. of funds with**	
	α_p	β_M	β_{SMB}	β_{HML}	β_{MOM}	β_{LIQ}	R^2 Adj.	$\alpha_p>0$	$\alpha_p<0$
Individual funds	-0.17%	0.842	0.164	-0.039	0.066	0.054	0.946	13 (2**)	56 (18**)

		α_p	β_M	β_{SMB}	β_{HML}	β_{MOM}	β_{LIQ}	R^2 Adj.
Whole sample	All	-0.12%	0.849***	0.170***	-0.036	0.074***	0.046***	0.986
	Surviving funds	-0.06%	0.850***	0.168***	-0.027	0.081***	0.047***	0.987

Note: This table summarizes the results from the estimation of equation (4) for domestic equity funds and for the whole period June 2001-December 2009. Mean monthly abnormal return when market portfolio is proxied by ASE-General Total Return Index for individual funds and for the equal weighted portfolio of the available fund is displayed. *All* refers to both surviving and non-surviving funds during the analyzed period. The distribution of funds with positive and negative estimates of selectivity as well as the number of funds with statistically significant coefficients, adjusted for autocorrelation and heteroscedasticity according to Newey and West (1987), are also presented.
***, ** and * indicate statistical significance at the 1% , 5%) and 10% level respectively.

4.3 Fund performance in sub-periods

In order to draw more robust inferences regarding managerial skills we divide total sample period into two sub-periods of equal length. Table 6 illustrates the results from estimating Jensen total alpha model employing monthly returns of an equal weighted portfolio of sample funds. With respect to estimated abnormal return, we document a highly significant fund undeperformance during the first sub-period which during the second half turns into a neutral performance. The results also show that most funds decrease their exposition to the market in the second sub-period which might be related to the general negative market sentiment triggered by the financial turmoil during 2008. In this context, we could claim that there is mild evidence of equity funds involving into a market timing strategy shifting their systematic risk levels.

In Table 7 we report estimates of the asset factor model for the two sub-periods. In general, performance derived from the 6-factor model was found quite robust among the different sub-periods. It is interesting to note that in both periods fund performance appears statistically insignificant and close to zero. With regard to risk exposures, a significant increase in the funds' sensitivity to the size factor and to the momentum factor was documented. Particularly, the momentum coefficient displays a rather substantial increase from the statistically insignificant 0.032 in the first period to the statistically significant 0.113 at 1% level in the second period. The level of diversification of funds remained high for both sub-periods as it is revealed by the high values of adjusted R^2.

Table 6

Estimates of Jensen total alpha model in sub-periods

Jensen's total alpha				
Subperiod 1		α_p	β_M	R^2 Adj.
Whole sample	All	-0.44%***	0.852***	0.964
	Surviving funds	-0.35%***	0.857***	0.967
Subperiod 2		α_p	β_M	R^2 Adj.
Whole sample	All	0.04%	0.811***	0.969
	Surviving funds	0.07%	0.806***	0.968

Note: This table summarizes the results from the estimation of equation (3) for the equal-weighted portfolio of domestic equity funds for two equal length sub-periods. *All* refers to both surviving and non-surviving funds during the analysis. Regressions have been adjusted for autocorrelation and heteroscedasticity according to Newey and West (1987) method.

***, ** and * indicate statistical significance at the 1% , 5%) and 10% level respectively.

Table 7

Estimates of augmented Carhart total alpha model in sub-periods

Augmented Carhart total alpha								
Sub-period 1		α_p	β_M	β_{SMB}	β_{HML}	β_{MOM}	β_{LIQ}	R^2 Adj.
Whole sample	All	-0.19%	0.844***	0.145***	-0.083**	0.032	0.055	0.984
	Surviving funds	-0.11%	0.854***	0.143***	-0.075	0.041	0.050	0.985

Sub-period 2		α_p	β_M	β_{SMB}	β_{HML}	β_{MOM}	β_{LIQ}	R^2 Adj.
Whole sample	All	-0.06%	0.846***	0.164***	0.020	0.113***	0.042***	0.988
	Surviving funds	-0.03%	0.842***	0.163***	0.028	0.121***	0.044***	0.988

Note: This table summarizes the results from the estimation of equation (4) for the equal-weighted portfolio of domestic equity funds for two equal length sub-periods. *All* refers to both surviving and non-surviving funds during the analysis. Regressions have been adjusted for autocorrelation and heteroscedasticity according to Newey and West (1987) method.

***, ** and * indicate statistical significance at the 1% , 5%) and 10% level respectively.

4.4 Performance aspects of selected funds

Additional remarks can be drawn regarding funds' performance by examining the behavior of the best and worst funds. Therefore, in this section we present some interesting findings regarding performance aspects and attitude towards risk for managers of the best and the worst funds. For the purpose of our analysis we determine eligible funds in terms of the t-statistic values of their estimated abnormal return derived from the asset factor evaluation model. Table 8 summarizes the results of the estimation process including abnormal return and factor loadings for the top and worst funds. It should be noted that regressions have been adjusted for potential bias resulting from autocorrelation or heteroskedasticity effects using Newey-West (1987) method. We can observe from Table 8 that, in the winners group two out of three funds exhibit a substantial monthly abnormal return ranging from 0.39% to 0.55%. This means that at the fund level stock picking ability exists among domestic equity funds especially if we take into account that the employed evaluation model controls for the majority of naïve investment strategies. Notwithstanding, unlike what would be expected the level of systematic risk of the funds is lower than that of the market. A possible explanation for this fact might be related either to the selected investment strategy exhibiting a tilt towards non-stock holdings or to fund liquidity considerations. Regarding factor loadings in the winners group, we detect a significant exposure of fund managers to small-cap effect and to relatively illiquid holdings as it is revealed by the positive sign of the associated coefficients. Moreover, in terms of behavioral-based investment tactics best equity fund managers appear to follow momentum strategies.

Another key issue raised in this context is related to the conflict of interests between shareholders and managers that has been extensively discussed in the delegated asset management industry[11]. However, our results in this section highlight a different perspective namely the alignment of interests between shareholders and fund managers that is encountered mainly in the hedge funds' industry. In particular, for the first time in the traditional mutual funds' industry, our findings suggest the existence of an *incentive effect* which might play an important role in fund's successful track record. The term incentive effect is borrowed from hedge funds industry and denotes a managerial performance-linked compensation. Stated differently, in a case that a manager participates in the shareholder structure of fund's management company then we would expect him to share the same objectives with fund's shareholder that is maximization of fund return. Our argument is further reinforced by reliable ownership data provided by domestic management companies. Therefore, according to official data, one of the best funds in terms of risk-adjusted return belongs to a management company whose chief executive manager is the second largest shareholder for more than 20 years.

On the other hand, we document a significant underperformance at a micro level among losers group. It should be noted that the magnitude of poor performance in the losers group is comparatively higher to that of the winners' category. It is also interesting to observe that funds that underperform relative to passive benchmarks exhibit high levels of systematic risk relative to the market portfolio which in turn might indicate a false market timing strategy.

Table 8

Estimates of the 6-factor performance model for selected funds

Fund	α_p	β_M	β_{SMB}	β_{HML}	β_{MOM}	β_{LIQ}	β_{BOND}
Marfin Athina	0.55%**	0.792***	0.293***	0.003	0.050	0.069*	0.141
HSBC Midcap	0.39%**	0.736***	0.218***	-0.011	0.125**	0.120***	-0.180

[11] Spencer 2000

Kyprou Dynamic	0.30%	0.850***	0.364***	0.092	0.174***	0.085**	-0.169
Marfin Premium	-0.55%***	0.851***	-0.008	-0.061	-0.056	0.020	-0.354***
Geniki Developing	-1.18%***	0.890***	0.266***	-0.071	0.036	0.096	-0.700**
AAAB	-1.21%***	0.759***	0.224***	-0.060	0.088	0.052	-0.209

Note: This table presents estimates of abnormal return employing the 6-factor model during whole sample period for the top and worst three funds. Funds' factor loadings for the employed risk factors are also displayed. Estimates have been adjusted for heteroskedasticity and autocorrelation using Newey-West (1987) method.

***, ** and * indicate statistical significance at the 1% , 5%) and 10% level respectively.

4.5 Quantile estimation of fund performance determinants

To shed more light into our analysis we report the estimates of a second stage analysis of inferred performance relative to a series of cost and operational characteristics. Table 9 presents coefficient estimates of fund's performance and characteristics equation across various quantiles.

With respect to cost variable, that is total expense ratio, we document a significant inverse relationship between fund performance and expenses in the 0.05 and 0.50 quantiles of risk-adjusted returns distributions. Stated differently, funds that keep their expenses low achieve superior performance. The reported relationship between performance and total expense ratio is consistent with the findings of previous studies, we refer *inter alia* to Malkiel (1995), Carhart (1997), Prather et al (2004) for US market and to Otten & Bams (2002) for 3 European markets. Therefore, higher expenses are associated with lower risk-adjusted returns implying the absence of economies of scale in the domestic fund industry.

Fund size seems to affect negatively performance only in low order quantile of returns distribution (0.05). Smaller funds appear to have an advantage over larger funds in delivering higher risk-adjusted returns. A plausible explanation for the documented relationship between asset scale and performance would be small size along with the illiquidity characterizing domestic capital market. Following the argument of Chen et al (2004) that asset size matters, we claim that while a small fund can place all of its assets in its best ideas, an illiquid stock market forces a large fund to invest in its less than optimal ideas and take larger positions in a stock, hence reducing performance. Our finding is in line with the reported relationship in Dahlquist et al (2001), Chen et al (2004), Prather et al (2004), whereas Otten & Bams (2002), for the major European fund markets, reported significant economies of scale. For the rest of the quantiles, fund assets exhibit a neutral effect on documented performance.

With regard to cash variable, we reached mixed evidence, that is we observe a significant negative effect on performance for quantiles 0.05 and 0.25. This means that within the lowest performance groups, managers' liquidity decisions result in an adverse effect on fund's final performance. In other words, fund managers for the period under consideration lack timing ability. However, the relationship between performance and liquid assets becomes less clear in cases of quantiles 0.50, 0.75 and 0.95 as the relationship in quantile 0.95 turns positive and statistically significant. The finding suggests that an OLS analysis, which is close to the median quantile (0.5), would be misleading, as it would report an insignificant coefficient for the portion of assets held in liquid positions. On the other hand, quantile regressions by allowing the estimation of various quantile functions of the underlying conditional distribution provide us with a more robust picture of the intrinsic relationships.

Table 9
Quantile estimation of fund performance determinants

	Constant	Exp_t	$lnAssets_t$	Age_t	$Cash_t$	R^2	H_0: $\beta_1 = \beta_2 = \beta_3 = \beta_4 = 0$
Quantile (τ=5%)	0.0172	-0.2384	-0.0006	-0.0002	-0.0198		F (4, 64) = 2.92
	(2.46)**	(-2.93)***	(-1.79)*	(-0.60)	(-1.65)*	30.19%	Probability>F = 0.0272
Quantile (τ=25%)	0.0059	-0.053	-0.0003	0.00004	-0.02		F (4, 64) = 4.51
	(-1.58)	(-1.60)	(-1.27)	(0.54)	(-3.07)***	16.84%	Probability>F = 0.0029
Quantile (τ=50%)	0.0043	-0.0673	-0.0002	0.00006	-0.005		F (4, 64) = 0.99
	(-0.99)	(-2.02)**	(-0.85)	(0.78)	(-0.57)	3.77%	Probability>F = 0.4179
Quantile (τ=75%)	0.0000	-0.0187	-0.0005	-0.0004	0.0066		F (4, 64) = 0.11
	(0.00)	(-0.46)	(-0.01)	(-0.27)	(0.55)	1.29%	Probability>F = 0.9769
Quantile (τ=95%)	-0.0102	-0.0998	0.0007	-0.0002	0.0447		F (4, 64) = 0.72
	(-0.54)	(-1.16)	-0.68	(-0.49)	(1.88)*	13.14%	Probability>F = 0.5794

Note: The table presents coefficient estimates of equation (9) employing simultaneous quantile regression. Standard errors of coefficients were obtained by bootstrapping with 100 sample replications. ***, ** and * represent statistical significance at the 1%, 5%, and 10% level, respectively.

4.5.1 Quantile estimation based on size of funds

The previous section has revealed a negative effect of asset size on funds' alpha in low order quantiles. However, due to the special characteristics of domestic capital market i.e. small capitalization and low trading activity, further analysis is warranted. In addition, international evidence fails to be conclusive on the underlying relationship[12]. To this end, we go a step further and examine the relationship between fund performance and various attributes employing quantile regression analysis for two different subsamples formed on the basis of fund size. Moreover, we form two subgroups of funds based on the median asset size as measured by total assets. In effect, the two subgroups are funds with low to average assets and funds with large assets under management. Results for small funds are presented in Table 10 whereas the estimated regressions across quantiles for larger funds are presented in Table 11.

[12] Otten & Bams (2002), Chen et al (2004), Cremers et al (2011)

Table 10
Quantile estimation of fund performance determinants of small funds

	Constant	Exp_t	$lnAssets_t$	Age_t	$Cash_t$	R^2
Quantile	0.0109	-0.2667	-0.0001	-0.0013	-0.006	
(τ=5%)	(1.38)	(-2.97)***	(-0.23)	(-0.70)	(-0.95)	56.52%
Quantile	0.0096	-0.067	-0.0006	0.0009	-0.0136	
(τ=25%)	(1.07)	(-1.06)	(-1.15)	(0.62)	(-1.97)*	18.14%
Quantile	-0.0065	-0.0741	0.0006	0.0004	-0.0163	
(τ=50%)	(-0.58)	(-1.47)	(0.78)	(0.17)	(-1.10)	6.86%
Quantile	-0.0203	-0.03	0.0012	0.0019	0.0029	
(τ=75%)	(-3.12)***	(-0.60)	(2.11)**	(1.21)	(0.24)	14.81%
Quantile	-0.0209	-0.0223	0.0008	0.0052	0.0259	
(τ=95%)	(-1.56)	(-0.38)	(0.61)	(1.00)	(1.01)	31.76%

Note: The table presents coefficient estimates of equation (9) employing simultaneous quantile regression for small funds only. Standard errors of coefficients were obtained by bootstrapping with 100 sample replications. ***, ** and * represent statistical significance at the 1%, 5%, and 10% level, respectively.

The findings for the group of smaller funds are qualitatively similar to those reported for the whole sample. Expenses are found to affect negatively performance especially in low order quantile. However, contrary to the previous findings asset size is reported to matter this time around as it carries a positive sign and it is statistically significant in high order quantile of 0.75 insinuating a different view regarding asset scale and fund performance for smaller funds. In the spirit of Chen et al (2004), we claim that in light of the special characteristics of domestic capital market[13] a large asset size could be a burden for funds resulting ultimately in lower risk-adjusted returns.

[13] As it is stated earlier, domestic capital market is characterized by small capitalization and low trading activity for many listed stocks

Table 11
Quantile estimation of fund performance determinants of large funds

	Constant	Exp_t	$lnAssets_t$	Age_t	$Cash_t$	R^2
Quantile	-0.0048	-0.4046	0.0011	-0.0007	-0.0575	
(τ=5%)	(-0.54)	(-2.03)**	(1.41)	(-0.54)	(-3.04)***	62.20%
Quantile	0.0041	-0.0466	-0.0002	0.0004	-0.0231	
(τ=25%)	(0.64)	(-0.36)	(-0.37)	(0.50)	(-1.99)**	20.67%
Quantile	0.0016	-0.0724	0.00000	0.0002	-0.0127	
(τ=50%)	(0.49)	(-1.49)	(0.02)	(0.25)	(-1.09)	6.28%
Quantile	0.003	0.0019	-0.0003	0.0009	0.0017	
(τ=75%)	(0.35)	(0.002)	(-0.86)	(1.14)	(0.12)	3.03%
Quantile	0.0174	-0.0243	-0.0011	0.003	-0.0148	
(τ=95%)	(0.76)	(-0.22)	-0.93	(2.64)**	(-0.72)	19.62%

Note: The table presents coefficient estimates of equation (9) employing simultaneous quantile regression for large funds only. Standard errors of coefficients were obtained by bootstrapping with 100 sample replications. ***, ** and * represent statistical significance at the 1%, 5%, and 10% level, respectively.

Regarding larger funds a finding worth noting is the importance of expenses. As before, in low order quantiles, expenses carry a negative sign but their impact on performance is much higher. In particular, for larger funds an increase in expenses by 1% results in lower performance by approximately 0.40% whereas for smaller funds the reduction in performance equals 0.26%. Among the rest variables, cash appears to affect negatively performance in low order quantiles i.e. 0.05 and 0.25. This finding implies that managers' fail to shift the composition of their portfolio to more profitable investment opportunities than cash or cash equivalents but rather they follow a more passive strategy that leads ultimately in lower performance. Finally, we observe that for larger funds age of the fund plays an important role for fund performance especially in higher order quantile (0.95).

4.5.2 Quantile estimation based on size of funds: the impact of liquidity

Following Chen et al (2004) we investigate in detail the role of liquidity for fund performance. To this end, we perform a simultaneous quantile regression of fund performance characteristics including the estimated liquidity factor sensitivity loading[14] as a separate regressor:

$$Q_{\tau}(\tau / X_t) = \alpha_{\tau} + \beta_1 Exp_t + \beta_2 \ln Assets_t + \beta_3 Age_t + \beta_4 Cash_t + \beta_5 Liq_t + \varepsilon_{\tau} \quad (10)$$

where Liq_t stands for Liquidity sensitivity factor estimated from equation (4)

As in previous section, we take into account the asset size of funds and we, thus, estimate Equation (10) for two different fund groups. Results of the quantile regressions are presented in Tables 12 and 13 respectively.

An interesting finding that emerges from current analysis is the positive sign of liquidity factor on fund's performance across quantiles for small funds. In particular, in the median quantile the effect of liquidity is found statistically significant indicating an implicit tendency of small funds' managers to earn abnormal returns by exploiting liquidity related premiums. Once more, in low order quantiles, expenses carry a negative sign and are statistically significant. However, and interestingly, expenses affect performance negatively at 10% statistical significance in high order quantile of 0.95 and in the median. This implies that once we take into account for liquidity expenses gain in importance.

Table 12
Quantile estimation of fund performance determinants of small funds: the impact of liquidity

[14] Following Carhart (1997) we have augmented its four factor performance evaluation model with a stock level liquidity factor. The time series estimated coefficient of funds' exposure to this risk factor stands for Liq_t

	Constant	Exp_t	$lnAssets_t$	Age_t	$Cash_t$	Liq_t	R^2
Quantile	0.0139	-0.3149	-0.0003	-0.0014	-0.0031	0.0214	
(τ=5%)	(1.39)	(-2.84)***	(-0.43)	(-0.67)	(-0.33)	(0.84)	57.76%
Quantile	0.0117	-0.0795	-0.0008	0.0011	-0.0124	0.0126	
(τ=25%)	(1.25)	(-0.84)	(-1.08)	(0.46)	(-1.17)	(1.20)	21.32%
Quantile	0.0027	-0.0891	-0.00010	0.0008	-0.0029	0.0143	
(τ=50%)	(0.22)	(-1.91)*	(-0.15)	(0.35)	(-0.30)	(2.09)**	15.63%
Quantile	-0.0079	-0.0718	0.0001	0.005	0.0105	0.0125	
(τ=75%)	(-0.48)	(-1.13)	(0.10)	(1.78)*	(0.58)	(1.29)	17.42%
Quantile	-0.0169	-0.1246	0.0010	0.0047	0.0087	0.0162	
(τ=95%)	(-2.36)**	(-1.96)*	(1.43)	(1.25)	(0.29)	(1.40)	40.13%

Note: The table presents coefficient estimates of equation (10) employing simultaneous quantile regression for large funds only. Standard errors of coefficients were obtained by bootstrapping with 100 sample replications. ***, ** and * represent statistical significance at the 1%, 5%, and 10% level, respectively.

Last, from Table 13 we infer that stock level liquidity is irrelevant for the performance of larger funds. In addition, in low order quantiles and in the median quantile expenses carry a negative sign that is highly statistically significant.

Table 13

Quantile estimation of fund performance determinants of large funds: the impact of liquidity

	Constant	Exp_t	$lnAssets_t$	Age_t	$Cash_t$	Liq_t	R^2
Quantile	-0.0072	-0.5214	0.0013	0.0000	-0.0504	0.0256	
(τ=5%)	(-0.63)	(-2.66)***	(1.55)	(0.04)	(-2.70)***	(1.61)	63.84%
Quantile	0.0026	-0.0501	-0.0001	0.0003	-0.0198	0.0009	
(τ=25%)	(0.30)	(-0.40)	(-0.16	(0.36)	(-1.42)	(0.10)	20.67%
Quantile	0.00	-0.1056	0.00010	0.0003	0.0008	0.0062	
(τ=50%)	(0.001)	(-1.74)*	(0.20)	(0.62)	(0.05)	(0.71)	8.80%
Quantile	-0.0019	-0.0959	0.0001	0.0003	0.0112	0.0087	
(τ=75%)	(-0.40)	(-0.92)	(0.42)	(0.54)	(0.63)	(1.22)	12.62%
Quantile	-0.0081	0.091	0.0001	0.0018	0.0052	0.0138	30.70%

(τ=95%)	(-0.58)	(0.75)	0.08)	(1.81)*	(0.25)	(1.48)

Note: The table presents coefficient estimates of equation (10) employing simultaneous quantile regression for large funds only. Standard errors of coefficients were obtained by bootstrapping with 100 sample replications. ***, ** and * represent statistical significance at the 1%, 5%, and 10% level, respectively.

5. Conclusion

The purpose of this paper is to provide evidence on the performance of Greek domestic equity funds controlling for a number of explicit and implicit risk factors. Our goal is to extend international literature focusing on a mutual funds market that presents some intriguing characteristics such as oligopolistic structure while is dominated by funds offered by bank subsidiaries. Greek stock market is a regional stock market that is characterized by small capitalization and low trading activity for many listed stocks which in turn might affect the behavior of domestic fund managers. Recognizing the difficulties inherent to the identification of the appropriate benchmark, a whole generation of studies has adopted the use of multi factor evaluation models as a tool for distinguishing managerial skill. Following Fama & French (1993,1996), Carhart (1997) and a series of asset pricing papers which stress the relevance of a liquidity factor in determining stocks' expected returns (see inter alia Lee 2011) we employ an asset factor performance measure that explicitly accounts for liquidity considerations of funds' stock holdings among other risk factors.

The empirical results derived through single or multi factor risk-adjusted performance measures reveal, at the overall level, neutral performance for Greek equity fund managers for the period June 2001–December 2009. Overall fund performance deteriorates further when ASE-GI Total Return is employed in place of the ASE General official index. In other words, fund managers fail to demonstrate significant stock picking abilities resulting in repeated underperformance relative to benchmarks using either of the alternative models. Our results are consistent with the majority of relevant literature suggesting that domestic active fund management does not provide fund shareholders with added value from identifying and investing in undervalued securities. Managers as a whole fail even to justify the various expenses that are imposed to shareholders for active portfolio management services[15].

[15] Babalos, Kostakis & Philippas (2009) concluded that domestic equity funds' total expense ratio is relatively stable around 3% p.a.

Therefore, even if no evidence of aggregate stock picking ability exists, it could be the case that some money managers possess superior skills. Particularly, we examined separately top and worst funds in terms of their estimated asset factor abnormal return and found statistically and economically significant performance in both directions. In the context of this analysis, we document the existence, for the first time in the traditional mutual funds industry, of an incentive effect. In particular, we have discovered that among the best funds in terms of their risk-adjusted return there is a fund whose Chief Executive Manager is the second largest shareholder of its management company. With respect to our new stock-level liquidity factor, it appears to add significant explanatory power to our performance evaluation model. In particular, asset factor model is superior in terms of explanatory power in all of the estimated regressions.

Examining the estimated slopes of the augmented Carhart model reveals interesting aspects of the managers' incentives. Overall, domestic equity funds demonstrate a significant exposure to small size effect whereas they tend to follow past winners stocks (momentum effect). Furthermore, our results suggest that funds load significantly and positively on the liquidity risk factor which reveals the presence of illiquid stock holdings in their portfolio.

Moreover, in a second-stage regression framework, we investigate the relationship between fund performance and a series of cost and operational variables. Due to the significant heterogeneity of fund performance we employ the robust non-parametric quantile estimation technique that allows the estimation of various quantile functions, helping to examine especially the tail behavior of that distribution. With respect to cost variable, we document a significant inverse relationship between fund performance and expenses in the 0.05 and 0.50 quantiles of risk-adjusted returns distributions. Smaller funds appear to have an advantage over larger funds as it is revealed by the negative relationship between alpha and fund size.

There are a series of policy issues regarding performance evaluation that arise from our paper. Firstly, fund managers should be evaluated and compensated according to their performance relative to a universal measure capturing all potential sources of implicit investment risk and not only market risk. Moreover, it is common belief that investors chase recent superior performance causing an asymmetric flow of money towards recent fund winners (Fiotakis & Philippas 2004). However, investors should be very cautious in their investment selection. Their investment preference should not rely solely on raw returns rankings that appear in financial press or elsewhere and can be misleading but rather on a complete risk-adjusted measure. Expense policy of mutual fund companies should be a concern for investors since the various expenses appear to play a significant role in funds' performance.

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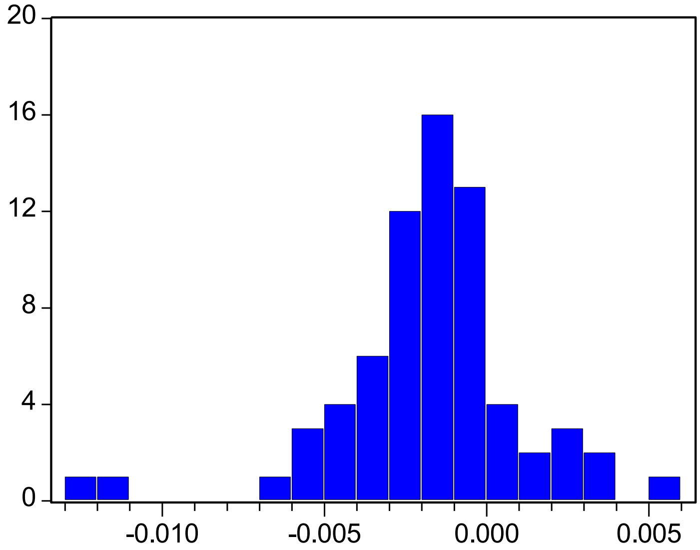
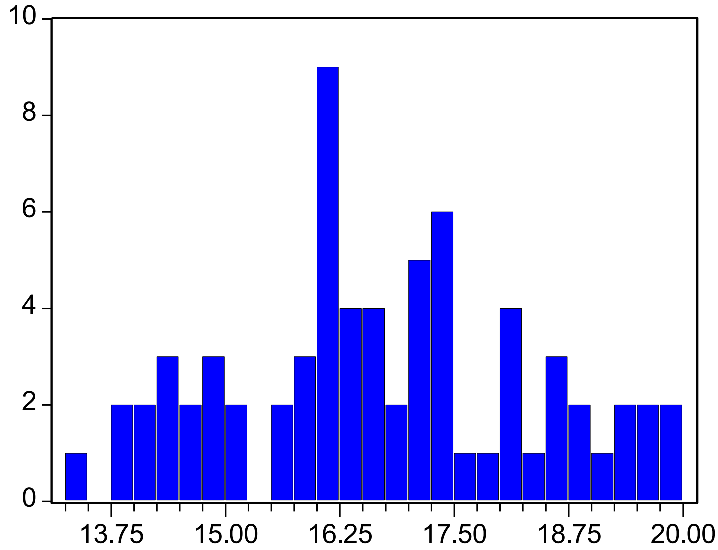
APPENDIX



Series: ACARHART	
Sample 1 69	
Observations 69	
Mean	-0.001736
Median	-0.001610
Maximum	0.005455
Minimum	-0.012051
Std. Dev.	0.002856
Skewness	-0.923584
Kurtosis	6.422316
Jarque-Bera	43.48230
Probability	0.000000



Series: LNASSETS	
Sample 1 69	
Observations 69	
Mean	16.71232
Median	16.66790
Maximum	19.83436
Minimum	13.44971
Std. Dev.	1.635328
Skewness	0.032249
Kurtosis	2.292085
Jarque-Bera	1.452749
Probability	0.483659