Performance Evaluation: A Review Article And An Empirical Investigation Of Greek Mutual Fund Managers

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Abstract

This paper surveys several mutual fund performance evaluation models. The models are applied to examine the performance of Greek equity and balanced mutual funds. Specifically, the Henriksson and Merton (1981), Bhattacharya and Pfleiderer (1983) and Lockwood and Kadiyala (1988) models are applied and compared. Empirical results show that models in which beta is treated as random variable imply superior manager performance in terms of selectivity, contrary to models based on the assumption of binary betas. All models are in agreement that fund managers do not exhibit superior macro-forecasting abilities.

Introduction

The importance of mutual funds in financial markets has literally sky-rocketed over the past fifteen years worldwide. This phenomenon that can be attributed to the unique benefits that mutual funds offer to individual investors, was also evident in Greece.

Mutual funds provide at least[1] four benefits to investors. *First*, they provide professional management independently of the investors' initial capital size. *Second*, they provide diversification. Individual investors commit as many resources as mutual funds can. Therefore, funds can exploit financial 'economies of scale' that individual investors cannot. *Third*, mutual funds have lower transaction costs because of savings due to brokerage and other security service discounts on large trades. Brehnan and Hugles (1991) document that brokerage commissions decline with the size of the transaction. *Fourth*, mutual funds enable investors to perform liquidity risk sharing.

At 30/09/00, more than 54 thousands of mutual funds existed worldwide, which corresponds to 14 trillion Euro[2]. In Greece, the evolution of the mutual funds market has been impressive. In 1985 there were only two state-controlled funds, which managed 4 billion drachmas. Today (31/12/00), there exist 265 funds of all types managing 10.5 trillion drachmas (about 30 billion Euro).

As a result of the trend, the performance of portfolio managers has become an important issue for applied financial economists and financial analysts. From a social point of view it is important to know whether the professional managers add value or whether they simply waste resources through their active management. Additionally the performance of fund managers affects investors decisions related to the placement of their wealth. Obviously it also affects the compensation of funds managers[3]. Of course, the ability of fund managers to increase returns based on better forecasting skills would violate the efficient market hypothesis and would have important implications[4].

Readers with comments or questions are encouraged to contact the authors via email.

The purpose of this paper is twofold: First, the presentation and critical evaluation of the most prominent mutual funds performance evaluation models and second the actual performance evaluation of Greek equity and balanced mutual funds. Section 2 of the paper presents the most prominent models of selectivity and timing. Section 3 describes the data used along with the definition of variables employed. In section 4 the empirical results are presented and analyzed. Section 5 concludes the paper.

2. The Greek Mutual Fund Industry

The mutual funds industry was established in Greece in 1972 with the introduction of two balanced funds. However, a series of economic and political events caused a recession in the stock market. As a result the growth of the mutual funds industry was delayed. Over the next fifteen years no other mutual fund was introduced. In 1989, investors turned their attention to the mutual fund industry. This was mainly due to institutional changes in the Greek capital market and the positive behavior of the Athens Stock Exchange. During the following years, the mutual funds industry continued to expand rapidly.

To start a mutual fund company, a minimum amount of 400 million drachmas is required. According to law, 2/5 of the capital must be invested by an S.A. company with equity capital of at least 4 billion drachmas The mutual fund's assets are deposited to a Greek bank, which acts as a custodian. The custodian guarantees the security of the assets, and guards the interests of the shareholders against management malpractice through extensive and strict controls. The custodian and the mutual fund company are both responsible for every violation of the law committed or any case of malpractice or mismanagement. The custodian's remuneration fee is detailed in the mutual fund's prospectus. The prospectus details the investment purpose of the fund, and describes the basic operation rules. This is provided by the mutual fund company and is subject to the approval of the Capital Markets Commission.

Greek mutual funds are classified as (a) money market funds, which invest mainly (at a minimum of 65%) in the money market, (b) bond funds investing mainly in bonds, (c) equity funds, investing mainly in common stocks, (d) balanced type, investing both in stocks and bonds, (e) special type, investing in stocks that belong only to a specific industry or branch of the economy.

There are 26 mutual fund companies in Greece, and 265 different funds, 62 of which are bond, 47 money market, 36 balanced and 120 equity funds. The total assets they manage amount to 10.5 trillion GRD and represents the 46,5% of cash deposits. The company that offers the largest number of products is Alpha AEDAK, which offers 26 different funds, and the Interamerican insurance corporation with 21 funds. The largest mutual fund (Alpha Money Market Fund) belongs to the Alpha Bank's mutual fund consortium.

In 1991, the ratio of mutual funds total assets to total deposits was 2%, and increased to 52% in the end of 1999. In 2000, Greek equity mutual funds experienced a drastic reduction in total assets (2.6 trillion compared to 4.9 trillion drachmas in 1999). Their own contribution to total assets was 41.6% in 1999 but only 25.5% in the end of 2000. It should be mentioned that in money market funds, total assets were increased from 38% in 1999 to 49.7% at the end of 2000.

The mutual fund industry in Greece has an oligopolistic structure, especially after recent mergers and acquisitions in the banking sector (Alpha/Ionian, National/National Mortgage, Piraeus Bank/Chios and Macedonian-Thrace etc). More specifically, two consortia (namely Alpha and National) control 38% of the market share (end of 2000) and seven consortia account for 79.5% of total assets. The distribution network for mutual funds consists mainly of the banking network, which accounts for 85% of their total assets. Insurance companies account for 13.4%, and only 2% is accounted for by the management company itself.

Despite the fact that the institutional framework is modern, several regulations would improve market operations and transparency:

a) There is a need for more extensive specialization of the existing types of mutual funds. Especially equity funds should be divided into small capitalization and large capitalization funds.

b) There is a need for the construction of better and more appropriate benchmark indices for performance evaluation purposes.

c) Fund managers should take a special examination, and a data bank with their qualitative characteristics must be made available. This bank could include features like university degrees, professional experience etc. In the interest of the general public, and potential as well as existing customers, this information cannot be private.

d) Significant improvements can be made in the field of transparency and uniformity in accounting reports. The reporting of expense ratio is also necessary.

Models of selectivity and timing

The Jensen model

Jensen (1968, 1969) formulated a return-generated model to measure performance of managed portfolios:

$$R_{pt}= \alpha_p + b_p R_{mt} + u_{pt} \quad (1)$$

where R_{pt} is the excess return (net of the risk free rate) of the p^{th} portfolio, R_{mt} is the excess return (net of the risk free rate) of the market portfolio, α_p is a measure of security selection ability, b_p is the beta coefficient of the portfolio p, u_{pt} is a random error which has expected value of zero and constant variance and t denotes time. This specification assumes that the risk level of the portfolio under consideration is stationary through time and ignores the market timing skills of the managers. Indeed, portfolio managers may shift the overall risk composition of their portfolio in anticipation of broad market movements.

Several methods have been proposed in the literature for the evaluation of the selectivity and timing abilities of portfolio managers, using only the observed time series of realized returns on the managed portfolios[5].

The Treynor – Mazuy Model

Treynor and Mazuy (1966) added a quadratic term to equation (1) to test for market timing skill. Thus, the portfolio return will be a nonlinear function of the market return as follows:

$$R_{pt} = a_p + b_p R_{mt} + c_p R_{mt}^2 + \varepsilon_{pt} \quad (2)$$

A positive and statistical significant value of c_p would imply positive market timing skill because the last term will make the characteristic line steeper as R_m is larger[6].

Treynor and Mazuy (1966) using annual returns for 57 open end mutual funds, find that the hypothesis of no market timing ability can be rejected with 95% confidence for only one of the funds.

Lehmann and Modest (1987) combined the APT performance evaluation method with Treynor and Mazuy model. They found statistically measured abnormal timing and selectivity performance by mutual funds. They also found that performance measures are quite sensitive to the benchmark chosen and a large number of negative selectivity measures. Cumby and Glen (1990) examined the performance of a sample of fifteen US based internationally diversified mutual funds for the period 1982 – 1988 using (among others) the Treynor – Mazuy model. The results show that there exists a perverse timing effect. Coggin – Fabozzi – Rahman (1993), using Treynor – Mazuy and Bhattacharya – Pfleiderer models, examined the performance for a random sample of 71 US equity pension fund managers for the period January 1983 through December 1990. The results suggest that pension fund managers are on average better stock pickers than market timers. More specifically, the average selectivity measure is positive and the average timing measure is negative regardless of the choice of benchmark portfolio or estimation model.

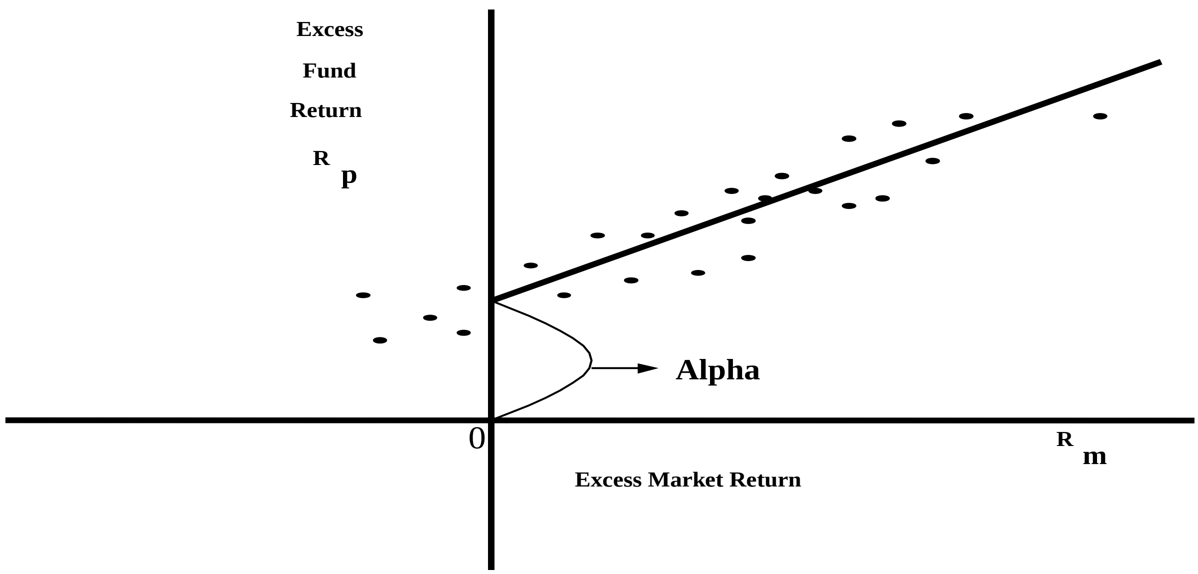
Fama's contribution

According to Fama (1972) performance skills can be classified into two categories, micro-forecasting or stock-selection skills, and macro-forecasting or market timing skills. This distinction is very important in the modern performance evaluation literature.

Stock selection ability

Stock selection ability refers to a manager's ability in picking good performing individual stocks on a risk-return basis. By following a strategy of investing in superior stocks, the fund should have relatively constant beta and positive alpha. Figure 1 presents the excess returns on the fund plotted against the excess return on the market. The regression line has a positive intercept, which indicates superior performance.

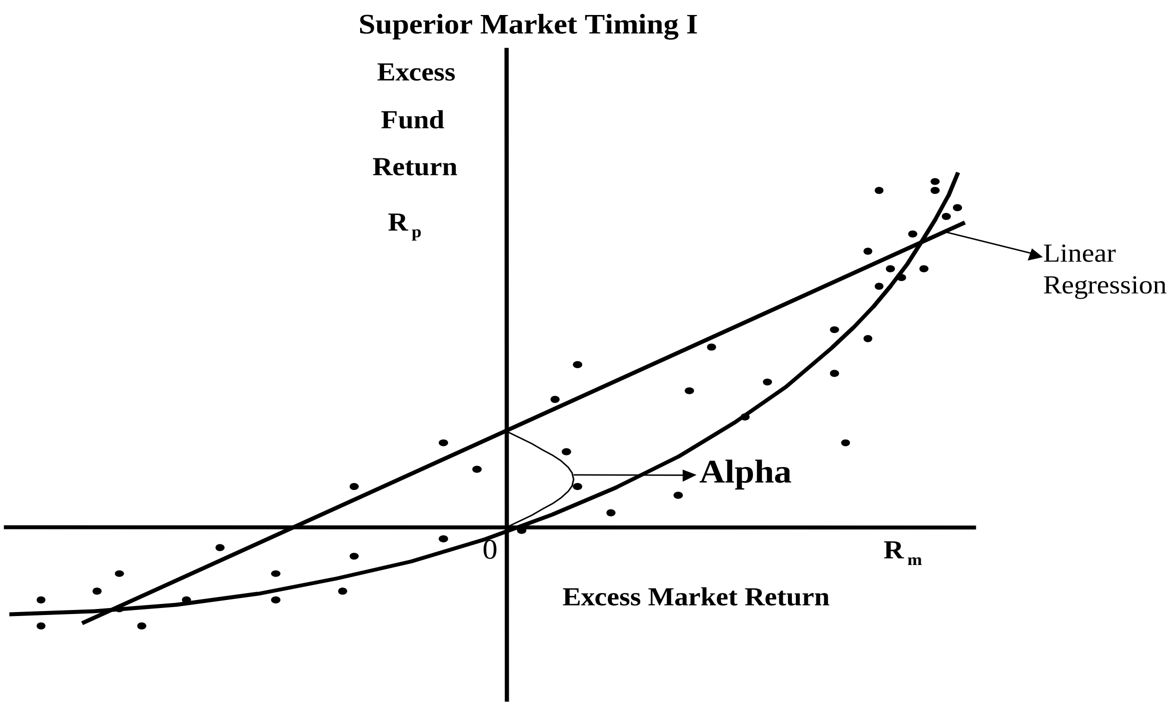
Figure 1
Superior Stock Selection



Market timing ability

Although the fund manager may have no ability to pick winners among stocks, the manager may be able to forecast market-wide changes, for example switches from bear to bull markets. This ability is known as market timing. Figure 2 presents a case of market timing. If the portfolio manager knows when the stock market will follow a rising path, it is rational for the manager to be more exposed to aggregate risk. Therefore, the fund's beta will increase, since betas are measures of systematic risk. If the portfolio manager knows when the stock market will follow a downward path, the manager will switch into low beta stocks, whose returns will decrease less than the market. This accounts for the nonlinear shape of the data. In Figure 2, we present the quadratic regression, which indicates superior macro-forecasting skills, and a linear regression, which ignores the presence of macro-forecasting. In this case, if the fund manager possesses superior timing skills (but no stock selectivity) the linear regression will incorrectly indicate significant selectivity. Therefore, in practice it is important to disentangle selectivity from market timing. In Figure 3, we present a fund manager with both market timing and stock selectivity skills. In this case, incorrectly fitting a linear regression will show no evidence of selectivity, which is clearly incorrect. These are major problems with the Jensen method of performance evaluation. For an excellent analysis, see Harvey and Gray (1997).

Figure 2



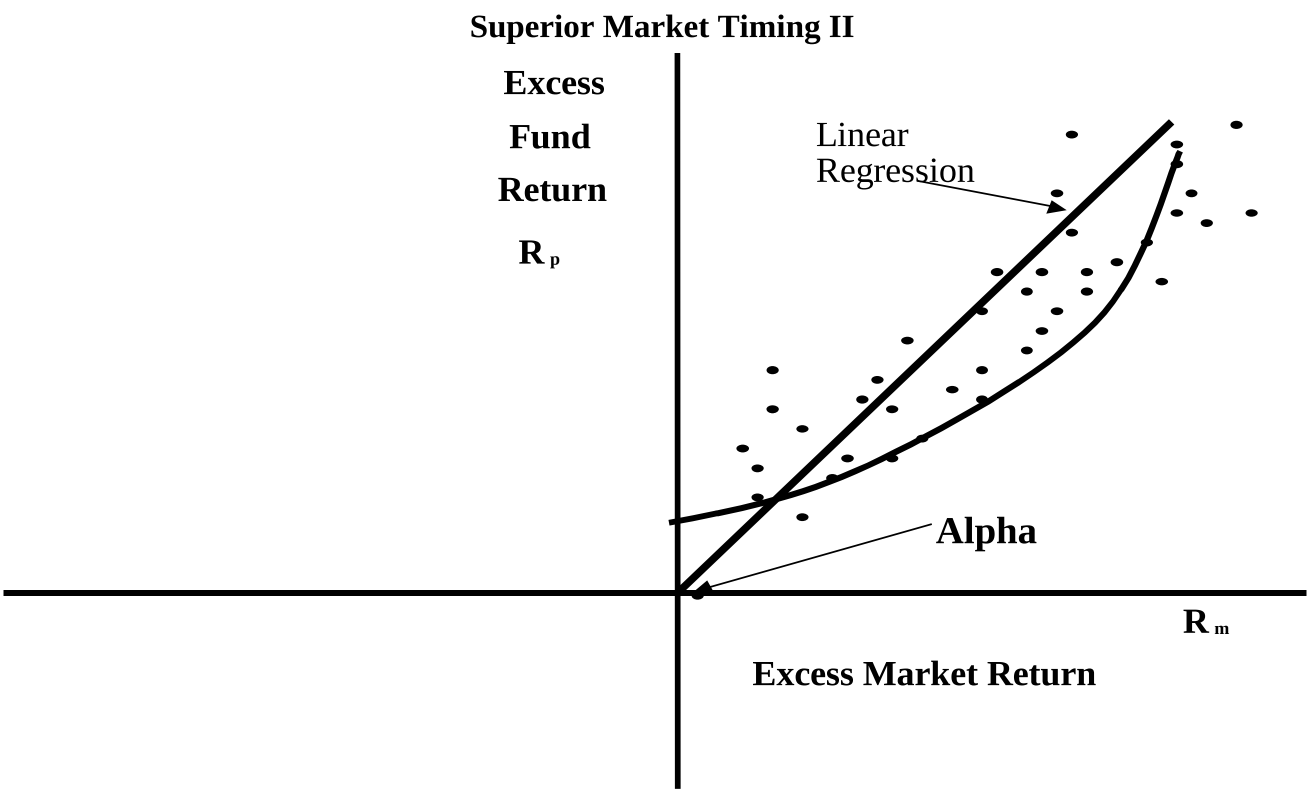
The Fabozzi – Francis model

The Fabozzi and Francis (1979) model tests whether a fund ’ alpha and/or beta differ statistically significantly in bull and bear market and they use the following equation:

$$R_{pt} = A_{1p} + A_{2p} D_t + B_{1p} R_{mt} + B_{2p} D_t R_{mt} + u_{pt} \qquad (3)$$

Where D_t is a dummy variable which is unity if the t^{th} period is a bull market and zero otherwise. The coefficients of the dummy variables A_{2p} and B_{2p} measure the differential effects of bull market conditions on the alpha A_{1p} and beta $B_{1p,}$ respectively. Equation 3 allows to test the hypothesis that a parameter of the single-index-market-model is equal and does not depend on market conditions by testing whether the differential coefficient is statistically different from zero. In this model, A_{2p} is the differential alpha, which represents the differential performance in bull markets if excess returns were used. Fabozzi and Francis considered in their empirical study 85 mutual funds over the period December 1965 to December 1971. They have used three definitions of bull and bear markets (p. 1246) to conclude that “mutual fund managers did not shift their fund’s beta to take advantage of market movements (p.1249).

Figure 3



The Henriksson - Merton model

The theoretical construct for the Up/Down model was established by Merton (1981) and Henriksson and Merton (1981). To examine the market timing ability of portfolio managers, Henriksson and Merton propose that the portfolio beta is cast as a binary variable, constrained to one value during up markets and another value during down markets, as follows:

$$R_{pt} = a_p + b_{pd} R_{mt} + u_{pt} \text{ for all t such that } R_{mt} \leq 0 \quad (4)$$

$$R_{pt} = a_p + b_{pu} R_{mt} + u_{pt} \text{ for all t such that } R_{mt} > 0 \quad (5)$$

which can be combined to form the dummy variable regression:

$$R_{pt} = a_p + b_{pd} R_{mt} + b_{po} R_{mt} D_t + u_{pt} \quad (6)$$

where R_{pt} , R_{mt} , have already been defined, D_t is a dummy variable and is equal to one if R_{mt} is greater than zero and to zero otherwise and u_{pt} is a zero mean white noise process.

Assuming the capital asset pricing model of Sharpe (1964), Lintner (1965), *and* Mossin (1966) holds, then α_p is the selectivity parameter, b_{pu} is the systematic risk during up markets and b_{pd} during down markets. The slope coefficient b_{po} equals the difference for portfolio p between its up and down market beta (b_{pu} - b_{pd}). The macro-forecasting ability of the portfolio manager can be evaluated with a t-test on b_{po} corresponding to the null hypothesis

$b_{po} = 0$. A significantly positive (non positive) b_{po} implies that the manager is a superior (inferior) macro-forecaster. While the above multiple regression methods are easy to apply, statistical inference requires care. As pointed out by *Henriksson and Merton (1981)* the managed portfolio's return will exhibit conditional heteroscedasticity because of the fund managers attempt to time the market, even when stock returns are serially uncorrelated and identically distributed through time.

Henriksson (1984) examined the market timing performance of 116 mutual funds, using monthly data from February 1968 to June 1980. He found that only three funds (one fund) had market timing ability at the 5% (1%) confidence level. He also found evidence of dynamic heteroscedasticity (GARCH effects). However the correction for heteroscedasticity in the regression model did not alter his conclusions. Chua and Woodward (1986) carried out the same test for Canadian, US, and UK funds for the period 1973 – 1983. They found that the market timing performance of the mutual funds was in general poor. Chang and Lewellen (1984) using the Henriksson – Merton model examined monthly returns of 67 mutual funds during the period January 1971 - December 1979 using the Henriksson – Merton parametric test. They ignore the presence of heteroscedasticity, relying on the assumption on the results obtained by Henriksssson that the correction for heteroscedasticity did not change the nature of the conclusion. They did not find evidence that funds were systematically timing the market. If anything there seems to be evidence of negative timing. The application of this technique to a multi – portfolio benchmark in Connor and Korajczyk (1991) reveals similar results.

Sinclair (1990) examined the market timing ability of managers of 16 Australian pooled superannuating funds from January1981 to December 1987. The return performance of market timing abilities of 15 out of the 16 funds was significantly negative indicating that the timing ability is perverse.

Koh, Phoon and Tan (1993) used both parametric (Henriksson – Merton (1981)) and non-parametric criteria to examine market timing abilities of fund managers vis-à-vis 6 mutual funds as well as 4 investment companies in Singapore. The use of non-parametric criteria led to the conclusion that market timing was achieved whereas application of non-parametric criteria led to opposite conclusions. The authors tried to reconciliate the empirical results and were eventually led to the conclusion that market timing abilities for the Singapore fund managers could not be disregarded[7].

The Bhattacharya – Pfleiderer model

Bhattacharya and Pfleiderer (1983), by correcting an error in Jensen (1972), show how to use a simple regression technique to obtain accurate measures of timing and selection ability[8]. They specify a relationship in terms of observable variables similar to one suggested by Treynor and Mazuy (1966):

$$R_{pt} = \alpha_p + \theta \, \mathrm{E}(R_m)(1-\psi)R_{mt} + \psi\theta R_{mt}^2 + \theta\psi\varepsilon_t R_{mt} + u_{it} \qquad (7)$$

where:

θ = the fund managers' response to information,
ψ = the coefficient of determination between the manager's forecast and excess return on the market, and
ε_t = the error of the manager's forecast

This quadratic regression of R_p on R_m and R_m^2 allows us to detect the existence of a manger's stock selection ability as revealed by α_p. The error term of equation (7)

$$w_t^{/} = \theta\psi E_t R_t^m + u_t^p \qquad (8)$$

Contains the information needed to identify the manager's market timing skill. We can extract the information by regressing the square of $w_t^{/}$ on the square of the excess market return. This produces an estimate of $\theta^2\psi^2 S_\varepsilon^2$, where S_ε^2 is the variance of the manager's forecast error. This, coupled with knowledge about S_F^2, the variance of the excess market return, allows us to estimate $\psi = \dfrac{S_F^2}{S_F^2 + S_\varepsilon^2} = r^2$, where r is the correlation between the manager's forecast and excess return on the market. Finally, we calculate r, a true measure of the quality of the manager's timing information.

Lee and Rhaman (1990, 1991) have used the Bhattacharya and Pfleiderer model to examine 93 mutual funds using monthly returns for an 87- month period (January 1977 through March 1984). Market return was taken as monthly rate of return on the CRSP value weighted index (including dividends). Monthly observations of the 91-day Treasury bill rate was used as a proxy for the risk free rate. The results show some evidence of selectivity and market timing at the individual fund level. Of the 93 funds 24 (25,81%) have α_p significantly different from zero at the 0.05 level, 14 of these funds (15.05%) have positive α_p and 16 (17.2%) have r significantly different from zero at the 0.05 level.

Coggin, Fabozzi and Rahman (1993) present an empirical examination of 71 US equity pension funds during January 1983 through December 1990. They have considered both the Treynor and Mazuy, as well as the Bhattacharya and Pfleiderer models. The empirical results indicate that regardless of the choice of benchmark portfolio or estimating model, the average selectivity measure is positive and the average timing measure is negative. However both appear to be sensitive to the choice of a benchmark when managers are classified according to investment style.

The Lockwood – Kadiyala Model

Lockwood – Kadiyala (1988) propose a model that exhibits evolving or time varying systematic risk,

$$\beta_{pt} = \delta_{p1} + \delta_{p2}\pi_{mt} + \phi_{pt} \qquad (9)$$

where β_{pt} is the stochastic systematic risk parameter, δ_{p1} and δ_{p2} are constants that define the relationship, for portfolio p, of systematic risk with the market return, $\pi_{mt}=R_{mt} - E(R_m)$, and ϕ_{pt} is a random disturbance. As shown by Jensen (1972), β_{pt} in eq. (9) represents the optimal solution for a portfolio manager who maximizes the utility of his client shareholders. Accordingly a superior macro-forecaster should adjust beta (β_{pt}) often and in direct proportion (except for random deviations) to the strength and direction of the market return.
To derive the new market – timing model, a time varying characteristic line,

$$\mathrm{R}_{\mathrm{pt}} = \alpha_{\mathrm{pt}} + \beta_{pt} R_{mt} + u_{pt} \qquad (10)$$

Can be combined with (9) yielding:

$$\mathrm{R}_{\mathrm{pt}} = \alpha_{\mathrm{pt}} + \delta_{p1} R_{mt} + \delta_{p2} Q_{mt} + u_{pt} \qquad (11)$$

Where $u_{pt} = \mathrm{R}_{\mathrm{mt}}\phi_{pt} + \varepsilon_{pt}$, $Q_{mt} = R_{mt}\pi_{mt}$ and ϕ and ε are assumed to be uncorrelated. Additional insight may be gained by examining the mean of (11), $\alpha_p + \delta_{p1}E(R_m) + \delta_{p2}\sigma_m^2$ which reveals that the expected return of market timing, $\delta_{p2}\sigma_m^2$, is proportional to market volatility.

The Method Of Estimation

In this case, the log-likelihood function from a sample of T observations for the p[th] mutual fund, is given by

$$L_p = -\frac{T}{2}\log(2\pi) - \frac{1}{2}\sum_{t=1}^{T}\log(\sigma^2_{p,\phi}R^2_{mt} + \sigma^2_{p,\varepsilon}) - \frac{1}{2}\sum_{t=1}^{T}\frac{(R_{pt} - \alpha_p - \delta_{p1}R_{mt} - \delta_{p2}Q_{mt})^2}{\sigma^2_{p,\phi}R^2_{mt} + \sigma^2_{p,\varepsilon}} \qquad (12)$$

The log-likelihood function can be maximized with respect to parameters $\alpha_p, \delta_{p1}, \delta_{p2}, \sigma^2_{p,\phi}, \sigma^2_{p,\varepsilon}$.

Lockwood and Kadiyala (1988) have used a four-step GLS technique to estimate the model. We have found, however, that *exact maximum likelihood* is quite feasible provided the maximization is with respect to parameters $\sigma^2_{p,\phi}$ and $\sigma^2_{p,\varepsilon}$ which are allowed to take values on the real line. This is the equivalent to using the Cholesky reparameterization in a general case.

Although GLS and ML have the same asymptotic distribution, ML is expected to be more efficient in finite (particularly in small) samples. Therefore more precise inferences should be possible based on using the ML approach. We have used a standard conjugate gradients technique with numerical derivatives to maximize the likelihood function, and we have obtained fast convergence without numerical problems in all cases considered. The Gauss software package has been used in order to perform the computations.

Hypothesis tests

We can now provide an interpretation of model parameters α_p, δ_{p2}, and $\sigma^2_{p,\phi}$. Market timing ability can be evaluated with a t-test on δ_{p2}. A significantly positive (negative) value of δ_{p2} indicates that the manager is a strong (weak) macro-forecaster. This implies the manager is constantly changing beta depending on the market. The micro-forecasting ability of manager the manager of the p portfolio is determined by testing the hypothesis $\alpha_p=0$. A significantly positive (negative) α_p is clearly an indication of superior (inferior) selectivity. Finally the random variation of a portfolio's beta can be evaluated with a t-test on $\sigma^2_{p,\phi}$. If the null hypothesis ($\sigma^2_{p,\phi}=0$) cannot be rejected, then beta is a deterministic function of the market return. If $\delta_{p2}=0$ and $\sigma^2_{p,\phi} \neq 0$ the betas are changing stochastically but independently of market conditions, so that we have a pure random coefficient model. Notice that if $\delta_{p2}=0$ and $\sigma^2_{p,\phi}=0$, betas are constant.

The authors examined monthly returns for 47 US mutual funds throughout the 192 month period from January 1964 through 1979. The conclusions of the study include the following: fund managers fail the suggested macro-forecasting test, betas change randomly in many funds and certain funds exhibit superior micro-forecasting.

4. Data Description

Monthly returns for all Greek mutual funds (balanced and equity type) are examined. To be included, each fund must have existed throughout the 48-month period from January 1996 through December 1999. The final sample consists of 34 mutual funds the assets of which account for 70% of the total assets of the relative categories[9]. The return data include dividends as well as capital gains and losses. The market portfolio is measured by the Official General Index of the Athens Stock Exchange. The risk free rate series uses three-month Treasury bill rates, appropriately adjusted[10]. All returns are measured as continuously compounded rates of return.

5. Empirical results

In this section we present and discuss the results of the analysis. Table 1 presents the empirical results from the estimation of Henriksson - Merton model, after correcting for heteroscedasticity with the Newey – West method. The selectivity coefficient a_p is positive for the 29 of the 34 mutual funds included in the sample. However, only 2 of these are statistically significant. Regarding the timing coefficient b_{p0} only 3 mutual funds managers show superior market timing. Out of 8 negative values for b_{p0}, none is statistically significant.

Table 2 presents the empirical results of the Battacharya – Pfleiderer model after correcting for heteroscedasticity with the GLS procedure. According to the empirical results only 3 mutual funds managers exhibited superior selectivity skills and only two exhibit superior timing ability.

The empirical results, using the Lockwood – Kadiyala model, are presented in table 3 and reveal that the fund managers have no market timing ability. From the 34 funds 20 have positive δ_2, but none is statistically significant.

The empirical results regarding the ability of fund managers to select undervalued stocks are presented in the first column of Table 3. According to the results 8 out of 34 managers (23%) have this ability at the 5% level. This finding is also in line with previous work, in that specific fund managers are able to identify undervalued assets[11]. Regarding randomness, we find that 18 out of 34 funds (53%) have statistically significant $\sigma^2_{p\phi}$ at the 5% level. This implies that the majority of funds have stochastically changing beta coefficient.

Portfolio betas may change for several reasons. First, the betas of stocks included in the portfolio may be subject to temporal variation. Second, the portfolio weights are usually not constant over time but change to adapt to changing market and overall economic conditions. Third, the passive strategy portfolio weights change over time, when the prices of assets included in the portfolio change. This is even more pronounced in index funds. Fourth, the inflow of money to the mutual fund affects its beta if the manager takes some time to allocate new money according to the usual investment styles. Naturally, the extent to which betas are affected depends on the amount of these cash flows.

Finally, correlation coefficients between selectivity and timing were estimated. All three are negative (-0.41 for Henriksson – Merton, -0,22 for the Batttacharya – Pfleiderer model and -0,13 for the Kadiyala – Lockwood model). It is worth mentioning that Kon (1983) and Henriksson (1984) have also found negative values and Coggin - Fabozzi, and Rahman (1993) slightly negative while Lee and Rahman (1990) had found positive coefficient.

According to the results presented, all models are in agreement that fund managers do not exhibit superior macroforecasting ability. This finding is aligned with the majority of the empirical studies, that also fail to document the presence of market timing ability of fund managers.[12]

It seems that for Greek mutual funds managers for this specific period there exists a negative relationship between selectivity and the timing abilities of mutual funds managers.

6. Summary and Conclusions

The purpose of this paper was to present and critically assess various mutual funds performance evaluation models and to apply three models to the Greek mutual funds market. The sample consists of all Greek equity and balanced mutual funds, which had a continuous set of observations for the period January 1996 to December 1999.

Empirical results show that models in which beta is treated as random variable imply superior manager performance in terms of selectivity, contrary to models based on the assumption of binary betas. All models are in agreement that fund managers do not exhibit superior macro-forecasting abilities. Upon a fund-by-fund examination of the empirical results, we feel that, during the examined period, the Lockwood-Kadiyala model reflects better the reality of the Greek mutual fund industry. 🕮

TABLE 1

Summary Results from Henriksson – Merton model for the period 1996 – 1999 with correction of heteroscedasticity according to the Newey – West method:

$$\mathrm{R}_{\mathrm{pt}} = a_p + b_{pd}\, R_{mt} + b_{po}\, R_{mt} D_t + u_{pt}$$

Parameter	**Positive**	**Negative**	**Statistically Significant***		**Statistically Insignificant**	
			Positive	Negative	Positive	Negative
α_p	29	5	2	0	27	5
β_{pd}	34	0	34	0	0	0
β_{po}	26	8	3	0	23	8

α_p: Selectivity Parameter

β_{pd}: Beta during down markets

$\beta_{po:}$ Beta during up markets – Beta during down markets (b_{pu} - b_{pd})

R_{mt}: Excess performance of the official General Index at the Athens Stock Exchange

*at 5% level

TABLE 2

Summary Results from Bhattacharya-Pfleiderer model for the period 1996 – 1999 with correction of heteroscedasticity:

$$R_{pt} = \alpha_p + \theta\ \mathrm{E}(R_m)(1-\psi)R_{mt} + \psi\theta R_{mt}^2 + \theta\psi\varepsilon_t R_{mt} + u_{it}$$

	Selectivity (α_p)		**Market Timing (r)**
	Positive	Negative	Positive
GLS estimation	3	0	2

α_p: Selectivity Parameter

r: Market Timing measure

R_{mt}: Excess performance of the official General Index at the Athens Stock Exchange

*at 5% level

TABLE 3

Summary Results from Lockwood – Kadiyala model for the period 1996 – 1999:

$$\mathrm{R}_{\mathrm{pt}} = \alpha_{\mathrm{pt}} + \delta_{p1} R_{mt} + \delta_{p2} Q_{mt} + u_{pt}$$

Total					**Significant**	
Parameter	Mean	Standard Deviation	Positive	Negative	Positive	Negative
a_p	0.5051	0.5318	31	3	8	0
δ_{1p}	0.5355	0.3643	34	0	34	0
δ_{2p}	0.0002224	0.001326	20	14	0	0
$\sigma_{p,\phi}^2$	0.03858	0.1004	34	0	18	0

Notes: All significance tests, except for $\sigma_{p,\phi}^2$ are two tailed .The significance tests correspond to the 5% level.

Endnotes

1. Additionally, they provide switching services, checking accounts, systematic accumulation, and withdrawal plans etc.
2. FEFSI 2001.
3. Kershot 1978, Smith 1978.
4. For an excellent discussion of the efficient market hypothesis, see Fama (1970).
5. For example see Treynor and Mazuy (1966), Fama (1972), Jensen (1972), Henriksson and Merton (1981), Kon (1983), Bhattacharya and Pfleiderer (1983), Chang and Lewellen (1984), Henriksson (1984), among others.
6. According to Coggin – Fabozzi – Rahman (1993) it is necessary to correct for heteroscedasticity.
7. According to the authors, the results are consistent with those of Admati and Ross (1985) and Jagannathan and Korajczyk (1986).
8. See Lee and Rahman (1990,1991) for a detailed discussion of the procedure.
9. The relevant data were drawn from the "KERDOS" database. "KERDOS" is an old and reliable greek economic newspaper.
10. The database used is that of Datastream On line.
11. The empirical studies, which find that fund managers are able to identify undervalued assets are among others: Lockwood and Kadiyala (1988), Coggin –Fabozzi and Rahman (1993), Gallo and Swanson (1996), Daniel-et al. (1997).
12. The empirical studies, which reveal no market timing skills are the following: Treynor and Mazuy (1966), Chang and Lewellen (1984), Henriksson (1984), Chua and Woodward (1986), Connor and Korajzcyk (1986), Grinblatt and Titman (1988), Lockwood and Kadiyala (1988), Cumby and Glen (1990), Sinclair (1990), Coggin –Fabozzi and Rahman (1993), Gallo and Swanson (1996), Daniel-et all (1997) among others. For an interesting review see Allen D.E. and V. Soucik (2000).

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