

THE PERFORMANCE OF GREEK MUTUAL FUNDS IN THE PERIOD 1973-76: A CASE OF INTERNATIONALLY DIVERSIFIED PORTFOLIOS

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Introduction

The purpose of this paper is to report some results from the study of the performance of the Greek mutual funds, * which are internationally diversified, in the period 1973-76. Mutual funds have been the subject of study in many countries but predominately in U.S.A. ¹ The performance of mutual funds is of interest to at least two groups of people; to investors who try to maximize their return, given a risk level, and to the scholars of capital markets who are interested in the concept of market efficiency. In this paper an effort is made for both groups to be satisfied. The performance of the two mutual funds («Delos», «Hellinikon») is compared with a

* See (7)

1. See bibliography, entries, 8,11,12,20,24.

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passive naive «buy and hold» policy on individual market portfolios² to ascertain investment performance. Also, the performance of the two mutual funds is compared with a passive naive «buy and hold» policy on the market portfolio of the Athens Stock Exchange (ASE) to ascertain the efficiency of the Greek stock Market.

The results indicate that:

a) Both mutual funds had a better performance than their respective markets, to the extent that an investor would be better off investing in the two Greek mutual funds than following a naive «Buy and hold» policy on a portfolio composed of the markets in which the mutual funds invested.

b) Both mutual funds had a better performance than the market portfolio of the ASE, indicating that Greek stock market is not efficient.

c) Despite the positive effects of the international diversification which both mutual funds attempted, their performance as compared with the foreign stock markets where they invested, was inferior.

I. The Theory

The term «performance» in this study has the following two dimensions³:

a) The ability of the mutual fund manager to attain excessive returns through successful prediction of future security prices,

b) the ability of the mutual fund manager to minimize the amount of the «non-market» risk, through efficient diversification.

The Capital Asset Pricing Model (CARM), as developed by Sharpe, Lintner and Mossin⁴ and clarified by Fama and others,⁵ provides the theoretical framework for developing measures that take into account both risk and return. Jensen⁶, Treynor⁷ and Sharpe⁸ have developed such measures of performance which applied in measuring the performance of U.S. mutual funds. The same measures have been used by other scholars in the study of the performance of mutual funds in other countries (France, Spain, England)⁹.

The case of the Greek mutual funds is slightly more complicated since both mutual funds are internationally diversified, holding stocks from U.S.A., U.K., Germany,

2. As will be explained below, for the purpose of the study the market portfolio is taken to be as a weighted average of the market portfolios of the countries in which the mutual funds invested. The weights are the same with the percentages of the various foreign stocks, in the mutual fund portfolio compositions. In this way a comparison of performance can be made.

3. M. Jensen in (8), has first used the term «performance» with the above dimensions.

4. See entries 20,10,14.

5. See 5.

6. See 8.

7. See 24.

8. See 11.

9. See 13,16,4.

and Switzerland, eventhough the major holdings (around 80%) are Greek stocks. Therefore, the CARM, strictly speaking, is not applicable since a new source of risk, not covered by the CAPM, is introduced; the exchange risk caused by fluctuations in the exchange rates.

B. Solnik¹⁰, modified the CAPM in order to incorporate exchange risk. His model, called the International Asset Pricing Model, (IAPM), is very similar to CAPM, in terms of the assumptions on which it is built as well as the pricing relation it comes out with. More specifically the risk pricing relation which Solnik derives, is:

$$\bar{R}_i - R_f^\alpha = \beta_i (\bar{R}_m - R_f^m) \quad (1)$$

\bar{R}_i = expected return on security (i)

R_f^α = risk free rate in the country (α) of security (i)

\bar{R}_m = expected return on the world market portfolio (m) (where each component is expressed in its own currency).

R_f^m = the average risk free rate in the world

β_i = the international systematic risk of security (i)

With the help of a «market model» similar to that one developed by Sharpe¹¹ for CAPM, he derives the following expression in realized returns.

$$\bar{R}_i - R_f^\alpha = \beta_i (\bar{R}_m - R_f^m) + \varepsilon_i \quad (2)$$

\bar{R}_i = realized return on security (i)

\bar{R}_m = realized return on the world market portfolio (m)

For international portfolios expression (2) becomes

$$\bar{R}_p - R_f^p = \beta_p (\bar{R}_m - R_f^m) + \varepsilon_p \quad (3)$$

β_p = the international systematic risk of portfolio (p), (beta).

R_f^p = average risk free rate of countries from which the stocks of the portfolio come from.

Equation (3) indicates that, given the beta (systematic risk) of portfolio (p), its return should be R_p . Thus, any unmanaged portfolio should have a return R_p . This, however, may not hold true for managed portfolios i.e.: mutual funds, since they aim at skilled timing. If they have indeed superior performance and can earn more than the normal risk premium for their risk level, then, equation (3) should have a constant, which should be positive indicating excess return. Thus, expression (3) becomes:

10. See 22.23.

11. See 10.

$$\bar{R}_p - R_f^p = \alpha + \beta_p(\bar{R}_m - R_f^m) + U_p \quad (4)$$

U_p = new error term with $E(u_p) = 0$ and serially independent.

Expression (4) can be used to capture possible superior or inferior performance of a managed portfolio.

One of the purposes of this study is to compare the performance of the mutual funds with the performance of a passive «buy and hold» policy on the market portfolio. Here, the market portfolio is not taken as the world portfolio but instead, as an artificial basket of portfolios which corresponds to the composition of the mutual funds portfolio. This is because the Greek mutual funds are not permitted by law to diversify internationally, in an optimal way, since law defines that only 20% of their assets can be devoted to the purchase of foreign securities. Thus, we impose on the market portfolio, the same percentage composition as that of mutual funds¹². If a regression is run on expression (4), the constant (α) will indicate superior or inferior performance. This measure was first developed by Jensen using the CAPM.

Two more measures are to be used in this study which also draw from the capital theory, Sharpe's and Treynor's measures. Sharpe's measure of «reward to variability» ratio is defined as:

$$S_i = \frac{\bar{R}_i - R_f}{\sigma_i} \quad (5)$$

\bar{R}_i = realized return on security or portfolio (i)

σ_i = standard deviation of (i)

R_f = risk-free rate.

In order to be adjusted in the frame of the IAPM the only modification is that R_f is not the national rate but a weighted average risk free rate.

Treynor's measure or «reward to volatility ratio» is defined as:

$$T_i = \frac{\bar{R}_i - R_f}{\beta_i} \quad (6)$$

Again, here, β_i is the degree of comovement with the world market portfolio (as defined above). The difference between the two measures is that the second one, prices only the systematic risk while the first one prices total risk.

II. The Data

The sample consists of two mutual funds, the only two open end funds existing in the Greek stock market, namely «Delos» and «Hellinikon». The time period covers

12. See also note 2.

the years 1973 to 1976 (four years) and monthly data were used (44 observations). The monthly returns were estimated as follows:

$$R_t = \frac{P_t - P_{t-1} + D_t}{P_{t-1}}$$

P_t = mutual fund share price at period t .

D_t = dividend per share at period t .

Returns on the individual market portfolios were estimated in the same way¹³ and the world market portfolio (as defined above) was taken as a weighted average of the individual market portfolios. Thus, the return on this basket was used as a proxy of a naive «buy and hold» policy.

The discount rate was taken as an approximation of the risk free rate in Greece, Germany, and Switzerland, while the Treasury Bill rate was taken for U.S.A. and U.K. Again, the international risk free rate was taken as a weighted average of the individual rates. The weights used were the same as above.

III. The Performance of Greek Mutual Funds-Results.

1. The Entire Period 1973-76

Using all 44 observations, excess returns on the mutual funds were regressed against excess returns on the «Market».

Table 1 summarizes the major results obtained.

Table 1

	\bar{R}	σ	β	T- β	α	T- α	\bar{R}^2
Delos	.691	3.940	.735	7.880	.527	1.305	.5869
Market-D	-.214	4.139	1.0	—	0	—	—
Hellinikon	.396	2.627	.499	6.459	-.210	-.704	.4864.
Market-H	.002	3.716	1	—	0	—	—

The first observation that can be made is that both «Delos» and «Hellinikon» are ex post more efficient than their respective markets. As it can be seen from the table,

13. As a matter of fact the return on the market portfolio was estimated as follows, $R_m = \frac{P_t - P_{t-1} + D_t}{P_{t-1}}$ where P_t is the price index of the stock exchange at period t , and D_t are the dividends accrued to the companies included in the index during period t . It should also be mentioned that dividend yields are not included for the market returns of U.K., Germany, and Switzerland due to lack of data.

both mutual funds had a larger return than their respective markets and a lower risk as measured by the standard deviation as well as the betas.

Thus, immediately we can infer that both funds had a superior performance than their respective «markets» despite the fact that the constant (a) comes out, for both funds not significantly different than 0 at 5% significance level.¹⁴ This can be confirmed by the use of the other two measures, Sharpe's and Treynor's. (see table 2)

Table 2

	\bar{R}	σ	Jensen's	Treynor's	Sharpe's
Delos	.691	3,940	.527	-.6957	-.1298
Market-D	-.214	4.139	0	-1.4132	-.3414
Hellinikon	396	2.627	-210	-1,6168	-3070
Market-H	002	3.716	0	-1.1952	-3216

Again, as it can be seen from the table, the initial conclusion is further confirmed, since Sharpe's measure agrees with the initial observation. Treynor's measure gives somewhat mixed results but the following should be mentioned:

— Treynor's measure gives almost, identical results with Jensen's¹⁵.

small investor (as is the case with a mutual fund buyer) is the total risk and not the systematic risk.

— Treynor's measure gives identical results with Jensen's by construction.

Based on the above results and clarifications we can fairly conclude that both mutual funds have out performed their surrogate markets during the period under examination. This means that an investor would be better off in investing in mutual funds than in following a passive policy of investing in the market portfolio (buy and hold policy).

2. Performance in Subperiods 1973-74 and 1975-76.

Further analysis was undertaken to see whether the above stated results were consistent throughout the period. The small sample was divided into two chronological subperiods: the first covers the years 1973-74 (20 observations) while the second covers the years 1975-76 (24 observations). Tables 3 and 4 present in tabulated form the results:

14. The results are not surprising since none of those who used Jensen's measure got «significant results, except Jensen himself who got 3 «a's», significantly positive, out of 115.

15. See J. Treynor's comment in Jensen's article 8.

Table 3**1973 - 1974**

	\bar{R}	σ	β	Treynor	Sharpe	Jensen
Delos	.531	5.15	.771	-.87	-.13	1.27
Market-D	-1.132	4.90	1.00	-2.52	-.51	0
Hellinikon	-.129	2.35	.379	-3.51	-.566	-.37
Market-H	-1.325	4.41	1.00	-2.53	-.573	0

Table 4**1975-1976**

	\bar{R}	σ	β	Treynor	Sharpe	Jensen
Delos	.834	2.808	.82	-.45	-.131	-.29
Market-D	1.107	2.632	1.00	-.10	-.033	0
Hellinikon	.825	2.657	.778	-.485	-.142	.002
Market-H	.709	3.200	1.00	-.488	-.152	0

As it can be from table 3, in the first subperiod 1973-74, both mutual funds have outperformed their respective markets since they are ex post more efficient (that is, they have higher return and lower risk). This observation is confirmed by Sharpe's measure and partially by the other measures.

In the second subperiod, 1975-76, the results are mixed; while «Delos» is still ex post efficient, this does not hold for «Hellinikon». In fact, the surrogate market of «Hellinikon» is ex post more efficient than «Hellinikon» indicating that «Hellinikon» did worse than the market in the second subperiod. The measures, indeed, confirm the above observations.

Another interesting observation is what happened to the betas of the mutual funds. The tabulated results indicate that «Delos», kept its risk level, as measured by the beta in the same level, throughout the period, while «Hellinikon» made a big change in its risk taking by becoming more aggressive in the second subperiod (its beta changed from .379 to .820). This variability in beta renders the results of the regression suspicious and consequently, the results of Treynor's and Jensen's measures unreliable.

The above results indicate that while «Delos» consistently outperformed its «market» this is not true for «Hellinikon» also, which eventhough it overly outperformed the market, its performance was not consistent.

3. Comparison with the A.S.E.

As stated before, the Greek mutual funds are internationally diversified. A reasonable question that can be raised then, is at which markets did the mutual funds do better and where they did worse. Since the data did not permit to make a direct comparison of the various parts of the portfolios of the mutual funds with the respective markets, another method was used.

The performance of the mutual funds was compared with that one of the market portfolio of A.S.E. By comparing the performance of the mutual funds on one hand with the A.S.E. and on the other hand with their respective markets, we can trace the combined effect of foreign stocks on mutual fund performance, by deduction.

Furthermore by doing it is a unique opportunity to perform a market efficiency test for the Greek stock market. The test is of the strong form at least two reasons.

— Both funds are run by professional managers who are supposed to have an expertise on the subject.

— Both funds were established by banks operating in Greek capital market; therefore, it should be expected that both funds have access to current and possibly inside information about many firms listed on the A.S.E.

Table 5 presents a concurrent comparison of the mutual fund performance with that of A.S.E. and their respective markets, for the whole period 1973-76.

Table 5

	\bar{R}	σ	β	Sharpe	Treynor	Jensen
Delos	.691	3.940	.694	-.13	-.73	.563
Hellinikon	.396	2.627	.456	-.31	-1.77	-.101
A.S.E.	-.346	4.388	1.00	-.35	-1.55	0
Delos	.691	3.940	.735	-.13	-.696	.527
Market-D	-.214	4.139	1.00	-.34	-1.41	0
Hellinikon	.396	2.627	.499	-.31	-1.62	-.210
Market-H	.002	3.716	1.00	-.32	-1.195	0

Three are the major observations to the tabulated results of table 5.

(a) We note that by moving from one market portfolio (the A.S.E.) to a multi-market portfolio, a gain is obtained in terms of reduced risk. Thus, the beneficial effects of international diversification can be confirmed.

(b) Both mutual funds outperformed the A.S.E., indicating that the Greek stock market does not operate in an efficient way.

(c) While both mutual funds out perform the A.S.E., their performance falls when the comparison with their respective «markets» is done, indicating that the foreign stocks of both funds are not doing better than their markets, taken all together. For example, note what happens with the performance of «Delos» as measured by Sharpe's measure; while it compares $-.13$ to $-.35$ with A.S.E. it compares $-.13$ to $-.34$ with its respective market (we have a decrease). Also, for «Hellinikon» this comparison is as follows: from $-.31$ to $-.35$ with A.S.E., to $-.31$ to $-.32$ with its respective market (decrease).

Some more interesting observations can be made if the above comparison is done for the two subperiods 1973-74. 1975-796.

Tables 6 and 7 present the results.

Table 6

1973-1974

	R	σ	β	Sharpe	Treynor	Jensen
Delos	.531	5.15	.73	-.13	-.917	1.204
Hellinikon	-.129	2.35	.33	-.56	-3.99	-.477
A.S.E.	-.14	5.15	1.0	-.99	-2.56	0
Delos	.531	5.15	.77	-.13	-.87	1.27
Market-D	-1.132	4.90	1.0	-.51	-2.52	0
Hellinikon	-.129	2.35	.38	-.566	-3.51	-.37
Market-H	-1.32	4.41	1.0	-.573	-2.53	0

Table 7

1975-1976

	R	σ	β	Sharpe	Treynor	Jensen
Delos	.825	2.657	.695	-.142	-.543	.113
Hellinikon	.834	2.808	.661	-.131	-.558	.097
A.S.E.	.497	3.536	1.00	-.199	-.706	0
Delos	.825	2.657	.778	-.142	-.485	.002
Market-D	.709	3.200	1.00	-.152	-.488	0
Hellinikon	.834	2.808	.820	-.131	-.450	-.290
Market-H	1.107	2.632	1.00	-.033	-.100	0

(a) At first, it can be seen that both mutual funds have consistently outperformed the A.S.E. in both subperiods. Thus there are clear indications that the A.S.E. is inefficient in the strong form.

(b) The previously mentioned observation that the foreign stock holdings of both funds did not do well in comparison with their respective markets, is further confirmed and explains the poor performance of «Hellinikon» which, while it outperformed the A.S.E., it was not able to do the same with its «Market» because of poorer performance in the foreign stock exchanges.

IV. Conclusions

Two are the major conclusions of this paper. At *first* it indicates that the Greek investors holding mutual fund shares in the period 1973-76 earned a larger return than that they could do on their own, by adopting a simple buy and hold policy on the market portfolio of A.S.E. In other words, the Greek stock market is inefficient (in the strong form) and people having access to information, not available to others, are able to realize above normal returns.

Secondly, it indicates that the Greek mutual funds managers did not perform as well in the foreign stocks part of their portfolios. As a result, part of the above normal returns were lost by investing abroad. Despite this observation, international diversification does pay (since individual stock markets are not perfectly correlated) and it should take place efficiently both in terms of diversification among stocks as well as among stock exchanges. Diversification among stock exchanges lowers the total systematic risk, while efficient diversification among stocks helps to obtain performance close to the market.

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