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PREDICTING MUTUAL FUND PERFORMANCE: AN APPLICATION OF MODERN PORTFOLIO THEORY

by

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ABSTRACT

This paper discusses the identification and selection of high performance mutual funds for the year 1992 by using elements of the modern portfolio theory. The paper proposes that it is possible to select mutual funds which are likely to outperform the market and many other funds by using certain historical data. Data was collected for the three prior years 1989, 1990, and 1991. Specifically, the identification process is based on the three well-known performance evaluation techniques: Sharpe, Jensen, and Treynor methods. The study finds that it is possible to classify funds into two opposite categories: high performance funds and low performance funds. This classification is based on the Jensen alpha. The two other methods are used to confirm the classification and all the results from the three methods are then compared. The findings are that the average high performance fund had a rate of return equal to 17.10 percent, the average low performance fund had a rate of return equal to -6.57 percent. The SP 500 return was 7.61 percent. It was determined that all three methods produced similar, but not identical results.

INTRODUCTION

Mutual funds have gained enormous popularity over the years. Raging bull markets bring in individual investors in record numbers. Mutual funds are bought for different reasons. Some families acquire them to educate their children, others to build a retirement fund. These are long-term goals and most investors follow a "buy and hold" policy. On the other hand, there are some who make an attempt to "time the market." These investors move between different mutual funds in the hope of improving return on their investment. Such exchanges can be accomplished by selecting investments within a group of funds. In these situations, transaction costs are usually minimal.

The important question is how to select funds which are likely to perform well, and how to select funds which should be avoided. There are many mutual fund advisory services which provide guidance in this matter. Interestingly, their recommendations are often contradictory. Most mutual funds are closely correlated with the movements of the general market. Year-to-year movements of individual mutual funds tend be somewhat erratic. Nevertheless, some basic underlying trends seem to persist over several years. Market technicians often use "trend following" technical indicators to identify such underlying patterns.

In this study we apply concepts from modern portfolio theory to identify mutual funds which may show superior performance. We use several risk-adjusted methods to identify such funds. We also compare the results produced by these techniques from a theoretical and empirical point of view. Most of the data used in this study was obtained from Alexander Steele's Mutual Fund Expert Data Base. This database contains performance information on over 1100 equity type mutual funds and is known for its accuracy.

RESEARCH METHODOLOGY

Definition of the Problem

The basic problem facing mutual fund investors is the selection of those funds which may have a potential of relatively good performance in the near future. Since there are so many different funds from which to select from this is not an easy task. In this study we will concentrate only on equity type funds.

Assuming that there is a suitable database which contains all the relevant information, then an effective screening procedure must be designed to select candidates for investment and divestment. Fortunately, modern portfolio theory provides us with such a mechanism.

Investment performance measurements must be done on a risk-adjusted basis. It is not sufficient to use return measures alone. This perceptive conclusion was reached formally by the Bank Administrative Institute in their 1968 study on investment performance measurement. Prior to this study a more informal approach to risk measurement involved grouping of funds into different categories such as "growth funds," "income funds," "bond funds," etc. This process is still utilized today as a risk classification system.

Modern portfolio theory allows us to develop performance measures more precisely and on a risk adjusted basis. There are three performance measurement techniques, namely, Jensen, Treynor, and Sharpe, which are widely used by investment professionals. We use each measure to select funds which may have the potential to perform well. We also compare the empirical results obtained from all three approaches.

Hypothesis

The main hypothesis of this study states that well-performing mutual funds can be identified and that those funds tend to produce superior results. The secondary hypothesis states that all three measures of performance will produce similar but not identical results.

Assumptions

We assume that mutual fund parameters such as alphas and betas remain reasonably stable over time. We further assume that trends in mutual fund price movements can be identified and they remain intact for several years.

Data and Information Requirements

In order to make this study possible, we needed a rather large mutual fund database. The Mutual Fund Expert Data Base provided information on over 1100 equity type mutual funds, with about 70 different data items on every fund.

Specifically, the following data were needed:

l) Treynor Measure
2) Sharpe Measure
3) Jensen Measure
4) Yearly Returns and Standard Deviations
5) Three-Year Annualized Returns
6) Three-Year Annualized Betas
7) Three-Year Annualized Alphas
8) Market Return

9) Market Variance
10) Risk-Free Rate

Sources of Data and Information

Aside from the main data source, Alexander Steele's Mutual Fund Expert Data Base, data on different market indexes are also included. The data contained in the program are compiled by the Investment Company Data, Inc. which is one of the most reliable sources of mutual fund information in the industry.

Scope of the Study

This study was limited to equity type mutual funds. Basic data were noted for three consecutive years: 1989, 1990, and 1991, and various parameters were averaged over these three years. The effectiveness of the models was tested with actual performance data for the immediately following year, 1992.

Expected Results

It is expected that the three performance measures -- Treynor, Sharpe, and Jensen -- are able to identify funds which are likely to perform well and funds which are likely to perform poorly. We also expect that all three measures of performance will produce similar but not identical results.

PORTFOLIO PERFORMANCE MEASURES

The CAPM gives a reasonable explanation of asset prices using expected return and risk measures. It represents an *ex ante* world. If the past and future returns are reasonably consistent, we should be able to use *ex post* data and draw modest conclusions about expected returns. In that case the past is a realistic representation of the future.

It has been observed that trends can persist. For example, a bull market normally lasts for several years. Similarly, bear markets can last for some time. Market technicians have observed that long-term trend lines remain intact over a considerable length of time. Our preliminary studies in this area indicated that data collected only over a one year period did not produce satisfactory results as far as predicting future performance was concerned. The price behavior was too erratic and the fund parameters were unstable. However, when data were averaged over a three year period, then funds behaved in a much more predictable manner.

Next, we will discuss several measures of performance evaluation. These measures have found wide acceptance in industry and are being used to evaluate the performance of money managers.

Treynor Measure: Reward to Volatility Ratio

Treynor was possibly the first researcher who came up with a well formulated risk-adjusted performance measure. He presented his approach in the *Harvard Business Review* in 1965. He proposed that the systematic risk should be used as a measure for investment risk.

Treynor divided the risk premium by the systematic risk or the beta coefficient. Mathematically, this may be expressed as follows:

$$T_P = \frac{R_P - R_F}{\beta_P}$$

where,

T_P = Treynor performance measure
R_P = Average portfolio return over the evaluation period
R_F = Average risk-free rate over the evaluation period

β_P = Beta coefficient

Larger values of the Treynor measure indicate superior performance. The measure is simply the excess return per unit of systematic risk. It can also be computed for the market index. Since by definition the market beta is one, the measure simplifies to:

$$T_M = R_M - R_F$$

The Treynor measure utilizes the security market line (SML) which is obtained by plotting the returns in the beta/return space. The Treynor measure is simply the slope of the risk-return line drawn from the risk-free rate through the average return of the portfolio over the measurement period. This graph enables us to compare the performance of different portfolios and compare portfolio returns with the market portfolio return.

Sharpe Measure: Reward to Variability

William F. Sharpe introduced his version of the performance measure in 1966. He measured performance by calculating the excess average return per unit of total risk. Total risk

is defined as the standard deviation of the holding period returns over the evaluation period. Sharpe uses the *ex ante* capital market line. *Ex ante* capital market line represents efficient portfolios and these must fall exactly on the line. *Ex post* data points do not fall on the market line but are distributed around the line. The *ex post* capital market line is drawn from the risk-free rate to the average return of the portfolio. The slope of the line is the Sharpe measure. The higher the slope, the better is the portfolio performance. An investor will reach a higher level indifference curve by selecting a fund with the highest Sharpe index.

The Sharpe measure can be expressed by the following equation:

$$S_P = \frac{R_P - R_F}{\sigma_P}$$

where,

R_p = Average portfolio return over the evaluation period
R_F = Average risk-free rate over the evaluation period

σ_P = Standard deviation of portfolio returns

The Sharpe measure can also be computed for the market portfolio. The equation for the Sharpe measure for the market is given below:

$$S_M = \frac{R_M - R_F}{\sigma_M}$$

where the standard deviation represents the market variability over the evaluation period.

We note that the Sharpe measure is obtained by dividing a percentage return by the standard deviation which is also a percentage return. The result is simply an index number.

Jensen Measure: Average Excess Return

Michael C. Jensen introduced his performance measure in 1968. His measure is the only one of the three measures which can be estimated by simple linear regression. Jensen based his measure on the characteristic line. However, it can also be expressed in terms of the Security Market Line (SML).

The Jensen measure is obtained from the following equation:

$$R_P = R_F - \beta_P \times [R_M - R_F]$$

R_P= Expected return on the portfolio
R_F= Expected return risk-free rate
R_M= Expected return on the market portfolio

βP = Systematic risk of the portfolio

Ex post data are used to calculate the Jensen measure by using:

$$R_{Pt} - R_{Ft} = \alpha_P + \beta_P \times (R_{Mt} - R_{Ft}) + e_{Pt}$$

The dependent variable is the risk premium for the portfolio. The independent variable is the risk premium for the market. Often treasury bills can be used for the risk-free rate. In this model the risk-free rate can vary from period to period. The Y axis intercept represents the "alpha" for the portfolio. The slope of the regression line is the beta coefficient for the portfolio. The e_t represents portfolio return deviations from the regression line.

The "alpha" is the risk adjusted excess return after adjusting for the systematic risk. Normally, the following equation is solved for alpha:

$$\alpha_P = ARP_P - \beta_P \times ARP_M$$

The ARP_p represents the average risk premium for the portfolio, and the ARP_m represents the average risk premium for the market. The Jensen alpha is also the vertical distance between the SML and the average portfolio return for the evaluation period.

Theoretical Relationships Between Performance Measures

There are some important differences and similarities between the three measures of performance. First, we will look at the differences.

One difference is the selection of the risk measure. Jensen and Treynor use beta or the systematic risk. However, these two betas could be different due the behavior of the risk-free rate. Jensen allows the risk-free rate to vary from period to period. On the other hand, Treynor uses a constant risk-free rate.

The Sharpe measure can produce different rankings from the Jensen and Treynor measures when the portfolios have high diversifiable risk. When the portfolios have only a small

amount of diversifiable risk then all three measures will produce similar results. Because Jensen and Treynor use systematic risk, which is the only type of risk awarded by the market, they can be used to evaluate both single securities or completely diversified portfolios.

Next, we will show the relationships between the three measures. First, we will show that the Jensen and the Treynor measures produce identical rankings if the risk-free rate is assumed to be constant.

For the Jensen measure we have the following expressions:

$$R_P - R_F = \alpha_P + \beta_P \times (R_M - R_F)$$

$$\alpha_P = (R_P - R_F) - \beta_P \times (R_M - R_F)$$

Dividing both sides by beta we get:

$$\frac{\alpha_p}{\beta_p} = \frac{R_P - R_F}{\beta_P} - (R_M - R_F)$$

We note that the first term on the right side of the equation is the Treynor measure. The last term on the right side is a constant. Consequently, the Jensen measure is a linear transformation of the Treynor measure.

Next, we will show that the Treynor and Sharpe measures are also linear transformations. The Treynor measure is given by:

$$T_P = \frac{R_P - R_F}{\beta_P}$$

$$\beta_P = \frac{COV(R_P, R_M)}{\sigma_P^2} = \frac{\rho_{PM}\sigma_P\sigma_M}{\sigma_M^2}$$

A perfectly diversified portfolio has a correlation coefficient equal to one. Therefore, we can write the Treynor measure as:

$$T_P = \frac{R_P - R_F}{\frac{\sigma_P}{\sigma_M}}$$

The Sharpe measure is given by:

$$S_P = \frac{R_P - R_F}{\sigma_P}$$

Therefore, we note that the two measures are linearly related as indicated by the equation shown below:

$$S_P = \frac{T_P}{\sigma_M}$$

We can conclude that for perfectly diversified portfolios the Treynor measure and the Sharpe measure are closely related. The Sharpe measure is useful when both the systematic and unsystematic risks need to be considered.

IDENTIFICATION OF WELL PERFORMING FUNDS

Fund Selection by Using the Jensen Measure

We feel that a good portfolio performance measure is the Jensen alpha. We used the Jensen alpha to select a set of equity funds from the Mutual Fund Expert Data Base for analysis. This set of mutual funds was then evaluated by all three performance evaluation measures.

After some experimentation, it became clear that the best way to select candidates for high performance was to use relatively high alphas. Similarly, to select candidates for low performance we used relatively large negative alphas. Somewhat arbitrarily, it was decided to include in the study funds which had a three-year average alpha larger than 0.65 and smaller than -0.65. The exact cutoff point did not appear to be particularly important. Alpha values between 0.65 and -0.65 seemed to have less significance.

Using this approach, 62 expected high performance funds and 81 expected low performance funds were selected (See Appendix). The selected funds are plotted in **Figure 1**. We can observe that the two groups of funds -- expected high performers and expected low performers -- form two distinctive groups. The average return on the high performance funds was 17.10 percent. The average return on the low performance funds was -6.57 percent. These averages are significantly different. The market proxy -- S&P 500 -- had a ROR of 7.61 percent in 1992. This means that the Jensen alpha can indeed separate high performance funds from low

performance funds. Thus, it seems that the Jensen alpha is a reasonably good predictor of future results.

Statistical results of the regression analysis are shown in **Figure 2.** The correlation coefficient was found to be 0.747. The slope of the regression line was found to be statistically very significant.

In **Figure 3** we have plotted the average high return and average low return funds in relation to the Security Market Line. Again, there is a clear difference between the two groups.

Fund Selection by the Sharpe Method

The Sharpe measure was obtained by dividing the risk premium of the portfolio by the standard deviation of the portfolio. The higher the Sharp index, the better should be the expected performance.

The regression line is shown in **Figure 4** and the statistics are shown in **Figure 5.** The correlation coefficient was found to be 0.72. The slope of the regression equation was found to be very significant. Apparently, the Sharp measure can also distinguish between the two groups and could be used as a measure for selecting funds which should show superior performance. Again, we can observe from the regression analysis that two distinctive groups of funds exist. Apparently, the groupings selected by the Jensen alpha remain intact when using the Sharpe measure. The Sharpe index seems to have a wider dispersion than the Jensen measure.

The Sharpe measure is based on the capital market line (CML). The *ex post* Sharpe index is shown in **Figure 6.** We have illustrated the average high expected performance group and the average low expected performance group in relation to the Capital Market Line. The high performance funds outperformed the market, and the low performance funds underperformed the market.

Fund Selection by the Treynor Method

The Treynor performance measure is obtained by dividing the risk premium of the portfolio by the beta coefficient of the portfolio. The regression equation is shown in **Figure 7** and the statistics are shown in **Figure 8.** In this case the correlation coefficient was found to be 0.63. The slope was statistically very significant. The Treynor measure clearly distinguishes between the high expected performance group and the low expected performance group.

The Treynor measure is expressed in terms of the Security Market Line. The *ex post* Treynor index and the SML are shown in **Figure 9.** We have shown the average expected high performance fund and the average low expected performance fund in relation to the Security

Market Line. Again, the well performing funds outperformed the market, and the low performance funds underperformed the market.

STATISTICAL RELATIONSHIPS BETWEEN MEASURES

Earlier we showed some mathematical relationships between the three measures of performance. Next, we will look at some empirical relationships as developed in this study. We would like to see how closely the three measures are related statistically.

Comparison of Jensen and Treynor Measures

The Jensen and Treynor measures will produce similar results as far as portfolio performance relative to the market proxy is concerned. Portfolios with a positive Jensen measure will also have Treynor measures which are greater than the Treynor measure for the market.

However, the Jensen and Treynor measures may give different rankings for a set of portfolios because they account differently for risk. When there is great volatility in the risk-free rate over the evaluation period then these measures may produce different rankings. We also observed that the Jensen measure should be used when portfolios have the same systematic risk.

Simple linear regression was used to show the relationship between the Jensen and Treynor measures. The regression line is shown in **Figure 10**, and the corresponding statistics are shown in **Figure 11**. The correlation coefficient was found to be 0.82. The slope was very significant. Clearly, high alphas correspond to high Treynor measures.

Comparison of Treynor and Sharpe Measures

From our previous discussion we see that these two measures are related linearly. This, however, is true only when portfolios are perfectly diversified. When the unsystematic risk is not important we prefer the Treynor measure. Otherwise it is better to use the Sharpe measure.

The regression line between the Treynor and Sharpe measures is shown in **Figure 12**, and the corresponding statistics are shown in **Figure 13**. The correlation coefficient was found to be 0.85, and the slope was very significant. These results seem to suggest that the mutual fund portfolios are quite well diversified.

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

The main conclusion from this study is that all three measures of performance can select mutual funds which are likely to perform well within the next year. It may be difficult to select some specific fund and predict its performance. However, one could form a portfolio of desirable funds and have a reasonably high likelihood that this portfolio would perform rather well.

The second conclusion is that all three measures were statistically correlated. This means that any one of the three measures could produce satisfactory results.

Recommendations

This study concentrates on average results. A future study should try to determine how the three methods would rank individual funds and look more closely at each fund so that differences in rank order could be explained.

Also, a future study could make use of techniques such as cluster analysis in order to classify more formally expected high and low performers.

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APPENDIX

* Figures 1-13

* List of High Performance Funds Used
* List of Low Performance Funds Used

FIGURE 1

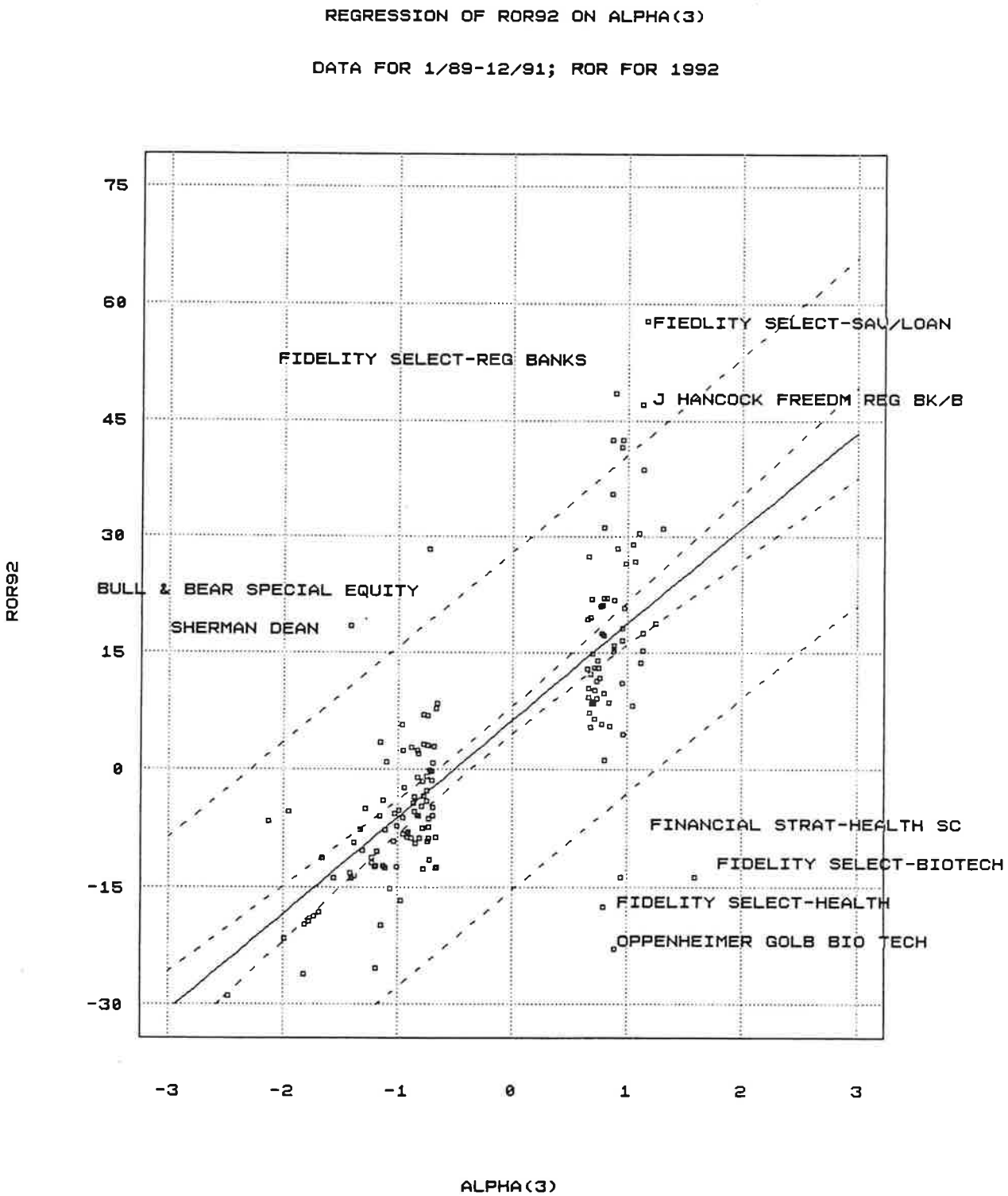

REGRESSION OF ROR92 ON ALPHA(3)
DATA FOR 1/89-12/91; ROR FOR 1992
ROR92
75
60
45
30
15
0
-15
-30
-3
-2
-1
0
1
2
3
ALPHA(3)
FIEDLITY SELECT-SAV/LOAN
FIDELITY SELECT-REG BANKS
J HANCOCK FREEDM REG BK/B
BULL & BEAR SPECIAL EQUITY
SHERMAN DEAN
FINANCIAL STRAT-HEALTH SC
FIDELITY SELECT-BIOTECH
FIDELITY SELECT-HEALTH
OPPENHEIMER GOLB BIO TECH

FIGURE 2

REGRESSION OF ROR92 ON ALPHA(3)
DATA FOR 1/89-12/91; ROR FOR 1992

Dependent variable: DATA1.ROR12 Independent variable: DATA1.ALPHA3

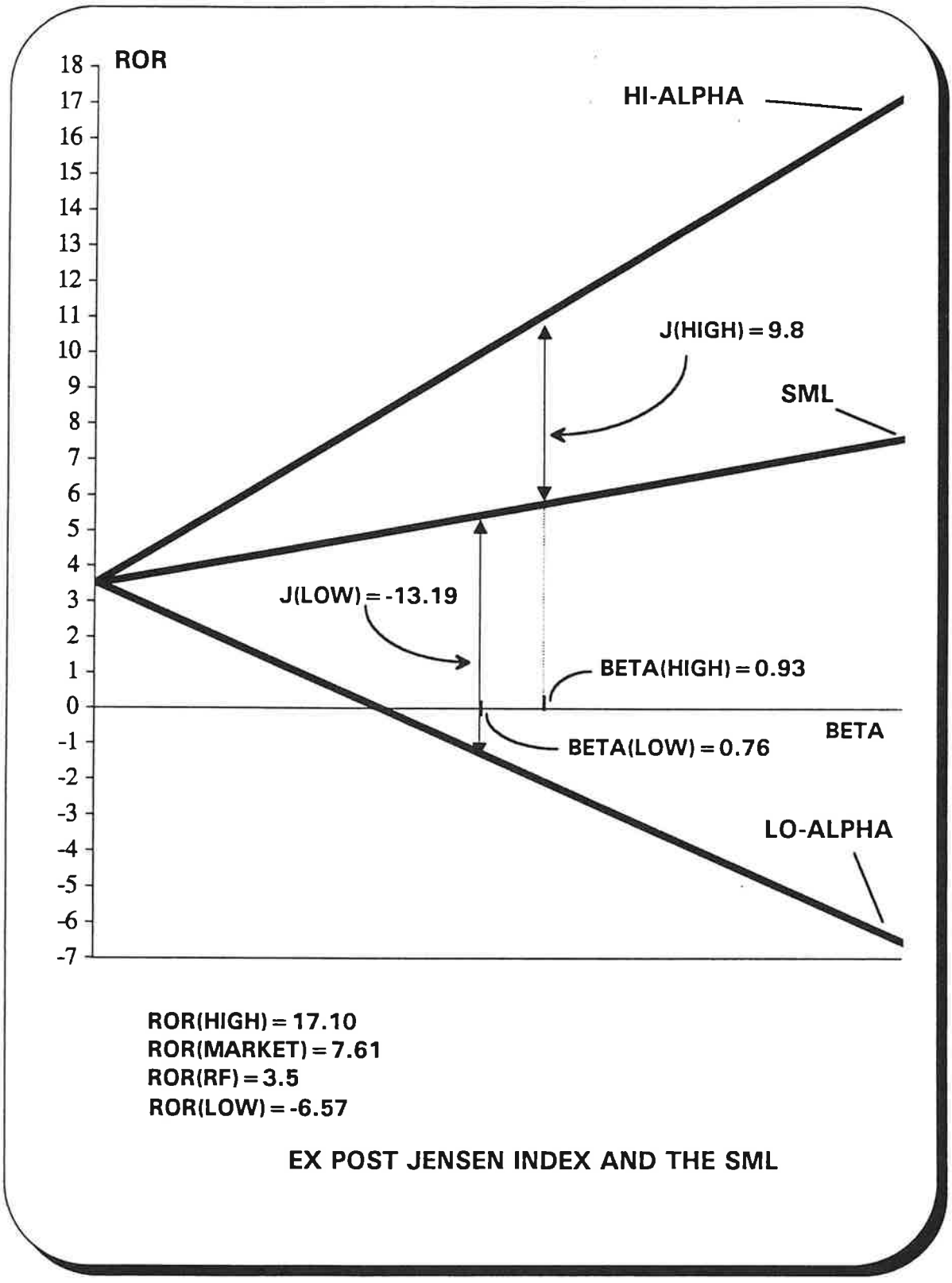
Parameter	Estimate	Standard Error	T Value	Prob. Level
Intercept	6.21385	0.896562	6.93075	.00000
Slope	12.2724	0.874329	14.0364	.00000

Analysis of Variance

Source	Sum of Squares	Df	Mean Square	F-Ratio	Prob. Level
Model	23725.912	1	23725.912	197.02	.00000
Residual	18786.024	156	120.423		
Total (Corr.)	42511.936	157			

Correlation Coefficient = 0.747061 R-squared = 55.81 percent
Stnd. Error of Est. = 10.9738

FIGURE 3



EX POST JENSEN INDEX AND THE SML

FIGURE 4

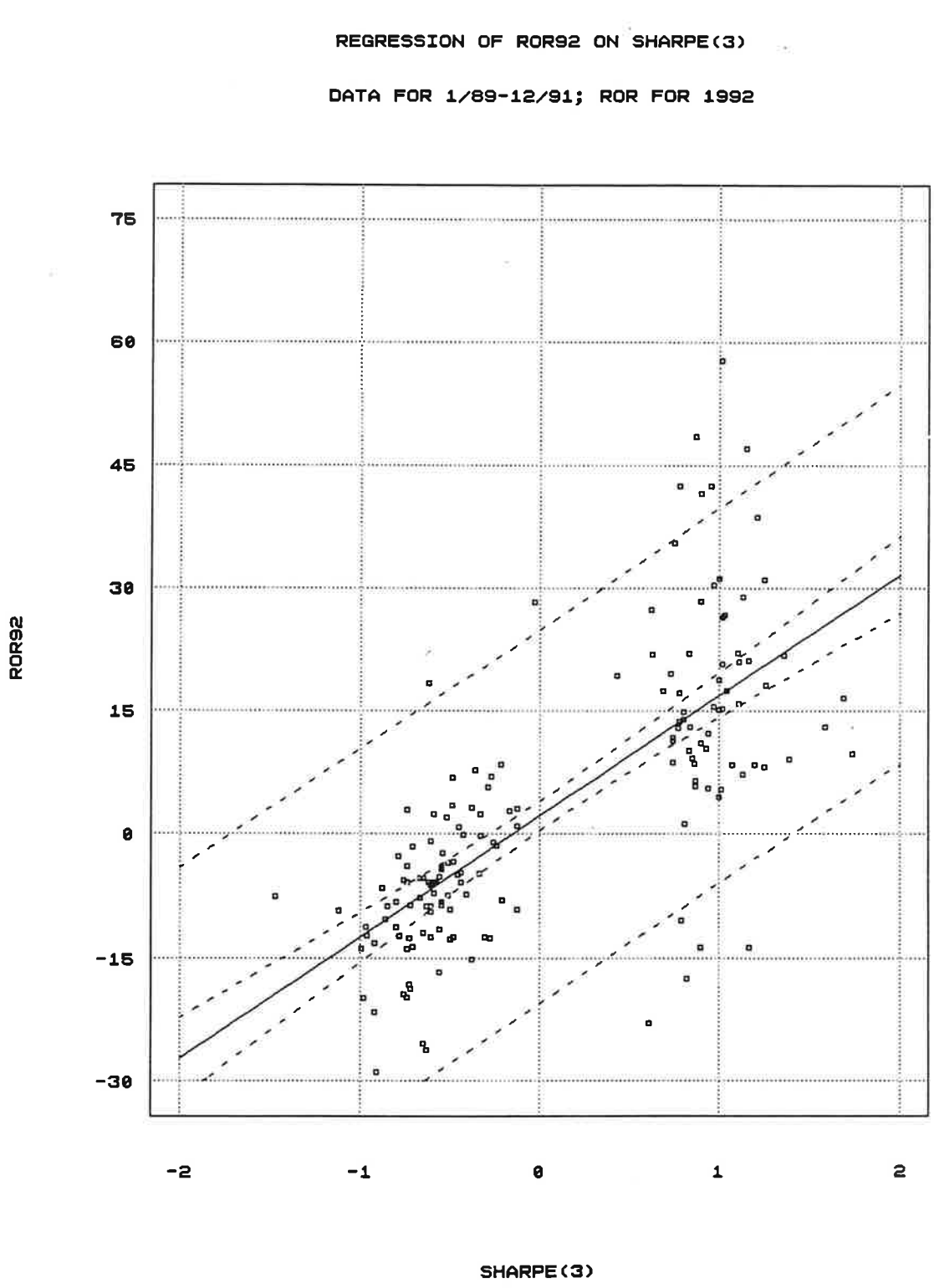

REGRESSION OF ROR92 ON SHARPE(3)
DATA FOR 1/89-12/91; ROR FOR 1992
75
60
45
30
15
0
-15
-30
ROR92
-2
-1
0
1
2
SHARPE(3)

FIGURE 5

REGRESSION OF ROR92 ON SHARPE(3)
DATA FOR 1/89-12/91; ROR FOR 1992

Dependent variable: DATA1.ROR12 Independent variable: DATA1.SHARPE3

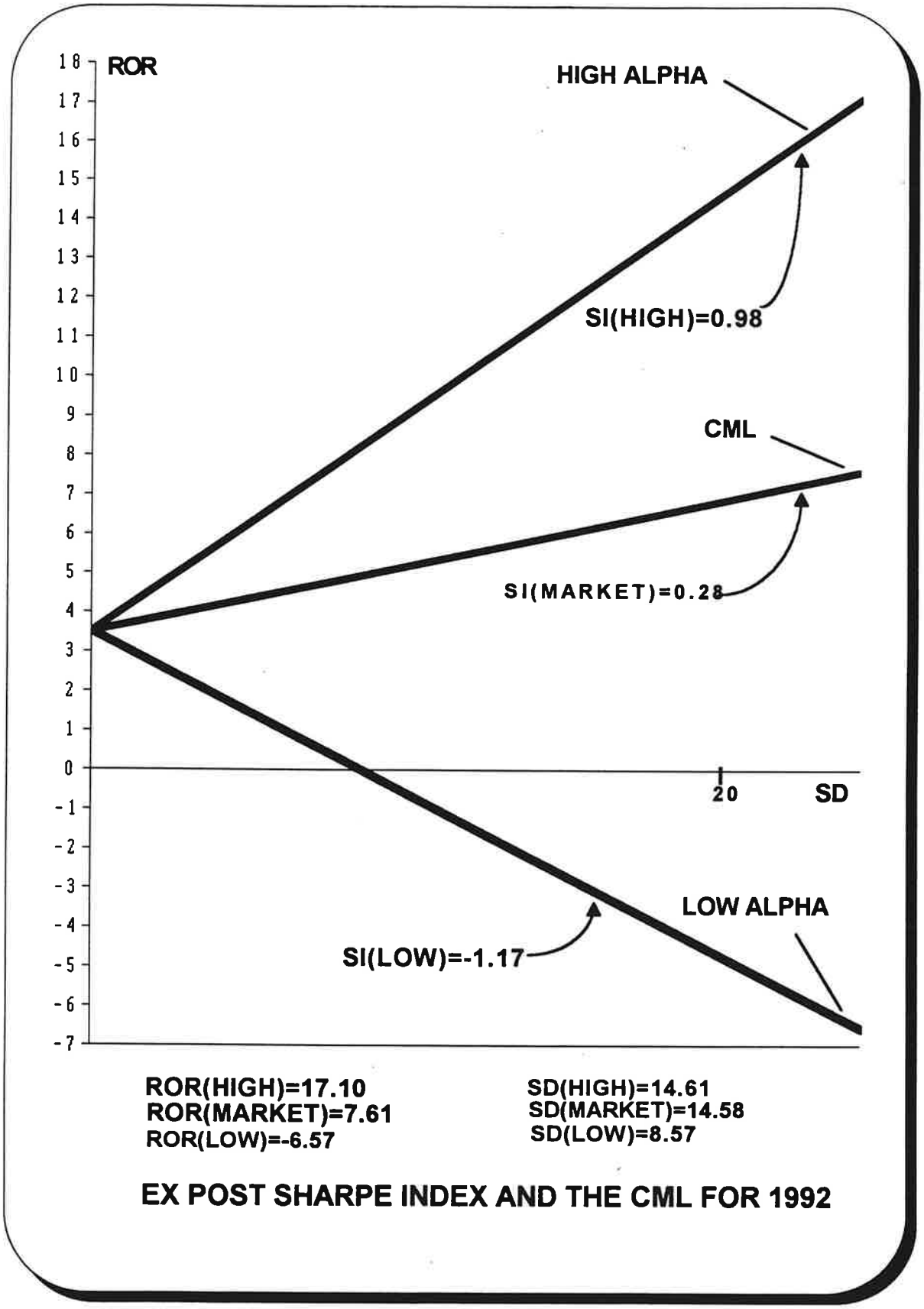
Parameter	Estimate	Standard Error	T Value	Prob. Level
Intercept	2.15631	0.915793	2.35458	.01979
Slope	14.6794	1.13224	12.9649	.00000

Analysis of Variance

Source	Sum of Squares	Df	Mean Square	F-Ratio	Prob. Level
Model	22048.899	1	22048.899	168.09	.00000
Residual	20463.037	156	131.173		
Total (Corr.)	42511.936	157			

Correlation Coefficient = 0.720175 R-squared = 51.87 percent
Stnd. Error of Est. = 11.4531

FIGURE 6



EX POST SHARPE INDEX AND THE CML FOR 1992

FIGURE 7

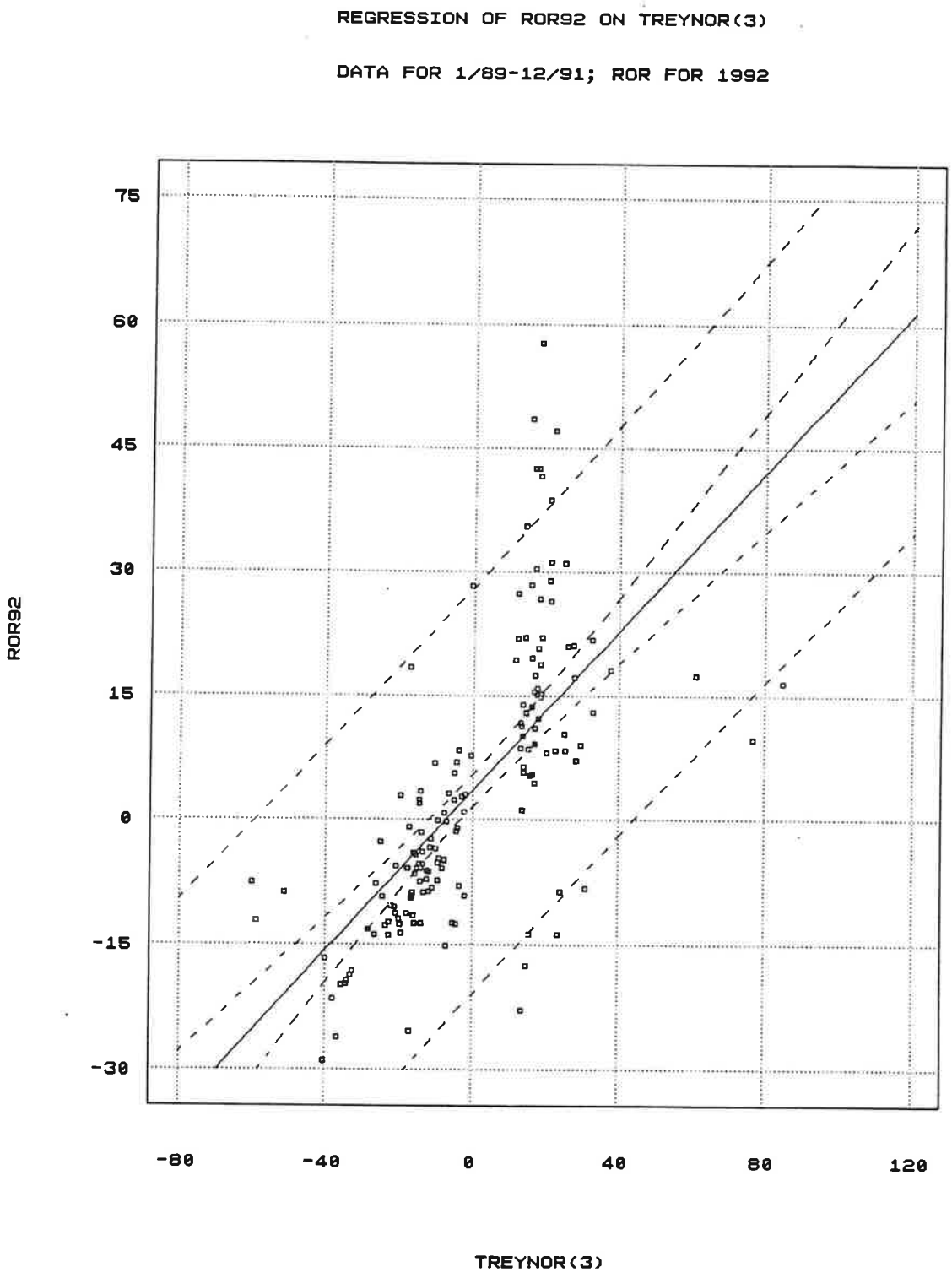

REGRESSION OF ROR92 ON TREYNOR(3)
DATA FOR 1/89-12/91; ROR FOR 1992
75
60
45
30
15
0
-15
-30
ROR92
-80
-40
0
40
80
120
TREYNOR(3)

FIGURE 8

REGRESSION OF ROR92 ON TREYNOR(3)
DATA FOR 1/89-12/91; ROR FOR 1992

Dependent variable: DATA1.ROR12 Independent variable: DATA1.TREYNOR3

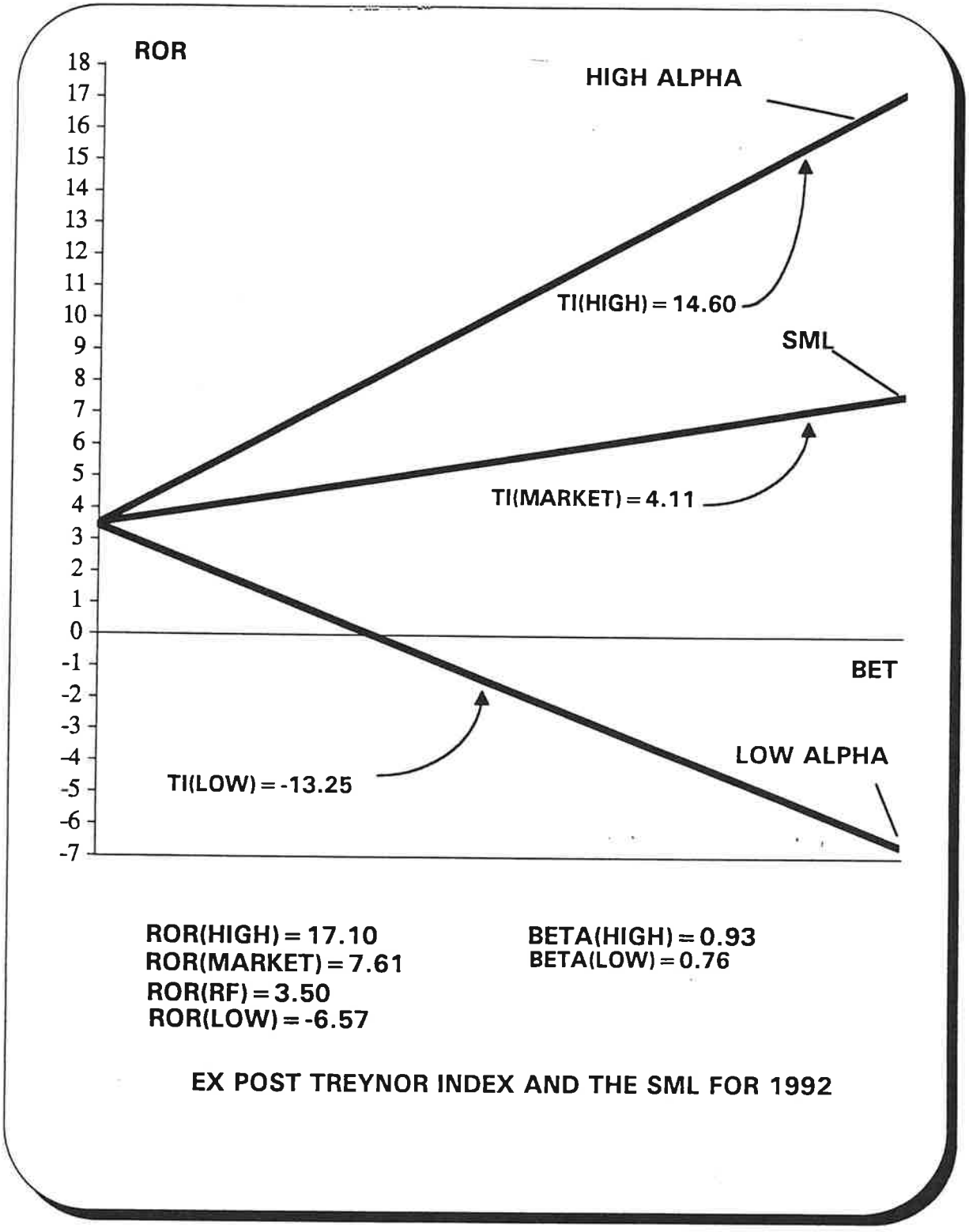
Parameter	Estimate	Standard Error	T Value	Prob. Level
Intercept	3.29232	1.01684	3.2378	.00147
Slope	0.4419	0.0432834	10.2095	.00000

Analysis of Variance

Source	Sum of Squares	Df	Mean Square	F-Ratio	Prob. Level
Model	17027.628	1	17027.628	104.23	.00000
Residual	25484.308	156	163.361		
Total (Corr.)	42511.936	157			

Correlation Coefficient = 0.63288 R-squared = 40.05 percent
Stnd. Error of Est. = 12.7813

FIGURE 9



EX POST TREYNOR INDEX AND THE SML FOR 1992

FIGURE 10

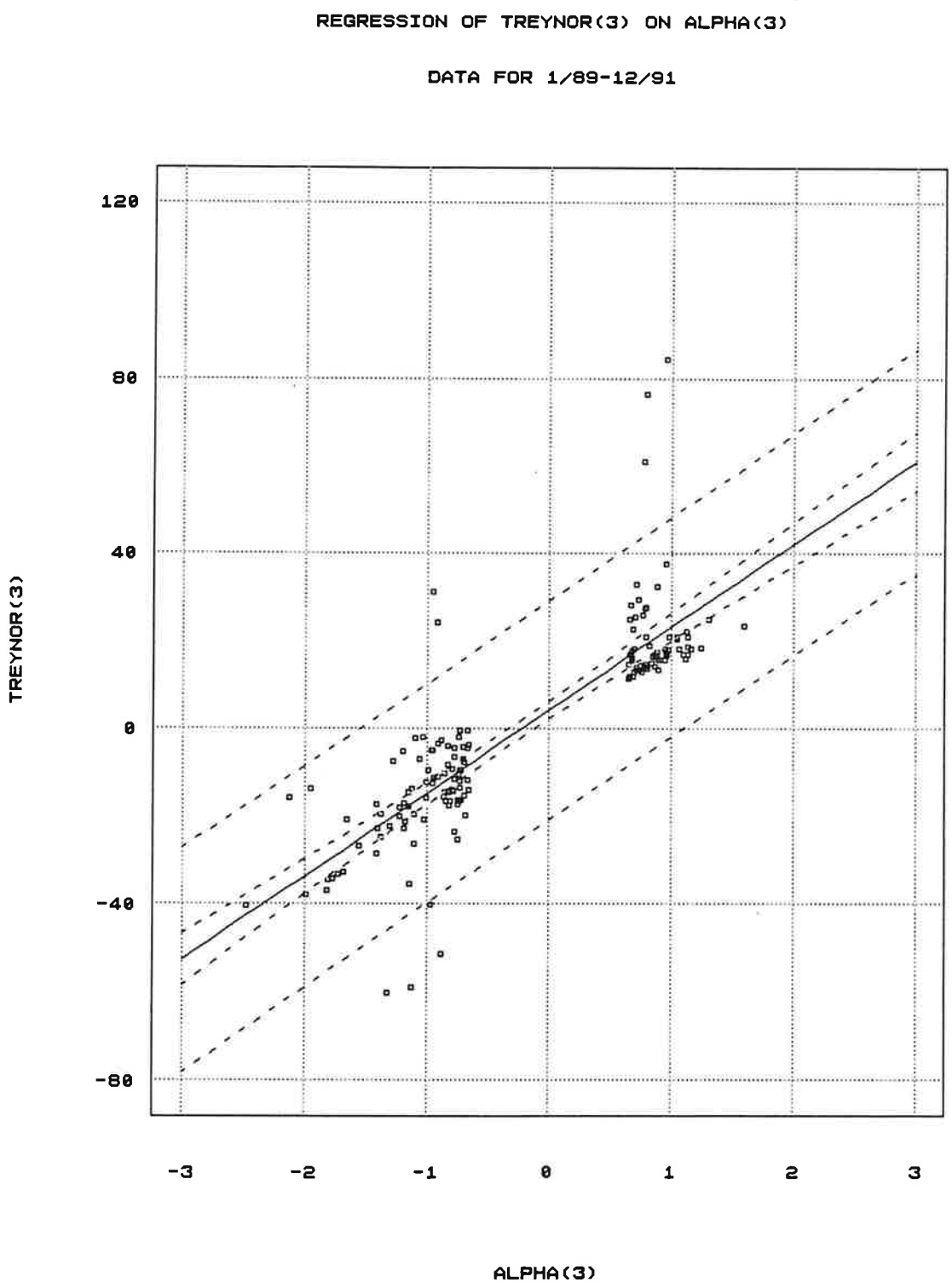

REGRESSION OF TREYNOR(3) ON ALPHA(3)
DATA FOR 1/89-12/91
120
80
40
0
-40
-80
TREYNOR(3)
-3
-2
-1
0
1
2
3
ALPHA(3)

FIGURE 11

REGRESSION OF TREYNOR(3) ON ALPHA(3)
DATA FOR 1/89-12/91

Dependent variable: DATA1.TREYNOR3 Independent variable: DATA1.ALPHA3

Parameter	Estimate	Standard Error	T Value	Prob. Level
Intercept	4.63498	1.10406	4.19812	.00005
Slope	19.3052	1.07668	17.9303	.00000

Analysis of Variance

Source	Sum of Squares	Df	Mean Square	F-Ratio	Prob. Level
Model	58709.860	1	58709.860	321.50	.00000
Residual	28487.954	156	182.615		
Total (Corr.)	87197.814	157			

Correlation Coefficient = 0.820546 R-squared = 67.33 percent
Stnd. Error of Est. = 13.5135

FIGURE 12

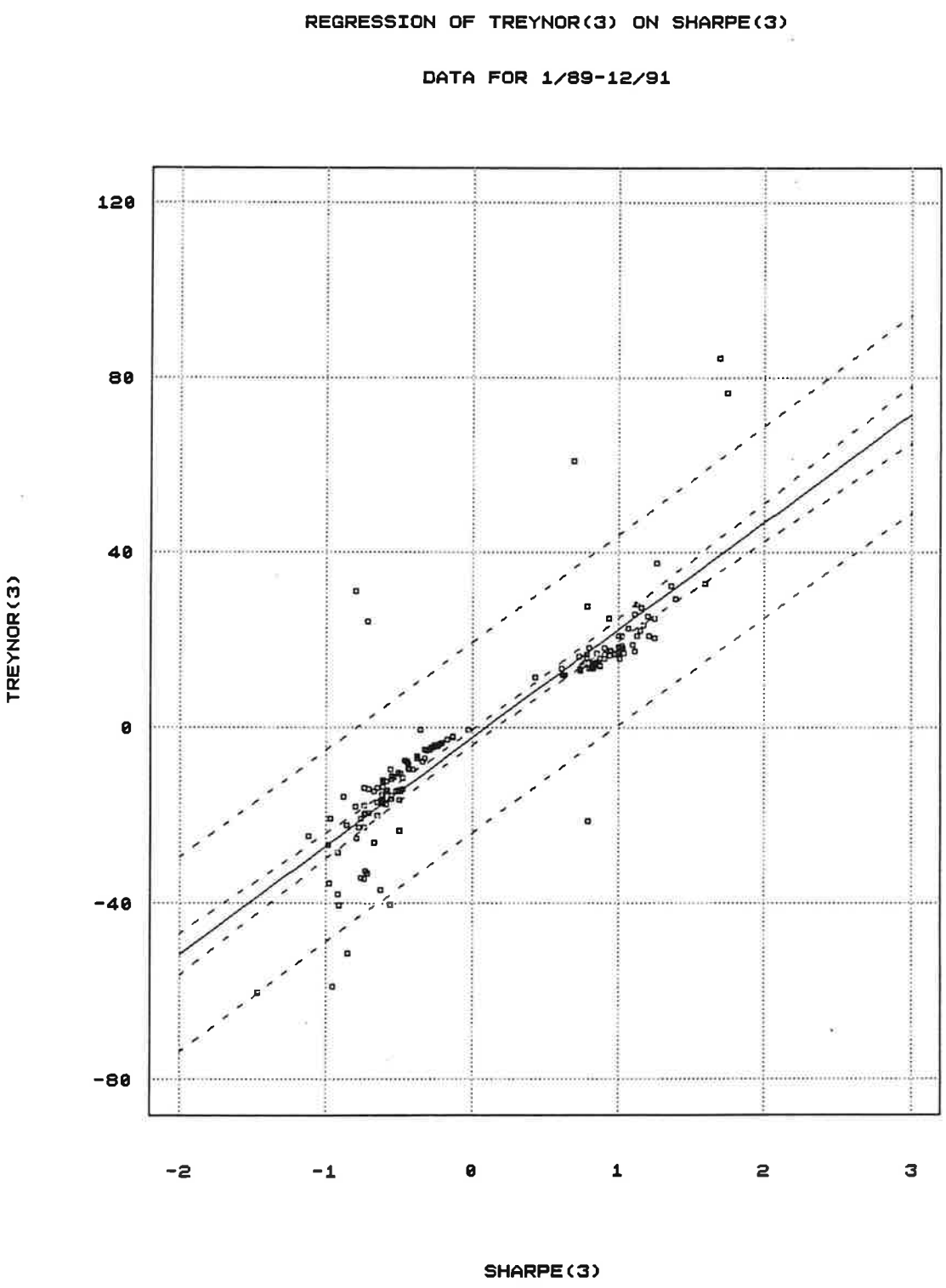

REGRESSION OF TREYNOR(3) ON SHARPE(3)
DATA FOR 1/89-12/91
120
80
40
0
-40
-80
TREYNOR(3)
-2
-1
0
1
2
3
SHARPE(3)

FIGURE 13

REGRESSION OF TREYNOR(3) ON SHARPE(3)
DATA FOR 1/89-12/91

Dependent variable: DATA1.TREYNOR3 Independent variable: DATA1.SHARPE3

Parameter	Estimate	Standard Error	T Value	Prob. Level
Intercept	-1.88976	0.993185	-1.90273	.05892
Slope	24.8389	1.22792	20.2284	.00000

Analysis of Variance

Source	Sum of Squares	Df	Mean Square	F-Ratio	Prob. Level
Model	63130.039	1	63130.039	409.19	.00000
Residual	24067.775	156	154.281		
Total (Corr.)	87197.814	157			

Correlation Coefficient = 0.850874 R-squared = 72.40 percent
Stnd. Error of Est. = 12.421

LIST OF HIGH ALPHA(ALPHA(3) > 0.65) MUTUAL FUNDS FOR '89,'90 AND '91

NAME	OBJECTIVE	ROR92
ABT.EMERGING GROWTH	AG	13.9
AMERICAN HERITAGE FUND	AG	19.23
BERGER ONE HUNDRED FUND	LG	8.53
BERWYN INCOME FUND	TR	21.71
CGM CAPITAL DEVELOPMENT	LG	17.48
COLONIAL UTILITIES FUND/A	UT	21.01
FAM VALUE FUND	GI	26.55
FIDELITY ADV EQ-GR/INSTL	LG	10.14
FIDELITY CONTRAFUND	LG	15.89
FIDELITY CONVERTIBLE SEC	TR	22.02
FIDELITY LOW PRICED STOCK	AG	28.95
FIDELITY REAL ESTATE INV	SF	19.51
FIDELITY SELECT-AUTOMOTV	SF	41.57
FIDELITY SELECT-BIOTECH	SF	-13.71
FIDELITY SELECT-COMPUTERS	SF	21.96
FIDELITY SELECT-ELECTRON	SF	27.44
FIDELITY SELECT-HEALTH	SF	-17.46
FIDELITY SLECT-REG BANKS	SF	48.53
FIEDLITY SELECT-RETAILING	SF	22.07
FIEDLITY SELECT-SAV/LOAN	SF	57.83
FIEDLITY SELECT-SOFTWARE	SF	35.54
FIEDLITY SELECT-TECH	SF	8.72
FINANCIAL STRA-TECHNOLOGY	SF	18.81
FINANCIAL STRAT-FINAL SER	SF	26.78
FINANCIAL STRAT-HEALTH SC	SF	-13.74
FOUNDERS DISCOVERY FUND	AG	15.17
FRANKLIN INCOME	TR	14.84
FRANKLIN MGT-CORP QUAL DV	TR	16.57
GABELLI CONVERTIBLE SEC	TR	12.98
HEARTLAND VALUE FUND	AG	42.47
INSTL INVESTORS TAX ADV	TR	9.76
J HANCOCK FREEDM REG BK/B	SF	47.01
J HANCOCK SPL EQUITIES	AG	30.41
KAUFMANN FUND	AG	11.32
LEXINGTON CONVERTIBLE SEC	TR	12.82
LINDNER DIVIDEND FUND	IN	21.1
MAIN STR INCOME & GROWTH	GI	31.11
MAINSTAY CAPITAL APPREC	AG	11
MERIDIAN FUND	LG	15.51
MERRILL LYNCH GLOB ALL-A	GE	12.19
MSF LIFETIME EMERY GROWTH	AG	11.71
MIM STOCK APPRECIATION	LG	5.82
MONETTA FUND	GI	5.48
NICHOLAS INCOME	TR	10.33
NORTHEAST INVESTORS TRUST	TR	17.49
OBERWEIS EMERGING GROWTH	AG	13.71
OPPENHEIMER GOLB BIO TECH	SF	-22.88
PAINE WEBBER REGIONAL (A)	SF	38.68
PHOENIX CAP APPRECIATION	LG	8.14
PRUDENTIAL GLO UTILITIES (A)	UT	9.25
ROCHESTER CONVERTIBLE FD	TR	31.18
SKYLINE FUND-SPECIAL EQTY	AG	42.41
STATE FARM BALANCED	BL	5.38
STRONG COMMON STOCK FUND	AG	20.78
THOMSON OPPORTUNITY (B)	AG	28.46
TWENTIETH CENT ULTRA	AG	1.27
UNITED NEW CONCEPTS FUND	AG	4.51
USAA INCOME FUND	TR	8.37
VANGUARD PREFERRED STOCK	IN	8.42
VISTA CAPITAL GROWTH FUND	LG	12.95
VISTA GROWTH & INCOME	GI	15.11
WESTCORE MIDCO GROWTH	AG	6.45

LIST OF LOW ALPHA(ALPHA(3) < -0.65) MUTUAL FUNDS FOR '89,'90 AND '91

NAME	OBJECTIVE	ROR92
44 WALL STREET FUND	AG	0.81
AFUTURE	LG	-0.84
ALLIANCE CANADIAN FUND	IE	-9.21
ALLIANCE GLOBAL SMALL (A)	GE	-4.89
ALLIANCE INTERNATIONAL(A)	IE	-5.86
ALLIANCE QUASAR FUND (A)	AG	2.81
AMERICAN INVESTORS GROWTH	LG	-12.36
API TRUST SPECIAL MARKET	SF	-1.5
BENHAM GOLD EQUITIES INDX	PM	-8.65
BOSTON CO INTERNATIONAL	IE	-10.39
BULL & BEAR SPECIAL EQUITY	AG	28.38
CAPSTONE NIKKO JAPAN FUND	IE	-28.88
COLONIAL INTL EQUITY INDX	IE	-12.25
DFA CONTINENTAL SMALL CO	IE	-19.82
DFA JAPANESE SMALL COMPNY	IE	-26.11
EXCEL VALUE FUND	LG	-3.87
FIDELITY OVERSEAS	IE	-11.46
FIDELITY PACIFIC BASIN FD	IE	-7.62
FIEDLITY SELECT-ENERGY SER	SF	3.43
FIEDLITY SELECT-ENVIRON	SF	-1.37
FINANCIAL INTERNAT'L GRTH	IE	-12.54
FINANCIAL STARAT-ENERGY	SF	-13.23
FINANCIAL STRAT-PACIFIC B	IE	-13.57
FINANCIAL STRATEGIC-GOLD	PM	-8.22
FIRST INVESTORS GLOBAL FD	GE	-4.79
FLAG INV EMERGING GROWTH	AG	-9.18
FLAG INV INTL TRUST	IE	-10.31
GT EUROPE GROWTH FUND	IE	-11.26
GT INTERNATIONAL GROWTH	IE	-5.83
GT JAPAN GROWTH FUND	IE	-21.51
IDS PRECIOUS METALS FUND	PM	-8.78
IDS STRATEGY WORLDWIDE GR	GE	-6.08
INTERNATIONAL EQUITY FUND	IE	-5.89
J HANCOCK FREEDM AVIA TEC	SF	3.02
J HANCOCK FREEDM ENVRN/A	SF	-5.25
J HANCOCK FREEDM GLOBAL/B	GE	-0.27
J HANCOCK FREEDM PAC BAS	IE	2.02
JAPAN FUND	IE	-16.74
KEYSTONE INTERNATIONAL	IE	2.37
KLEINWORT BENSON INTL EQ	IE	-3.42
LEXINGTON GLOBAL FUND	GE	-3.55
LEXINGTON TECH STRATEGY	AG	-12.48
MACKENZIE AMERICAN FUND	LG	7.77
MACKENZIE CANADA FUND	IE	-7.56
MAINSTAY GLOBAL FUND	GE	-8.25
NATIONAL WORLDWIDE OPPORT	GE	3.17
NOMURA PACIFIC BASIN FUND	IE	-12.68
OCEANOGRAPHIC	LG	-5.28
PAINE WEBBER ATLAS(A)	GE	-8.69
PHOENIX INTERNAT'L PORT	IE	-12.41
PRICE INTL DISCOVERY FUND	IE	-9.08
PROGRESSIVE VALUE PORT	LG	-25.36
PROVIDENT MUTUAL INVEST	GI	2.46
PROVIDENT MUTUAL WORLD	IE	-4.28
PRUDENT SPECULATOR LEVERG	AG	0.96
PRUDENTIAL GLO GENESIS (B)	GE	-0.08
PRUDENTIAL GLO NATURAL (B)	SF	2.94
PRUDENTIAL GLOBAL FD (B)	GE	-5.27
RODNEY SQUARE INTL EQUITY	IE	-12.43
RUSHMORE NOVA PORTFOLIO	GI	-1.01
SCHRODER INTL EQUITY FUND	IE	-4.01
SHEARSON GOLBAL OPPORT/A	GE	-6.29
SHERMAN DEAN	AG	18.39
SOUTHEASTERN SMALL-CAP	AG	6.84
STEADMAN AMERICAN IND	AG	-6.54
STEADMAN ASSOCIATED	IN	5.63
STEADMAN INVESTMENT	LG	-8
STEINROE INTNL GROWTH FD	IE	-7.42
SUNAMERICA CAP APPREC	LG	8.46
THOMSON INTL FUND/B	GE	-5.84
THOMSON PREC METALS (B)	PM	-12.23
TRUSTEES COMMINGLED INTL	IE	-8.72
UNITED SERV EURO INCOME	IE	-11.25
UNITED SERV GOLB RESOURCE	SF	-2.75
UNITED SERV GROWTH	AG	-15.11
US BOST FOREIGN GR/INC	IE	-13.8
UST MASTER INTERNATIONAL	IE	-9.36
VAN ECK WORLD TRENDS FUND	GE	-8.54
VANGUARD WRLD-INTL GROW	IE	-5.79
WPG INTERNATIONAL FUND	IE	-5.53
YAMAICHI GLOBAL FUND	GE	-2.28

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