

**U.S.
Investment
Research**

March 17, 1997

U.S. Strategy

Leah Modigliani (212) 761-6319

Yes, You Can Eat Risk-Adjusted Returns

Who says you can't eat risk-adjusted returns? Ours put food on the table. The way we define risk-adjusted returns, they're just as attainable as the performance of any portfolio. More importantly, investors who maximize risk-adjusted performance will eat better than those that don't (all else equal). Whether your investment objectives are aggressive or conservative, it is critical to recognize that risk is not a fixed characteristic of any portfolio but a malleable one that can be altered to match investor preferences at will.

Last month I wrote an essay describing the M^2 measure of risk-adjusted performance that I developed in conjunction with my grandfather, Professor Franco Modigliani ("The Time for Risk Measurement is Now," *Investment Perspectives*, 2/5/97). Since then we have received many calls and letters with questions and comments about our measure and the philosophy behind it. Below I have outlined some of the fundamental theory behind our approach as well as some of its broader implications. We continue to welcome your feedback.

M^2 provides a framework for understanding risk and return as well as a tool for evaluating investment performance. We avoid the time-worn debate over how to define risk and jump ahead to the notion that before evaluating the relative performance of funds and their managers, portfolios should be made "equally risky." To accomplish this we rely on a fundamental principle: the risk of any portfolio can be easily altered using leverage. By varying the exposure to

the assets in the portfolio, any portfolio can be transformed into a new version of that portfolio with any desired level of risk.

As described in last month's essay, by leverage we mean borrowing or lending. "Levering down" a portfolio by selling off a fraction of the assets and replacing them with Treasury bills lowers the risk of a portfolio but also lowers the expected return. On the other hand, "levering up" a portfolio by borrowing and over-investing in the assets (buying on margin) increases the risk but also increases the portfolio's expected return. Accurate comparisons of performance can only be made after accounting for differences in risk. M^2 levers or unlevers all portfolios to exactly match them to the level of risk of a benchmark — producing risk-equivalent portfolios. The risk-adjusted performance, M^2 , of any portfolio is simply the return on the risk-equivalent portfolio. For the time being, we are using volatility as our measure of risk. M^2 ranks portfolios identically to the Sharpe ratio (a well-known measure of risk-adjusted performance yielding "return per unit of risk"). Yet instead of giving answers in ratio form, M^2 measures the difference in performance of any two portfolios in the customary percentage points, which are easy for investors to understand. Results are made clearer by the M^2 framework for analyzing risk and return.

M^2 is not "pie in the sky" but delectably edible performance. The M^2 returns of any portfolio could actually have been achieved had the portfolio been levered

or unlevered accordingly. While returns would vary with the cost of borrowing, investors leveraging against the securities in their portfolios can usually count on very favorable interest rates. M^2 is a measure of achievable performance.

M^2 measures results relative to a benchmark, but the benchmark simply provides a standard risk level to which all portfolios are scaled so that they can be compared “apples to apples.” You can change the benchmark at your discretion. Although it is counter-intuitive, *this will not change the ranking of the portfolios*. As a set of portfolios is scaled up or down to alternative levels of risk, the relative performance of the portfolios is unaffected. The best-performing portfolio compared to one benchmark will still be the best portfolio when compared to any other benchmark, at any given level of risk.

This provides the basis for our definition of the “best” or highest-ranking portfolio. The portfolio with the highest M^2 risk-adjusted return is the portfolio that offers the highest return for *every* level of risk. M^2 is not an arbitrary criterion for assessing performance. The portfolio that is designated the “best” by M^2 would have given you the highest return for any level of risk you might have chosen.

The notion that risk is malleable and our definition of the best portfolio lead us to a key implication for investment strategy — a corollary to the M^2 approach: In the pursuit of superior performance, investors should separate decisions regarding how much risk to incur from decisions regarding which portfolio to hold. In theory, you should always hold

the most efficient portfolio — that with highest risk-adjusted return. Risk can then be easily altered using leverage. The fundamental reason you want to hold the best portfolio is because it will produce the highest return whatever level of risk you choose. This renders leverage a key tool in the task of risk management.

Is leverage a sophisticated mechanism? Certainly, downward leverage is a familiar concept, with balanced funds a classic case in point. While hedge funds are known for using leverage to enhance their positions, the average investor probably does not buy on margin, and many professional money managers are restricted from doing so. Nonetheless, the practice of holding debt as well as stocks and bonds is common practice today and is in fact encouraged by the tax deduction for debt used for investment. New Jersey Governor Christie Whitman has announced a plan to issue \$3.4 billion in bonds to cover the state’s unfunded pension liabilities and invest the proceeds in the stock market. This is simply a levered investment in equities. I have loans from graduate school and money in the stock market. I have indirectly levered my portfolio. Investors with credit card debt who hold stocks or bonds have also effectively levered their portfolios (at what are probably very high costs). The best returns are achieved with the lowest borrowing costs, but leverage is not quite as remote from everyday investing as it first appears.

Table 1 shows the ten best-performing diversified small-capitalization funds as measured by average annual total return over the last five years (according to Morningstar). These funds have been featured in newspapers and maga-

Table 1

M^2 Analysis of Selected Mutual Funds; Benchmark Russell 2000

Mutual Funds (in order of risk-adjusted return)	Average Annual Total Return	Risk-Adjusted Return M^2	M^2 Portfolio Share	M^2 Cash Equiv. Share	Sharpe
Benchmark: Russell 2000	15.6	15.6	100%	0%	1.1
Barr Rosenberg US Sm Cap Ins	22.5	21.1	92%	8%	1.5
FPA Capital	24.5	18.3	69%	31%	1.3
Retirement Sys Emerging Growth	23.6	17.9	71%	29%	1.3
Heartland Value	22.0	17.3	73%	27%	1.2
AIM Aggressive Growth	24.9	16.4	59%	41%	1.1
PIMCo Adv Opportunity A	22.3	14.8	57%	43%	1.0
RSI Retirement Emerging Growth	21.4	14.4	58%	42%	1.0
PIMCo Adv Opportunity C	21.3	14.3	58%	42%	0.9
Parkstone Small Cap Instl	21.5	12.7	47%	53%	0.8
American Cent-20thC Giftrust	20.8	12.2	45%	55%	0.8

zines as top performing portfolios. As can be seen in column one, all of the funds produced average returns in excess of 20% over the last five years, far exceeding the Russell 2000, which returned 15.6%. Yet this evaluation does not take risk into account. When the funds are adjusted to match the level of risk (volatility) in the Russell 2000, a different picture emerges. First, we observe that all of these funds are higher risk than the benchmark. All have to be levered down accordingly. (A fraction of the portfolio must be replaced with T-bills to make it risk-equivalent to the benchmark. This is shown as the M² Cash-Equivalent Share in column 4.) When the funds are put on the same risk scale as the benchmark, we see that now only half of the funds outperformed on a risk-adjusted basis. The M² risk-adjusted returns are shown in column two. For example, on the basis of total return, AIM Aggressive Growth was the best performing fund of the group, with an average annual total return of 24.9%, 9.3 percentage points above the benchmark. After leveraging the portfolio down by 41% to create the risk-equivalent version of AIM Aggressive Growth, the return is 16.4%, only 0.8% above the benchmark. On a risk-equivalent basis, it was the fifth best performer out of the ten.

The number one best-performing fund on a risk-adjusted basis was the Barr Rosenberg US Small Cap fund. It

produced the highest return of all of the funds at the standard level of risk for small-cap funds — the Russell 2000. Table 2 shows the same ten funds evaluated against an alternative benchmark: the S&P 500. In this table all of the portfolios have been readjusted to the level of risk in this benchmark. Note that the risk-adjusted portfolio ranking does not change. Barr Rosenberg is still number one (and the only one that outperformed the S&P) and AIM Aggressive Growth is still number five, etc.

Barr Rosenberg will be the best-performing fund of the group at any level of risk. Whether you lever it up or down it will give you a higher return than any other fund in this group levered to the same level of risk. Whether you prefer a high or low level of risk, the M² prescription is clear: portfolios should be selected for their risk-adjusted performance potential without regard to their risk characteristics. Risk can be altered through leverage. (Issues relating to when to use alternative measures of risk such as beta will be addressed in essays to follow.)

M² can be used to measure the performance of any portfolio relative to any benchmark. The results can be compared with the risk-adjusted performance of any other portfolio. M² can be used on stock funds, bond funds, hybrid investments, international funds, or any other type of portfolio. Our measure is not perfect, but we think that it

Table 2

M² Analysis of Selected Mutual Funds; Benchmark S&P 500

	Average Annual Total Return	Risk-Adjusted Return M ²	M ² Portfolio Share	M ² Cash Equiv. Share	Sharpe
Benchmark: S&P 500	15.2	15.2	100%	0%	1.4
Barr Rosenberg US Sm Cap Ins	22.5	16.2	66%	34%	1.5
FPA Capital	24.5	14.2	49%	51%	1.3
Retirement Sys Emerging Growth	23.6	14.0	50%	50%	1.3
Heartland Value	22.0	13.6	52%	48%	1.2
AIM Aggressive Growth	24.9	13.0	42%	58%	1.1
PIMCo Adv Opportunity A	22.3	11.8	41%	59%	1.0
RSI Retirement Emerging Growth	21.4	11.6	42%	58%	1.0
PIMCo Adv Opportunity C	21.3	11.5	41%	59%	0.9
Parkstone Small Cap Instl	21.5	10.3	33%	67%	0.8
American Cent-20thC Giftrust	20.8	10.0	32%	68%	0.8
Russell 2000	15.6	12.4	71%	29%	1.1
TBill	4.5				

Based on quarterly returns for the 5 years ending 4Q96 Source for quarterly returns: Morningstar Inc.

Portfolio share = the percent of the risk-equivalent portfolio invested in the original fund

Cash-equivalent share = the percent of the risk-equivalent portfolio invested in cash-equivalent (a negative number denotes borrowing)

provides the tools for a disciplined approach in a user-friendly format.

We recognize that qualitative performance measurement is a backward-looking exercise. It may not tell us how well a portfolio will perform going forward, especially if the market environment, portfolio management, or investment styles change. Nonetheless, investors chase performance.

We see this regularly in the mutual fund flows by asset category and for the market as a whole. Flows tend to

follow performance. We also see it in the popularity of index funds. I am suspicious of “indexmania” and the idea that investors have been permanently converted to the wisdom of indexing. The reality is that the S&P 500 has produced higher returns than the vast majority of mutual funds in recent years. I think that investors are just chasing performance as they always have. Our work with M² suggests that they should at least be seeking performance on a risk-adjusted basis.

Morgan Stanley & Co. Incorporated and/or its affiliates or its employees have or may have a position or holding in the securities, options on securities, or other related investments of issuers mentioned herein.

To our readers in the United Kingdom: This publication has been issued by Morgan Stanley & Co. Incorporated and approved by Morgan Stanley & Co. International Ltd., regulated by the SFA. MSI and/or its affiliates may be providing or may have provided significant advice or investment services, including investment banking for any company mentioned in this report. The investments discussed or recommended in this report may be unsuitable for investors depending on their specific investment objectives and financial position. Private investors should obtain the advice of their MSI representative about the investments concerned. The price or value of the investments to which this report relates, either directly or indirectly, may fall or rise against the interest of investors. Where an investment is denominated in a currency other than pounds sterling, changes in rates of exchange may have an adverse effect on the value, or price of, or income derived from the investment. Past performance is not necessarily a guide to future performance. Income from investments may fluctuate. This publication is disseminated in Singapore by Morgan Stanley Asia (Singapore) Pte.

Additional information on recommended securities is available on request.

This memorandum is based on information available to the public. No representation is made that it is accurate or complete. This memorandum is not an offer to buy or sell or a solicitation of an offer to buy or sell the securities mentioned. Morgan Stanley & Co. Inc. and others associated with it may have positions in and effect transactions in securities of companies mentioned and may also perform or seek to perform investment banking services for those companies.

MORGAN STANLEY

**20-3, Ebisu 4-chome
Shibuya-ku, Tokyo 150
Tel: (813) 5424-5000**

**3 Exchange Square
Hong Kong
Tel: (852) 2848-5200**

**1585 Broadway
New York, New York 10036-8293
Tel: (212) 761-4000**

**Canary Wharf / 25 Cabot Square
London E14 4QA
Tel: (071) 513-8000; 425-8000**



This product
was printed on
recycled paper

©1997
Morgan Stanley & Co.
Incorporated
