

# An Index Fund Fundamentalist

*Goes back to the drawing board.*

John C. Bogle

In 1997, I prepared a study of the returns for the mutual funds in each of the nine Morningstar “style boxes,” a matrix with large-, mid-, and small-capitalization funds on one axis and value, blend, and growth funds on the other (Bogle [1998]). For the five-year period 1992 through 1996, the study presents powerful evidence that the low-cost quartile of funds in each box had earned not only higher returns than those in the high-cost quartile, but also returns that significantly exceeded the cost differential.

The results can be summarized as follows: average return of low-cost funds, 14.9%; average return of high-cost funds, 12.3%. This difference of 2.6 percentage points is *double* the 1.3 percentage point expense ratio differential of the funds (annual expense ratio of low-cost quartile, 0.7%; expense ratio of high-cost quartile, 2.0%). The differential *increases* slightly when risk-adjusted returns are substituted for total returns.

As a result, I concluded:

An investor who doesn't seriously consider limiting selections to funds in the low-expense group and eschewing funds in the high-expense group is someone who should take off the blinders—perhaps even a bit of a fool [1998, p. 38].

**JOHN C. BOGLE** is founder and former chairman of the Vanguard Group in Valley Forge (PA 19482).

## THE ROLE OF COSTS

Emboldened by the magnitude and consistency across the nine style boxes, I then asked, in effect: *Since*

the lowest-cost funds in the marketplace today are index funds, why not just buy index funds in each of the style boxes? I then tested that proposition, and I found the results equally compelling.

In seven of the nine boxes, the comparable-style index produced higher returns, and in all nine boxes, the index funds assumed lower risks. In terms of risk-adjusted returns, the index fund's superiority was substantial in eight boxes, and marginally lower in but one (small-cap growth). Holding risk constant, the indexes delivered a return surplus of 3.6 percentage points per year (16.5% versus 12.9%) in the large-cap group, 4.2 percentage points (18.0% versus 13.8%) in the mid-cap group, and 4.4 percentage points (19.5% versus 15.1%) in the small-cap group.

Armed with this evidence on the relationship between fund costs and fund performance, I then concluded: "The magnitudes . . . are so large and so consistent as to devastate the concept of high-cost active management."

Prudently, however, I added the caveat:

We should go only so far with five-year numbers in a strong equity market . . . . But a shorter period . . . would be even less satisfactory, and a longer [ten-year] period . . . would cut the number of funds we could observe by half, making for a less reliable sample. . . . Analysis of the [five-year] data . . . deserves testing in other periods and under a variety of market conditions [1998, p. 40].<sup>1</sup>

This article does exactly that, using the ten-year period ending June 30, 2001.

## RESULTS

The decade-long period from July 1, 1991, through June 30, 2001, covered in the new study clearly includes a variety of conditions—the quiet stock market of 1992–1994, the boom of 1995–1999, and the subsequent bust in 2000–2001. Interestingly, however, the annual return of the S&P 500 stock index was virtually the same during the past decade (15.1%) as during the earlier study (15.2%). The variation in actual returns between the best and the worst style boxes was wider in the prior study: 3.2 percentage points (15.1% to 11.9%). In the current study, the variation in average return between the extremes is remarkably slight: 1.3 percentage points (14.5% to 13.2%).

Exhibit 1 presents the data.

### EXHIBIT 1 ANNUAL RATE OF RETURN Ten Years Ended June 30, 2001\*

	Value	Blend	Growth
Large-Cap	13.6%	13.2%	13.4%
Mid-Cap	14.4	14.5	13.8
Small-Cap	14.5	14.3	14.4

\*Source: Morningstar. Includes 634 mutual funds in operation throughout the period.

### EXHIBIT 2 ANNUAL RATE OF RETURN Ten Years Ended June 30, 2001

	Low-Cost Quartile	High-Cost Quartile	Low-Cost Advantage
Large-Cap Value	14.8%	12.8%	2.0%
Large-Cap Blend	14.7	10.9	3.8
Large-Cap Growth	14.2	11.2	3.0
Mid-Cap Value	15.3	12.5	2.8
Mid-Cap Blend	15.4	14.2	1.2
Mid-Cap Growth	14.7	12.5	2.2
Small-Cap Value	16.8	12.0	4.8
Small-Cap Blend	15.6	11.3	4.3
Small-Cap Growth	15.4	14.5	0.9
All Funds	14.5%	12.3%	2.2%

The hypothesis that the funds in the low-cost quartile would outperform those in the high-cost quartile was again clearly validated during this period, as Exhibit 2 shows. The expense ratio differential during this period was 1.2 percentage points (0.6% for the low-cost funds, 1.8% for the high-cost funds), about the same as the 1.3 percentage point spread in the prior study. But the performance differential is once again approximately double the cost differential, 2.2 percentage points. Each \$1.00 of extra cost, then, resulted in a loss of \$1.83 of return in the ten-year period, as compared to \$2.00 in the five-year period.

Unlike the 1992–1996 period, when the risk exposure of the high-cost funds (standard deviation, 12.2%) was only slightly higher than for the low-cost funds (11.8%), the risk exposure differential during 1991–2001 has increased sharply. The standard deviation of the low-cost funds averaged 17.4%, versus 20.1% for the high-cost funds, a 15.5% greater risk exposure. As a result, the *risk-adjusted* returns of the low-cost funds averaged 13.8%, versus 10.8% for the high-cost funds, raising the performance differential to 3.0 percentage points annually during the past decade. That is, each \$1.00 of extra cost resulted in a loss of \$2.50 in risk-adjusted return.

It is not possible to understate the significance of

**EXHIBIT 3**  
**RISK-ADJUSTED RETURNS**  
**Ten Years Ended June 30, 2001\***

	Low-Cost Quartile	High-Cost Quartile	Low-Cost Advantage
Large-Cap Value	15.3%	13.4%	1.9%
Large-Cap Blend	14.6	11.0	3.6
Large-Cap Growth	13.3	10.2	3.1
Mid-Cap Value	15.8	11.5	4.3
Mid-Cap Blend	14.3	12.4	1.9
Mid-Cap Growth	13.7	11.6	2.1
Small-Cap Value	15.9	10.6	5.3
Small-Cap Blend	15.1	11.8	3.3
Small-Cap Growth	16.6	13.7	2.9
All Funds	13.8%	10.8%	3.0%

\*Calculation method described in Modigliani and Modigliani [1997]. Style-specific benchmarks are used to calculate risk-adjusted returns. See the appendix for detailed figures.

these differences. *Costs matter*, and they matter even more now than the 1992-1996 study suggests.<sup>2</sup>

The consistency of the advantage in risk-adjusted return that low-cost funds have achieved over high-cost funds is remarkable, as Exhibit 3 shows.

The Sharpe ratio provides another way of viewing risk-adjusted returns. In the 1992-1996 study, the average Sharpe ratio for the low-cost funds was 1.13, or 35% higher than the 0.84 for the high-cost funds. Even this substantial difference widened in the ten-year study. The Sharpe ratio of 0.77 for the low-cost funds compares to 0.52 for the high-cost funds, an improvement of fully 48% (Exhibit 4).

This differential is even more consistent across the nine style boxes than was the case before, when eight of

the nine style boxes fit the pattern. In the ten-year study, the low-cost funds demonstrate substantial superiority in all nine of the style boxes.

**INDEX FUNDS**

As a result of the powerful link between cost and return evidenced in the 1992-1996 study, I then asked if costs matter so much—as they obviously do—and if index funds are the lowest-cost funds—*why not just hold index funds that replicate each of the nine style boxes?*

That proved to be a profitable avenue of exploration. Taking all mutual funds as a group, and comparing them to a mix of comparable index funds, the earlier study shows the results in Exhibit 5.

As Exhibit 5 shows, the Sharpe ratio of the index funds (1.23) exceeds that of the average managed fund (0.99) by fully 24%; that of the high-cost funds (0.84) by 46%; and even that of the low-cost funds (1.13) by 9%.

The consistency of the relationship found between index funds and managed funds throughout the nine style boxes is remarkable. In eight of the nine boxes, the appropriate index fund Sharpe ratio exceeds that of the average managed fund by from 0.16 to 0.46. (In the four fund groups with the largest—and therefore more statistically significant populations—the range is narrower, +0.16 to +0.31.) Only in the small-cap growth fund segment does the small-cap growth index fund fall short, by 0.06. (More about that group later.)

The new study clearly confirms the finding of the earlier study. During the ten years ended June 30, 2001, the index fund advantage is again compelling, as summarized in Exhibit 6. The index fund advantage over the

**EXHIBIT 4**  
**SHARPE RATIOS**  
**Ten Years Ended June 30, 2001**

	Low-Cost Quartile	High-Cost Quartile	Low-Cost Advantage	5 Years Ended Dec. 31, 1996 % Difference
Large-Cap Value	0.91	0.74	23%	60%
Large-Cap Blend	0.82	0.51	61	24
Large-Cap Growth	0.62	0.40	55	33
Mid-Cap Value	1.01	0.60	68	63
Mid-Cap Blend	0.81	0.66	23	56
Mid-Cap Growth	0.48	0.35	37	45
Small-Cap Value	1.04	0.57	82	9
Small-Cap Blend	0.74	0.46	61	(7)
Small-Cap Growth	0.60	0.43	40	8
All Funds	0.77	0.52	48%	35%

average fund is slightly less than in the 1992-1996 study—18% above the Sharpe ratio of the average fund (0.79 versus 0.67) compared to 24%. The advantage *increases* from 46% to 52% over that of the high-cost funds (0.79 versus 0.52), but *declines* from 9% to 2% above that of the low-cost funds (0.79 versus 0.77).

Once again, the index funds prevail over active managers, albeit at somewhat lower margins of advantage (*Exhibit 7*). The uniformity of advantage is striking. The index funds provide higher risk-adjusted returns in eight of the nine style boxes. The sole exception is the apparent superiority of active managers in the small-cap growth category, as evidenced also in the earlier study.

### SUMMING UP THE STUDIES

It is highly significant that the ten-year study so powerfully reinforces the findings of the five-year study. Once again, low-cost funds outpace high-cost funds. Once again, costs matter even more than we expect (i.e., a 1% reduction in costs generates an increase in risk-adjusted return that is much higher than 1%). Once again, index funds—the fund category with the lowest costs—give an excellent account of themselves.

The 1998 study concludes: 1) higher returns are directly associated with lower costs; and 2) the notion that indexing works only in large-capitalization markets no longer has the ring of truth. Both conclusions are reinforced in the current study.

### MUTUAL FUND RETURNS ARE CONSISTENTLY OVERSTATED

However one regards the validity of these data, it must be recognized that *the average returns of the actively managed mutual fund that I have presented are significantly overstated*. First and foremost, they are *survivor-biased*.

Only the funds that survived through the decade to report their performance at the close of the period are included in the sample. The 634 funds for which Morningstar reported ten-year records represent the survivors of an estimated 890 funds that began the decade. The records of the remaining 256 funds are lost in the dustbin of history. It is reasonable to postulate that the poorer performers dropped by the wayside, thereby biasing the study results in favor of the manager.

How much bias? We can't be sure. Independent studies confirm that survivor bias is substantial. In Malkiel [1995] and Carhart et al. [2001], survivor bias ranges

### EXHIBIT 5 FIVE YEARS ENDED DECEMBER 31, 1996

	Expense Ratio	Annual Return	Risk*	Sharpe Ratio
All Funds	1.25%	13.7%	11.9%	0.99
High-Cost Quartile	2.03	12.3	12.2	0.84
Low-Cost Quartile	0.69	14.9	11.8	1.13
Index Funds	0.25	15.1	9.7	1.23

\*Standard deviation of returns, 1992-1996.

### EXHIBIT 6 TEN YEARS ENDED JUNE 30, 2001

	Expense Ratio	Annual Return	Risk*	Sharpe Ratio
All Funds	1.16%	13.7%	18.7%	0.67
High-Cost Quartile	1.85	12.3	20.1	0.52
Low-Cost Quartile	0.64	14.5	17.4	0.77
Index Funds	0.20	14.4	16.2	0.79

\*Standard deviation of returns, 6/30/91 to 6/30/01.

from 1.5% to 3.1% per year. If we were to assume a bias of 2% during the ten-year period ended June 30, 2001 (greater for each of the small-cap groups, less for the large-cap groups), the annual risk-adjusted return of the average managed fund would drop from 12.5% to 10.5%, a 3.9 percentage point shortfall to the 14.4% return of the total stock market, and more than double the active fund shortfall of 1.9 percentage points I have suggested. When they fail to acknowledge the role of survivor bias in the data, studies that purport to show that indexing doesn't work leave much to be desired.

Several years ago, Morningstar estimated the survivor bias for each of its style boxes over the five-year period 1992-1996 (see Barbee [1999]). Even in that relatively short period, the bias was equal to almost 1% per year. Interestingly, in the light of my earlier finding that only small-cap growth funds had succeeded in outpacing their target index, the annual survivor bias in that style box was 1.7%. If we assume, for the purposes of argument, that the (necessarily higher) ten-year bias is 3.0% per year, the data showing a 1.7 percentage point annual advantage over the index for small-cap managers becomes a 1.3% *disadvantage*.

### SOME FUND RETURNS ARE INFLATED

Even the records of those funds that do survive are to some degree suspect. It is hardly without precedent for small funds, often those run by large advisors, to inflate

**EXHIBIT 7****SHARPE RATIO: INDEX FUNDS VERSUS MANAGED FUNDS**

Ten Years Ended June 30, 2001

	Index Fund	Managed Fund	Index Advantage	Index Advantage	Five Years Ended Dec. 31, 1996
Large-Cap Value	0.88	0.81	0.07	9%	25%
Large-Cap Blend	0.84	0.69	0.15	22	20
Large-Cap Growth	0.68	0.55	0.13	24	23
Mid-Cap Value	1.00	0.82	0.18	22	29
Mid-Cap Blend	0.87	0.74	0.13	17	30
Mid-Cap Growth	0.48	0.45	0.03	7	24
Small-Cap Value	1.06	0.84	0.22	26	40
Small-Cap Blend	0.73	0.67	0.06	9	20
Small-Cap Growth	0.38	0.48	(0.10)	(21)	(9)
All Funds	0.79	0.67	0.12	18%	24%

their records by purchasing IPOs, quickly flipping them, and generating returns that do not recur when the fund becomes large. Two managers have been fined by the SEC for this practice.

One managed a fund that reported a 62% return for 1996, an excess return largely accounted for by purchasing just 100 to 400 shares of 31 hot IPOs. The other rose 119% during the 18 months following its initial offering, 83 percentage points of which came from first-day gains realized on newly public stocks. In yet another case, a fund advertised (in boldface type) a 196.88% return in 1999, acknowledging (in small print) that a significant portion came from IPOs. Yet these records are included in the industry data as if they were holy writ.

Actively managed funds also surrender a substantially greater portion of their pre-tax performance to taxes, in an amount that could have increased index fund superiority by as much as another 1.5 percentage points per year or more during the past decade. The 13.7% pre-tax annual return reported by the average mutual fund fell to an after-tax return of 11.1%, a loss of fully 2.6 percentage points to taxes.

Since only one index fund has operated during the entire past decade, after-tax style-box returns for the indexes are not available. But the largest S&P 500 index fund bore a tax burden of just 0.9%—far lower than the tax burden for the average fund. Ignoring taxes represents one more overstatement of fund returns by most studies of manager performance.

Finally, fund sales charges are ignored in most fund comparisons (including my data). Nonetheless, sales charges represent a hidden reduction in reported returns. If we assume that a decade ago three-quarters of all funds carried an average initial sales charge of 6%, the cost, amortized over the ten years would reduce returns reported by funds by another 0.5 percentage point annually. The high

turnover of fund shares by investors, however, indicates that the average holding period is no more than five years. Thus, the actual reduction in annual return engendered by sales charges would be significantly higher than that, another substantial reduction in the return of managed funds.

When we consider all these factors, it must be clear that, whatever the relationship between style-box returns in managed funds and index funds, the reported returns of managed funds are significantly overstated. And, even when we accept the overstated fund data as presented, mutual funds as a group, style box by style box, with only one exception, fall well short of their index fund benchmarks, largely as a result of the costs they incur. *Index funds win.*

**THE DATA VERSUS THE FACTS**

You might say: So what else is new? For it must be obvious that if we take all stocks as a group, or any discrete aggregation of stocks in a particular style, an index that owns all of those stocks and precisely measures their returns must, and will, outpace the return of the investors who own that same aggregation of stocks but incur management fees, administrative costs, trading costs, taxes, and sales charges. Active managers as a group will fall short of the index return by the exact amount of the costs the active managers incur. *If the data we have available to us do not reflect that self-evident truth—well, the data are wrong.*

There are infinite ways the data can mislead. We count each mutual fund as a unit in calculating average returns, while the industry's actual aggregate record is reflected only in an asset-weighted return. Funds rarely stay rigidly confined to their style boxes; a growth fund may own some value stocks; a small-cap fund may own mid-cap and large-cap stocks.

Of course, it is at least theoretically possible that

mutual fund managers as a group may be smarter than other investors, and in fact consistently outpace the market by an amount sufficient to overcome their substantial costs. Let's think about that.

Is it realistic to believe that fund managers who—including the pension accounts they manage—control the investment process applicable to upward of 35% of the value of all U.S. equities can outpace other managers, advisors, and individuals? For example, for fund managers to outpace the market by 1 percentage point annually after costs of, say, 2% (excluding taxes) would require an excess return of 3%. In that case, all other investors as a group would then lose to the market by about 2 percentage points per year, or by 4 percentage points after costs.

In reasonably efficient markets such as those in the U.S., where prices are set largely by professional investors, such a gap would seem inconceivable. Further, the available data showing returns earned by individual investors give every indication that, like institutions, individuals match the market before costs and lose to the market after costs, a conclusion that would surprise no one who has ever examined performance data with care.

## IMPORTANT SUCCESS

Even someone who has never plied the fund performance seas must understand this central fact of investing: *Investment success is defined by the allocation of financial market returns—stocks, bonds, and money market instruments alike—between investors and financial intermediaries.* Despite the elementary, self-evident, and eternal nature of this capital market equation—gross return minus cost equals net return—the dialogue between advocates of indexing and advocates of active management continues unabated, for there is a lot of money at stake—certainly well over \$100 billion per year. Mutual fund direct costs alone (excluding sales charges and transaction fees) account for some \$70 billion; fund trading costs likely account for an additional \$50 billion or more.

The reality is that the horses ridden by the mutual fund jockeys are handicapped with so much weight that the entire fund industry cannot possibly win the race for investment success. Given the limitations on the data available that I have noted above, of course, if one searches long enough and hard enough, one can possibly identify interim periods when the equation will appear to be disproven.

But the reality is what it is. While there can be debate over the figures, there can be no debate over the facts: For investors in the aggregate, the capital market

equation is unyielding. Yes, some managed funds can, and some do, outpace the indexes, but there is no sure way to identify them in advance.

## INDEXING AND MARKET EFFICIENCY

There is one more misconception to put to rest. As Minor puts it:

If [Bogle] is right [about the role of cost and the superiority of indexing], he will be wrong; and if he is wrong, he will be right. The more people become convinced they can beat the market (i.e., Bogle is wrong), the more efficient the markets become, as more intelligent and capable professionals enter the market. Ironically, it then becomes less likely they will outperform it. Or, if managers and investors come to believe that active management is a waste of money (i.e., Bogle is right), money managers will be replaced by index funds. This will reduce the number of market participants and hence worsen market efficiency. *The remaining minority of active money managers will then have a better chance of outperforming their respective markets* [2001, p. 49; emphasis added].

This allegation does not meet the test of simple logic. Whether the markets are efficient or not, as long as the index reflects the performance of the market (or any given segment of the market), it follows that the remaining participants (largely active managers) will also earn the market return (or market segment return) *before their intermediation costs are deducted.* The syllogism is 1) All investors as a group earn the market return. 2) Index funds earn the market return. Therefore: 3) All non-index investors earn the market return—but only before their costs are deducted. Result: The substantial costs of financial intermediaries doom active investors as a group to poorer returns.

Admittedly, if our markets turn inefficient—something that is hard to imagine in these days of infinite information—the “good” managers may be able to improve their edge over the “bad” managers. But it must be self-evident, that in effect each manager who succeeds in outpacing the stock market by, say, 4% per year before costs over a decade, must be balanced by another who falls short by 4%, again before costs.

Efficient markets or inefficient, active managers—good and bad together—lose. Such is the nature of financial markets.

APPENDIX

Supplemental Data

Index Fund Data<sup>a</sup>

Equity Fund Data

Low-Cost Quartile versus High-Cost

Number of Funds	Category Average										Low-Cost Quartile versus High-Cost														
	10-Year					10-Year					Sharpe Ratio					% Risk-Adj Return					Expense Ratio				
	Return <sup>b</sup> %	Std Dev %	Sharpe Ratio	Risk-Adj Return %	Expense Ratio %	Return <sup>b</sup> %	Std Dev %	Sharpe Ratio	Risk-Adj Return %	Expense Ratio %	Low Cost	High Cost	Low Cost	High Cost	Low Cost	High Cost	Low Cost	High Cost	Low Cost	High Cost	Low Cost	High Cost	Low Cost	High Cost	
139	LV	13.62	14.48	0.81	14.20	1.06	14.80	12.81	14.72	14.40	0.91	0.74	15.28	13.39	0.63	1.61	LV	14.98	15.43	0.88	14.98	0.20			
155	LB	13.17	16.08	0.69	13.09	1.02	14.70	10.89	16.10	15.70	0.82	0.51	14.59	10.98	0.45	1.73	LB	14.90	15.93	0.84	14.90	0.20			
119	LG	13.40	21.49	0.55	12.28	1.26	14.20	11.23	20.74	22.21	0.62	0.40	13.28	10.21	0.73	2.26	LG	14.37	18.70	0.68	14.37	0.20			
45	MV	14.40	15.96	0.82	13.61	1.36	15.29	12.55	13.97	16.87	1.01	0.60	15.79	11.52	0.82	2.05	MV	15.82	14.64	1.00	15.82	0.20			
25	MB	14.50	18.02	0.74	13.70	1.24	15.37	14.24	18.36	20.53	0.81	0.66	14.31	12.40	0.74	1.71	MB	15.60	16.53	0.87	15.60	0.20			
62	MG	13.82	27.25	0.45	13.26	1.22	14.66	12.54	28.24	28.88	0.48	0.35	13.72	11.65	0.84	1.69	MG	14.05	25.54	0.48	14.05	0.20			
24	SV	14.49	15.71	0.84	13.55	1.26	16.81	11.97	15.39	17.46	1.04	0.57	15.86	10.62	0.87	1.80	SV	16.07	14.18	1.06	16.07	0.20			
26	SB	14.33	19.09	0.67	14.09	1.15	15.63	11.32	19.49	20.06	0.74	0.46	15.14	11.79	0.64	1.72	SB	15.03	18.61	0.73	15.03	0.20			
39	SG	14.38	27.75	0.48	14.30	1.34	15.36	14.48	24.67	29.86	0.60	0.43	16.58	13.72	0.91	1.85	SG	12.62	27.52	0.38	12.62	0.20			
634	All <sup>c</sup>	13.69	18.73	0.67	12.48	1.16	14.48	12.29	17.45	20.11	0.77	0.52	13.78	10.82	0.64	1.85	All	14.36	16.18	0.79	14.36	0.20			

<sup>a</sup>S&P indexes for large-cap funds, Russell Mid-Cap for mid-cap funds, Russell 2500 for small-cap funds, and Wilshire 5000 for all funds; returns adjusted for estimated expenses.

<sup>b</sup>Annual rate of return (after expenses) June 30, 1991-June 30, 2001.

<sup>c</sup>Average, weighted by number of equity funds.

Source: Morningstar. Prepared by The Vanguard Group, July 2001.

## ENDNOTES

<sup>1</sup>Minor [2001] responded to that challenge by presenting data for the 1992-1996 period that seemed to contradict my conclusions.

<sup>2</sup>One explanation for this leverage effect, where the performance shortfall bears a 2½:1 ratio to cost, may be higher portfolio turnover. The annual turnover of the high-cost funds averaged 98%, more than 50% higher than the 63% turnover of the low-cost funds.

## REFERENCES

Barbee, Olivia. "Numbers Do Lie." *Morningstar FundInvestor*, October 1999, pp. 1-13.

Bogle, John C. "The Implications of Style Analysis for Mutual Fund Performance Evaluation." *The Journal of Portfolio Management*, Summer 1998, pp. 34-42.

Carhart, Mark, Jennifer Carpenter, Anthony Lynch, and David Musto. "Mutual Fund Survivorship." Working paper, New York University, Stern School of Business, 2001.

Malkiel, Burton G. "Returns from Investing in Equity Mutual Funds 1971 to 1991." *Journal of Finance*, Vol. L, No. 2 (1995).

Minor, Dylan. "Beware of Index Fund Fundamentalists." *The Journal of Portfolio Management*, Summer 2001, pp. 45-50.

Modigliani, Franco, and Leah Modigliani. "Risk-Adjusted Performance." *The Journal of Portfolio Management*, Winter 1997.

*To order reprints of this article please contact Ajani Malik at [amalik@ijournals.com](mailto:amalik@ijournals.com) or 212-224-3205.*