To What Avail? Computer Technology and Mutual Funds

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Less than one year ago, on May 23, 1996, a mutual fund investor completed his daily review of his 15-fund, $150,000 mutual fund portfolio on his Quicken computer program. Our investor was sure that he was missing out on too much of the action in the stock market. Over America Online, he learned that "The Motley Fool" crowd thought that hot stocks were the way to go, and he decided to switch his only money market fund holding of $10,000 into a hot new "momentum" emerging growth fund.

So far in its first year, as he browsed the web site of the no-transaction-fee mutual fund marketplace he used for his fund trading, the fund was up 60%. Its portfolio manager had run another fund with great success, and, through the fees the shareholders of his new fund had anted up to be listed in the marketplace, had already attracted more than one hundred thousand investors and nearly $1 billion of assets. The manager was lionized in the press and on television, and would soon be the star of the *Morningstar* annual conference in June. A quick check of the *Morningstar* web site enveloped our investor with all the data he could imagine about the portfolio manager's earlier strategies, including his 10 favorite stocks, the key components of a portfolio with price-earnings ratios of 45, a median market capitalization of $700 million, a concentration of 53% of assets in technology and healthcare stocks, 500% portfolio turnover, and so on.

The investor revisited his marketplace on the World Wide Web, hit a few keys on his computer, and immediately exchanged his money market fund into the emerging growth fund. Both sides of the trade would be executed—without visible commissions or costs—at the market's close, only one-half hour away. Satisfied with his day's labors, the investor turned off his computer.

Two months later, late in July, the investor was worried. The market had declined, and as he watched each day the fund dropped even faster—off 22% since his purchase. But he read in a national mutual fund magazine that it was a leading candidate to be "the next Magellan Fund," and decided to hang on for the recovery that would surely come.

We advance the calendar. Reviewing his portfolio in detail on Quicken at year-end 1996, our investor is now very troubled. He has guessed right: the bull market had resumed. The S&P 500 Index was up another 11% since May 23, but according to his computer check his new fund was still down more than 20%. He made a note to keep a watchful eye on the fund. By mid-March, the market continued to roll--up yet another 6%--but his fund had *lost* another -18%, now down 35% despite an 18% market advance--a 53 percentage point shortfall.

He acted swiftly. Dialing up his marketplace at its web site, he switched out of the once-hot fund and into a new one. While index funds hadn't much appealed to him (all that tiresome stuff about passive management, "owning the market," cost advantage, large-cap stocks, long-term time horizon), he knew from his weekly review of the top performing funds that the S&P 500 Index funds were hot, and were beating more than 90% of all managed funds. He couldn't buy the S&P Index Fund he wanted in his marketplace--the one called the "industry darling" in *The Wall Street Journal* (it apparently couldn't afford the cost of joining)--but he found another one that was *almost* as good, and made the exchange, again merely by hitting some computer buttons. He'd try that one for awhile. If he guessed wrong again, well, he could change his mind at the drop of a hat . . .

What I have described in microcosm is what the mutual fund industry is becoming today, in the waning years of the twentieth century, the flowering of the age of computer technology. The funds in this brief example are fact, but the investor is fictional . . . or is he? I present this example only to introduce you to the miracles technology has brought to the mutual fund industry:

- A financial system that has enabled professional money managers to offer a whole new variety of investment products, to provide remarkable liquidity for transactions, and to transact business around the globe with the speed of light.

- An up-to-date information network that provides data about mutual fund portfolios and performance so vast as to be beyond the ability of the human mind to absorb.

- A communications network so efficient that any fund investor can place transaction orders instantaneously (albeit, at least today, for execution no more frequently than hourly), without moving from a desktop computer.

But, with all of this extraordinary technology available to investors, I ask: to what avail?

First, let me freely concede that computer technology has played a major role in the growth of the mutual fund industry. To be sure, the incredible, virtually uninterrupted, 15-year bull market has been the primary driver of this industry's success and acceptance. But the computer has added a whole new order of magnitude to this growth, and indeed has in some measure created a new industry that is distinctly different from its staid, largely conservative ancestor--in variety, in concept, in investor participation, in service quality, and in pricing.

Most obviously, the number of mutual funds has exploded—providing investors with an enormous panoply of choices in fund objectives, strategies, and managers. The old industry, just 20 years ago, comprised but 300 equity funds, embattled survivors of the great 1973-74 bear market who were licking their wounds. The new industry comprises 2,800 equity funds,[1] one-half of which have been formed in the past five years. The number of equity funds matches the total of 2,800 individual common stocks of U.S. corporations listed on the New York Stock Exchange.

Today, it is fair to say, stocks are "out" and mutual funds are "in." That is all right, I guess, as far as it goes. But it doesn't go very far. The reality is that, to an important degree, mutual funds today are evaluated as stocks, purchased as stocks, traded as stocks, and talked about as stocks in the corridors of commerce and at cocktail parties alike. For millions of investors, funds *are* stocks.

(A very recent example: an article in *Morningstar Investor* presented, deadpan, recommendations by an investment adviser for a married couple investing $350,000, with retirement only five years away. He

[1] The current reported figure is 4,900 equity funds. However, some 2,100 are simply classes of existing portfolios, so 2,800 fund investment portfolios is the relevant figure.

recommends a portfolio, almost entirely in equities, of 17 small-cap and international funds. We can predict, I think, a high likelihood that the total of 2000 individual stocks in the 17-fund portfolio will produce a market return, before expenses. After fund expenses averaging a rather robust 1.6% of assets, the costs of a 92% average annual portfolio turnover, and the adviser's fee of 1%, it would seem *inconceivable* that the couple would be very happy with the outcome when retirement comes.)

While the trend that is turning funds into stocks has been gradual, I like to mark a particular date that the conversion became clear to me: March 19, 1995. This date, if it hardly will live in infamy, serves as my landmark. For that is the Sunday when the editors of *The New York Times* chose to move the mutual fund price and performance listings *ahead* of the New York Stock Exchange price quotations. New York Stock Exchange prices had been first in line for the attention of *Times* readers since time immemorial--more than a century?--but from now on the Big Board would play second fiddle to the upstart *nouveau riche* mutual fund colossus.

Investment Technology

How did this transition happen? Let's begin with investment technology and the financial market system. Consider some of the instruments we have today that would have barely been conceivable--certainly not in the breadth of their usage and depth of their liquidity--without the computer: Something like $20 *trillion* in notional value of derivatives outstanding. An estimated $1.5 trillion traded each day in world currency markets. A vibrant market in financial futures, including a notional value of nearly $200 billion in futures for the Standard & Poor's 500 Stock Index, updated in real time. Market indexes (of which we recently counted more than 3000!), and thus index funds. Enormous market volumes, with some 500 million shares of stock trading daily on the New York Stock Exchange, another 500 million shares on the NASDAQ. In all, $20 billion worth of shares changing hands each day.

In the mutual fund industry, amid this feverish trading, we have developed sophisticated investment techniques that are aggressive beyond anything we could have imagined 15 years ago; resulting in micro-cap funds, quantitatively-managed funds, funds based on theories of price momentum, or earnings expectations, or technical readings of the market, or on multiple regressions that, dare I say, boggle the mind, funds based on adjustable-rate mortgages, covered call options, foreign currencies, funds for stocks in Vietnam and Jakarta and the Czech Republic--none hitherto known as bastions of capitalism. Even many of the old-line funds follow strategies that "only yesterday" would have been deemed outrageous. On average, mutual fund managers turned over their portfolios at a 10% rate in the 1950s and 1960s, (though in the "Go-Go Years" of 1965-1971 it soared to . . . almost 40%). Last year, their average turnover rate was 91%--suggesting that the average holding period for a given stock is now only a hair over one year. What ever happened to long-term investing by professional managers?

As these professional investors have become aggressive traders, vigorously using today's computer driven financial system and the liquidity it has created, mutual funds--once considered long-term investors--have become, to an important degree, short-term speculators. Many of the shepherds of the flock have become the sheep of the pasture--a roaming, inconsistent, wild lot, given to impulsive--if sometimes precisely quantified--decisions that frustrate the very purpose of investing on the basis of traditional standards of corporate valuation. Surely they have moved light years from the philosophy that Warren Buffett--hardly a failure in his investment endeavors--described in his recent Annual Report:

> Inactivity strikes us as intelligent behavior. Neither we nor most business managers would dream of feverishly trading highly-profitable subsidiaries because some Wall Street pundit had reversed

his views on the market. Why, then, should we behave differently with our minority positions in wonderful businesses? . . . you simply want to acquire, at a sensible price, a business with excellent economics and able, honest management. Thereafter, you need only monitor whether these qualities are being preserved.

For enabling us in the mutual fund industry to engage in all of this feverish activity, we have investment technology to thank. But it has given us the tools without giving us the wisdom to handle them constructively.

Information Technology

Next, I turn to information technology. The computer and the Internet have given us non-stop access to the data to analyze and evaluate mutual funds beyond our wildest dreams, to make fund selections with unimaginably vast information literally at our fingertips. Never again will the mutual fund investor lack the ability to make fully-informed investment decisions. Surely, mutual fund investors should be among the greatest beneficiaries of the computer revolution.

Perhaps so, but they are also among its greatest victims. For every day, as in the example of investment behavior I described at the outset, mutual fund investors are proving (as we must have known all along) that in investing, information is all too often mistaken for knowledge. And in investing, too, knowledge is all too seldom translated into wisdom. But it is wisdom—far more than mountains of detailed data—and patience—far more than opportunism--that is ever destined to be the prime ingredient of long-term investment success. Warren Buffett is right.

Surely communications technology has given us immediate access to abundant information on which to make our fund selections--to buy, to hold, to add or subtract, to withdraw entirely. How much information? Using today's garden-variety communications technology, you can go to Morningstar's web site and connect with its Principia service on your computer in just seconds: push the Vanguard/Wellington Fund button and click on "print." Out will come 37 ("count 'em") pages of statistics and charts:

- For the stock portfolio . . . ratios of price to earnings and book value, earnings growth, market cap, industry diversification.
- For the bond portfolio . . . maturity, credit quality, coupon.
- For the whole portfolio . . . turnover, top 10 holdings, and total issues.
- For risk . . . R-squares, betas, alphas, standard deviations, Sharpe ratios.
- For return . . . performance over 25 years, monthly and three rolling months, rankings vs. index and vs. objective group, tax-adjusted returns.
- For investment style . . . nine boxes for stocks, nine for bonds.
- For cost . . . sales charges, 12b-1 fees, expense ratio comparisons (at Vanguard, we love these!).
- And for the concluding *summum bonum* . . . the number of Stars earned. (Happily, Wellington is rated "Four Stars".)

It is no exaggeration to say that the superb *Morningstar* on-line service provides all the information an investor could possibly need to evaluate a fund's characteristics, to understand a fund's *persona,* and to make informed decisions. Indeed, I think it is fair to say that the portfolio managers of many funds could not score more than a "gentleman's C" on a test given by an investor holding the Principia printout, presumably there to give the investor an edge in making investment choices.

And investors do rely on this information. But do they use it for knowledge? It seems dubious that they do. Rather we seem to simply place our trust “in our stars, not in ourselves.” Last year 90% of the $140 billion that flowed into equity mutual funds that were rated by *Morningstar* went into funds with Five-Star or Four-Star ratings, and only 10% to the One-Two-Three Star funds. (Perhaps ominously, another $50 billion flowed into untested funds--with hot records that have not yet been rated. They had not reached the ancient vintage that is used to establish a manager's *bona fides:* just three years--and three booming market years, at that.)

However, it is not information, but knowledge, and its translation into wisdom, that is power. And trusting in the “stars” has not given investors the power to enhance their returns. *Hulbert's Financial Digest*, calling, as it does, all investment advisers to judgment, calculates that investing in the top-rated *Morningstar* funds has over the past three years provided an annual return of 12%, versus 18% for the Wilshire 5000 Index. What is more, the funds had assumed a risk 25% greater than that of the market. (Apparently, part of the return shortfall is explained by the recurrent sales charges incurred when fund holdings are changed, although investors may not be doing as much trading in load funds as in the so-called no-load funds that are the stock in trade of the no-transaction-fee marketplaces.) But it is hard to imagine that any evaluation would produce a conclusion that trading among top-rated funds as they fall in and out of favor would produce a marginal advantage. If there were, surely we would have seen a study demonstrating it by now.

In short, while the *Morningstar* web site is *priceless* for understanding a fund's investment style, its past returns, and its present portfolio, the evidence strongly suggests that it may be *worthless* in terms of enabling investors to pick the future top performers. Returning to my theme, technology has made information accessible without providing knowledge, and without engendering wisdom.

Transaction Technology

The third aspect of the revolution in computer technology I will discuss today--after investment technology and information technology--is transaction technology. It has given us the ability to trade funds beyond our wildest imagination. And use it investors do. Turnover of equity fund shares by investors has soared. In the 1960s and 1970s, redemptions (and their twin, exchanges out) of equity fund shares averaged 9% of assets per year; in the 1990s, the rate has more than tripled, to 30%. Today, fund investors change their investment managers almost as rapidly as they appear to change their holdings of individual stocks.

Using the reciprocal of these numbers as a proxy for average number of years equity fund shares are held (and it is a pretty good proxy), we see that the holding period has tumbled from eleven years in the 1960s and 1970s, to slightly over three years in the 1990s. *Just three years.*[2] This trend, in my view, has simply emasculated the purpose of the best long-term investment medium ever devised: the broadly-diversified, soundly-managed, efficiently-operated mutual fund. Whatever happened to long-term investing

[2] And three fine market years at that. In the tough climate of 1987, the redemption rate took a quantum leap upward to an astonishing 72% of assets, a worrisome omen of what we might face in the next sharp market decline.

by mutual fund shareholders? Is Warren Buffett wrong when he tells investors that "inactivity strikes us as intelligent behavior?"

Perhaps the apotheosis of the confluence of investment technology, information technology, and transaction technology is found in the great fund casino--the no-transaction-fee mutual fund marketplace in which funds can buy a computer billboard and permit shareholders to turn their shares over rapidly and without apparent commissions. The costs of the system are hidden from view. First, *all* of the shareholders pay for the access that is used, in most cases, by a small minority of them--an annual fee of about 35 basis points paid by the funds to the casino on the assets of funds held there. Second, *all* of the shareholders are burdened by the costs the fund incurs when portfolio transactions are necessitated by the inflows and outflows of capital engendered by the minority. The record appears clear that the sensitivity to fluctuations in the stock market of fund shareholders playing in the casino is substantially higher than among other shareholders (although, as my earlier turnover figures suggest, that is quite high enough).

That said, it seems clear that technology has served fund shareholders extremely well in one sense: the cost of fund share transactions and fund portfolio transactions have sharply declined. Indeed, it has already helped to reduce fund operating expenses. Computer costs have plummeted by 90%, from $150,000 per MIPS (million instructions per second) in 1985 to $15,000 per MIPS in 1997. The cost of a personal telephone response was $10 in 1985, and today is only $2 for an automated (if a bit uncomfortable for many investors) phone response. When a printed fund prospectus is delivered, the cost is $8; when delivered over the Internet, just $1. Fund transactions can be electronically implemented by pushing just a few buttons of a personal computer and processed electronically, a further huge savings.

Today, it is estimated that some 10 million of 25 million fund investors have home computers, and that some 5 million of them use them in investing. (A recent estimate holds that 30% of the shareholders in the largest casino already handle their transactions on its web site.) Today's 1.5 million users will soon become 3 million and then 5 million. And they will all have the ability to redeem their shares at a moment's notice. One need only spend an instant imagining what might happen in the financial markets if, say, one-half of that number responds to a major earth-shaking (literally or figuratively) news event. Our old gatekeeper—the busy signal—is, for better or worse, retiring, although perhaps an Internet crash will, well, protect us. Honestly, it's sort of scary, isn't it?

Of course, the savings engendered by these plummeting costs have largely benefited fund *managers* and only rarely fund *shareholders*. Indeed, the industry alleges that new services have increased costs rather than reduced them. But the new services are often *marketing services*, designed to attract investors and their dollars and hence to increase advisory fees and record-keeping fees, and hence the profits earned by the fund's management company. It is the cost of *communication and transaction services* that has fallen. Nonetheless, taking aggregate costs for *all* shareholder record-keeping *and* administrative services, Vanguard--which, unlike other industry participants, operates on an "at-cost" basis--has reduced these costs by more than 50%--from 19 basis points of assets 15 years ago, to 9 basis points today--saving $250 million for our shareholders in 1996 alone. (In fairness, thanks in important measure to the great bull market, our asset base is much larger today, $250 billion compared with $6 billion in 1982.)

With respect to fund portfolio turnover, technology has also reduced costs--but likely only *unit* costs. If the cost of trading stocks has dropped by 50%, for example, and the rate of turnover has tripled (as it has), the *total* costs borne by fund shareholders have increased by 50%. But again, it is the investors, not the managers who are paying the freight—without any evidence whatsoever that all of this feverish activity enhances the net returns they receive.

Let's grade the impact of technology on mutual funds today:

- Investment technology: innovative financial instruments, A+; liquidity, A+; cornucopia of funds, A+; soundness of new funds, C; investment behavior of managers, D.

- Information technology: availability of data, A+; completeness and scope, A+; meaningful knowledge, C; contribution in effectiveness in selecting funds for future performance, D; investment behavior of shareholders, E.

- Transaction technology: ease and facility, A+; implicit encouragement to trade funds, A+; efficiency and expense savings, A+; flowing-through lowered costs to fund shareholders, E.

This balance sheet would say that the contribution of technology to information is A+, to knowledge is C, and to wisdom is, if not E, then surely in the nether regions. In all, good grades for the technology, bad grades for the users.

Conclusion

What does the technology revolution portend for tomorrow? More web sites, more bulletin boards. More information, more transactions, still more facilitation and speed, and more cost savings (though probably not to the benefit of shareholders). And, I must add, more risk. Most of the new instruments have never been tested in the crucible of a bear market. Nor have most fund shareholders, who are now not only able to trade without restraint, but, given the Internet, without even the intercession that used to be represented--for better or worse--by the inability of funds to man enough telephone lines. Anyone who is not cognizant of these risks is making, in my view, a perilous mistake.

I hope you won't mark me down as some aging Luddite who renounces the future and calls for the past to return. It won't and, in many respects, it shouldn't. But I do hope we will soon return to the fundamental principle that mutual funds are best used as long term investment programs. And I'm enough of an idealist to be confident that the kind of casino capitalism that is in the air today will not be a permanent fixture of the mutual fund industry. We should recognize that technology, for all its gee-whiz wonder, is both bane and blessing.

This dichotomy is true, of course, of other fields as well. Consider medicine: Dr. Bernard Lown, the brilliant cardiologist whose healing powers helped to keep me alive from 1967 until my heart transplant one year ago (now *there* is a miracle of medical science) recently observed: "Medicine depends profoundly on science, but it is not a science," stating that the medical establishment "has made a Faustian bargain with technology. What is lubricating it is greed. We have created a system that is bizarre." Ditto for the mutual fund industry.

Consider, too, the gamut of fields from A to Z--from air transportation to zoology--two subjects I link only because best-selling author Michael Crichton has tackled the information technology revolution in both of them. In "Airframe," veteran reporter John Lawton, 68, observes, "the irony of the Information Age is that it has given new respectability to uninformed opinion. These days, everybody seems to believe in Santa Claus, in something for nothing." In "The Lost World," Sarah Harding, a glamorous young biologist, tells her protégé, "Before he goes into the field, the zoologist reads everything that's ever been written about the animal he's going to study. Popular books, newspaper accounts, scientific papers, everything. Then he goes out and observes the animal for himself. And you know what he usually finds? That nearly everything that's been written or said is wrong . . . exaggerated, or misunderstood, or just plain fantasy." One can only hope Mr. Crichton doesn't next turn his critical gaze to mutual funds.

Asking "to what avail?" about the remarkable advances in the application of technology is not to demean it. Really. Rather, I ask that we give far more thoughtful consideration to curbing the powerful monster we have created and figuring out how to make him do, not his will, but ours. We must begin by obliterating the notion that funds should be treated as individual stocks--to be actively traded, to take exotic forms, to offer managements that can create miracles. Abandoning the massive advertisement of funds as though they were beer or toothpaste or perfume would be a step in the right direction. And we ought to give serious consideration to appropriate limitations on frequency of exchanges, restrictions on telephone exchanges (though that won't help much when the Internet is our transaction mode of preference), and to fee penalties when shares are redeemed after short holding periods. All of these steps would be met with horror by short-term investors who are using funds as stocks. But all of them would help the long-term investors we are sworn to serve.

If I may burden you with a single, final quotation, consider the words of Benjamin Franklin at the close of the Constitutional Convention in 1789. Speaking of the new republic that had just been created, he pointed to General Washington's chair, on which a sun was painted. He observed that "I have in the course of the Session, and the vicissitude of my hopes and fears, looked at that sun without being able to tell whether it was rising or setting. But now I have the happiness to know that it is a rising and not a setting sun."

Similarly, I have expressed today my own hopes and fears about the impact of computer technology on the new mutual fund industry we have created. Whether it is a rising sun or a setting sun is up to us.

Thank you.

Note: The opinions expressed in this speech do not necessarily represent the views of Vanguard's present management.