

**Recent studies should prompt you to take another look
at the conventional wisdom on diversification**

BY JAMES PICERNO

INVESTING

HOW MANY STOCKS DOES IT take to properly diversify your investment portfolio? The answer may be higher than you think.

In fact, it may take two to three times as many stocks today as it did just 16 years ago to maintain a given level of risk, measured by a portfolio's price volatility. That's the conclusion of an academic paper, "Have Individual Stocks Become More Volatile?" by three professors—John Campbell (Harvard University), Burton Malkiel (Princeton University), Yexiao Xu (University of Texas at Dallas)—and Martin Lettau, an economist at the Federal Reserve Bank of New York. Their research was published in the *Journal of Finance* in its February 2001 issue.

Two of the authors (Xu and Malkiel) recently completed a follow-up study further exploring this shift ("Investigating the Behavior of Idiosyncratic Volatility," forthcoming in the *Journal of Business*). Notably, they've taken a look at why it now takes more stocks to adequately diversify a portfolio than it once did. Their answer is twofold: the rise of institutional investors over the past generation and the increasing inclination of corporations to reach for relatively higher-risk growth strategies.

What lessons can an individual investor draw from these studies? The most important is this: you (and perhaps your mutual fund managers) may be underestimating your portfolio's risk. Or as the academics say, the portfolio could be exposed to excessive unsystematic, or individual company, risk. (Systematic risk is market risk—the possibility that the whole market will drop.) That's a fancy way of saying any individual stock may crash and burn without much warning (think Enron)—either from internal or external events. As you may recall, modern portfolio theory advises us that there's no payoff for unsystematic risk, which can easily be eliminated through diversification.

At the very least, the new research on diversification demands that investors rethink some of the long-held assumptions about portfolio theory.

The definition of diversification, in short, is subject to change—an observation that is too often overlooked. Some of the most influential literature on the subject could wrongly persuade investors that minimum diversification guidelines

have been written in stone. Consider, for instance, that famed investor, Benjamin Graham. In his classic book, *The Intelligent Investor* (HarperCollins), first published in 1949, Graham wrote that adequate but not excessive diversification ranges between 10 and 30 stocks. Graham's instincts were more or less quantitatively confirmed in 1968 when "Diversification and the Reduction of Dispersion," an early academic inquiry into diversification by J.L. Evans and S.H. Archer, appeared in the *Journal of Finance*. The paper found that with as few as 10 randomly selected stocks, and no more than 15, the benefit of diversification (measured by the reduction of the standard deviation of price volatility) is virtually exhausted. In other words, more than that, and you're wasting

How Many

your time, at least in terms of quantitative risk.

The Evans and Archer paper has remained an influential study for the 30 years since its publication. For example, Jack Clark Francis, a professor of economics and finance at Baruch College's Zicklin School of Business in New York City, in the 1991 edition of his book, *Investments: Analysis and Management* (McGraw Hill), writes that owning substantially more than 10 to 15 stocks "cannot be expected to reduce risk any further."

This numerical range is echoed in the classic textbook, *Fundamentals of Investments* (West Publishing), by R.A. Stevenson and E.H. Jennings: "The results of the Evans and Archer study indicate that a portfolio of approximately 8 to 16 randomly selected stocks will closely resemble the market portfolio in terms of fluctuations in the rate of return."

Although there have been some dissenting voices over the years regarding the idea that you can properly diversify a portfolio with as few as 10 or 15 stocks, it's not just the academic press that has endorsed this notion. Thanks in large part to the long-running popularity of *A Random Walk Down Wall*



Stocks Should You Hold?

Street (W.W. Norton), first published in 1973, a mass audience has gained confidence in the 15-stock rule. Ironically, the book was written by Malkiel, a co-author of each of the two new papers on portfolio diversification, which effectively repeal that piece of conventional wisdom.

The *Journal of Finance* paper warns that no matter how many stocks you own, the mix is two to three times less effective in delivering diversification compared with a portfolio of the same number of randomly chosen equities as recently as 1985. For example, a portfolio of 20 randomly selected stocks for the 20 years through 1985 reduced annualized excess standard deviation to about 5 percent, the study finds. (Excess standard deviation is a measure of diversifiable portfolio risk calculated as the square root of the difference between the variance of the portfolio in question and the variance of an equally weighted benchmark index. Aren't you glad you asked?) But for 1986 through 1997, 50 stocks—not 15—were needed to obtain a comparable level of annualized excess standard deviation.

What's behind this diversification inflation? In essence,

individual stocks became more volatile, even though the market as a whole did not.

True, market volatility spiked upward in the late '90s, leading to the widespread belief that it was a long-term trend that was here to stay. But a look at market history over decades finds otherwise. The *Journal of Finance* paper explains that "there is no discernible trend in market volatility" between 1926 and 1997 for U.S. stocks. If anything, market volatility has been slipping in the last 20 or 30 years. The paper reveals that stocks' average annual standard deviation of 11 percent in the '90s (through 1997) was lower than it was in the '70s (14 percent) or '80s (16 percent).

But this isn't the case for individual stock volatility, which has trended higher in the 20th century. How can individual stock volatilities rise while overall market volatility remains trendless? The combination seems counterintuitive, but it's really not. The mechanism that allows the two phenomena to coexist is falling correlations in price movements between stocks. "Declining correlations [between stocks] allow the volatility of the market portfolio to remain the same even if

there is an increase in each individual stock's volatility," the authors write.

There is a "clear tendency for correlations among individual stock returns to decline over time," the paper continues. Correlations drawn from the trailing five years of monthly data have slipped from 0.28 in the early '60s to 0.08 in 1997. Also, correlations based on one year of daily data have declined from 0.12 in the early '60s to between 0.02 and 0.04 in the '90s. (Correlation, which measures the relationship of price movements between two stocks, ranges between -1 and 1. A correlation of 1 means that the two stocks move together identically, 0 indicates no pattern of relationship, and -1 is perfect negative correlation, that is, the stocks move inversely to one another.)

So if you imagine that every stock is perfectly correlated with every other stock, all the time, then equities would continually post a correlation of 1 with each other. In this fantasy world, there's no point in owning more than one stock, because any single equity behaves identically to every other one. Diversification, in sum, would yield no benefit.

But back in the real world, the correlations among stocks vary through time, which, in turn, alters the value of diversification through time. More to the point, the declining correlations offer more opportunities to diversify. That jibes with the *Journal of Finance* paper's finding that a greater number of stocks are needed in order to maintain a set level of volatility, or risk, when compared with portfolios that were created in the past.

But why have individual stocks posted rising volatilities

and declining correlations? The search for an answer is the subject of the paper that will be published in the *Journal of Business*, says Yexiao Xu, who is co-author along with Malkiel. They concluded that institutional investors and the pursuit of growth by corporations have been driving individual stock volatility higher in recent years. Professor Xu explains that institutional investors, such as mutual funds and pension funds, have come to dominate stock trading. In decades past, by contrast, individual investors owned the majority of shares. The evolution from individual to institutional supremacy has increased stock volatility, both up and down, because professional investors tend to act in unison, selling or buying en masse. A new earnings report, for instance, usually triggers huge trading volume by "the crowd." On the other hand, individual investors tend to act independently of one other, so their collective impact on stock volatility is relatively low.

Xu and Malkiel also show that the race for earnings growth among companies generally has contributed to higher stock volatility. Corporations take all sorts of approaches in reaching for higher growth. For example, AT&T has been desperately trying to broaden its business operations beyond long-distance telephony, which has increasingly become a commodity business. Commodity businesses, of course, suffer diminishing growth prospects. To fire up the growth engines, AT&T has chased a number of new ventures beyond its traditional operations, including the cable television business. Results have been mixed, as they often can be when companies venture into unfamiliar commercial terrain. As investors

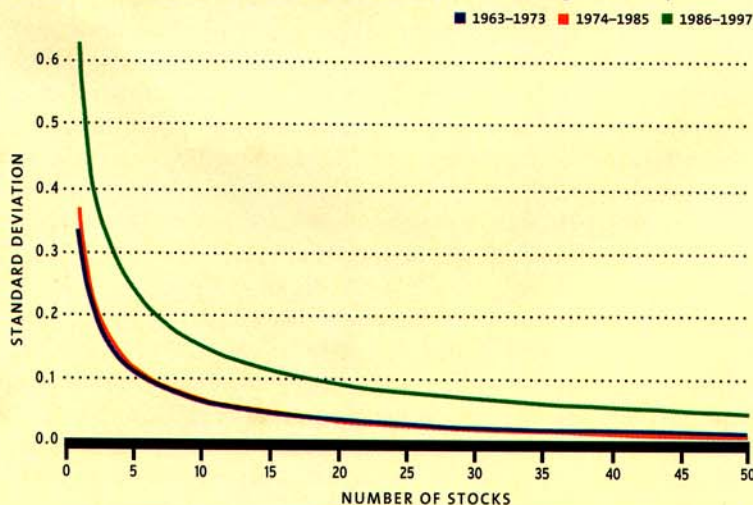
try to value evolving corporate paradigms, higher stock volatility is the by-product. "If you're seeking growth opportunities, you have to constantly reinvent yourself to sustain growth," Xu says. "You have to constantly seek a new, unique investment opportunity." In short, every business ultimately becomes a commodity business, a law of the corporate jungle that's increasingly unacceptable on Wall Street.

The only defense against institutions' ascendance in the stock market and corporations' increasing obsession with growth is to spread your eggs across many baskets. Don't assume that yesterday's dose of diversification will solve today's risks. Change, after all, is the only constant in the universe, especially on Wall Street. ■

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DIVERSIFICATION INFLATION

As the number of stocks in a portfolio rises, risk declines. The graph below compares how this dynamic operated over three time periods. In the one studied most recently—1986 through 1997—the risk in smaller portfolios was higher than during the earlier periods.



SOURCE: *The Journal of Finance*