The Enviable Dilemma:
Hold, Sell, or Hedge Highly Concentrated Stock?

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Numerous individuals and families have accumulated great wealth by holding large amounts of a single highly appreciated stock. The investor may have acquired the stock through the sale of a business, superior invest-ment performance, an inheritance, or some other route. Regardless, this one stock has now become the prime determinant of his future wealth. Generally, investors are emotionally attached to such a stock for good reason: The stock has made them rich.

At the same time, a concentrated holding creates a conundrum for the investor and his legal and tax advisors. The stock may continue to shine, and diversification via sale usually entails a daunting tax bill. However, most investors are aware that tying much of their future security to the fluctuations of one stock is not prudent. Although this dilemma is not unique to the 21st century, today's environ-ment makes the issue of concentration ripe for discussion: Over the last decade, the capital-gains tax rates have been reduced by nearly half—strengthening the case for diversifica-tion sooner rather than later.

But the hold-or-sell decision goes far beyond resolving a binary issue: accepting the risk or paying the taxes. How much of a con-centrated position—if any—should an investor divest, and what should he do with the remainder? Should he consummate the sale in one transaction, or slowly over time? Can he hold on to his stock, reduce risk, and delay taxes by hedging? Inevitably, these are charged issues emotionally, and the decisions investors make can have life-changing consequences.

There is, of course, no singular solution (for investors in general or any given investor). A 75-year-old with substantial assets outside his single stock must approach the dilemma dif-ferently from an investor 30 years younger whose solitary stock constitutes the whole of her portfolio. And even for a particular investor, there's a myriad of variables to con-sider, since the future performance of any given stock as well as the market in aggregate is unknown.

To address these issues, we have created a framework that helps investors understand the financial implications of various strategies they might consider. It draws on our earlier research into historical single-stock risk/return attributes—a picture far worse than we sus-pect many investors would anticipate. Using the model as a driver, we can present an array of possibilities for an investor's future wealth, based on strategies that range from *holding* all of his stock to *selling* all of it. And the model will highlight the necessary trade-offs that each investor must consider in determining the best course of action for his unique circumstances. Armed with this analysis, we offer two key recommendations: the *optimal* sale amount, based on the investor's tolerance for risk, and the *minimum* sale amount to help ensure meeting his lifetime spending needs.[1] This framework can also be used to assess a range

of other strategies, including the liquidation of concentrated stock over time and advanced hedging techniques.

In this study, we begin by profiling the historical track record of single stocks versus the broad market, acknowledging the upside potential and the emotional appeal of concentrated positions but emphasizing their longer-term risk. Along those lines, we introduce a quantitative model designed to identify both a minimum and an optimal divestment percentage, tailored to each investor's circumstances. For corporate executives who are unable to execute a sale strategy all at once or for those investors unwilling to take that path, we analyze the trade-offs of various methods of selling over time. Finally, we explore the use of hedging tactics to manage single-stock risk, with a focus on prepaid variable forward sales (PVFs). By comparing expected wealth under various circumstances from hedging versus divesting, we identify situations where utilizing a hedge is likely to add value—or not.

THE RISK/REWARD IMBALANCE

Holding a single stock is alluring: There may be no better way to build massive wealth in the capital markets than by concentrating your portfolio. Indeed, though single stocks carry many well-known risks, entrepreneurial investors looking to substantially grow their wealth may see concentrating their assets as a route to meeting their objective (Brunel [2002]). For example, if an investor had put $1 million into Coca-Cola stock on January 1, 1984, it would have grown to $34 million by the end of 2003. The same investment in Wal-Mart would have grown to $49 million; an incredible $289 million in Microsoft (since the company went public in March 1986). Investors who bought these stocks early, and could withstand the volatility along the way (which in some cases reached extreme levels), trounced the S&P 500 long-term. However, if history is a guide, the odds are against the holder of a concentrated portfolio.

For one thing, few stocks—no matter how prized—have proven immune to a drastic turn of events. In Exhibit 1, we show how *Fortune* magazine's "Most Admired Companies" of 2000, published right before the market collapse, went on to perform during the heart of the bear market over the next 2½ years.

Of these 10 companies—each identified by corporate executives, directors, and analysts as America's best—seven lost at least half their stock value over this period. Despite their image of invincibility, they fared worse than the market as a whole during its most difficult period

EXHIBIT 1
Top 10 on *Fortune* "Most Admired" List: 2000

Company	Cumulative Return 3/31/00 – 9/30/02
Lucent	(98)%
Cisco	(86)
Intel	(79)
Home Depot	(59)
Microsoft	(59)
Dell	(56)
General Electric	(50)
S&P 500	(44)
Wal-Mart	(12)
Southwest Airlines	(6)
Berkshire Hathaway	29

Source: FactSet, Fortune, Standard & Poor's, and Bernstein.

since the Great Depression. Further, dramatic losses like these have not been a rare occurrence over the years, or confined to any particular industry. Shareholders of numerous large and once-prestigious companies—the likes of TWA, Magnavox, Enron, Singer, Zenith, PanAm, WorldCom, and Wang—have suffered mightily from poor management decisions, overexpansion, new competition, or unethical business practices.

"Average" Stock Has Lagged the Market

Moreover, our research reveals that poor results are not reserved for special cases: *The average stock tends to lag the market, and the more volatile the stock, the lower the expected growth*; see our prior work (Feld [1999]) and further detail by Ikenberry, Schockley, and Womack [1998] and Stein, Siegel, Narasimhan, and Appeadu [2000]. This assertion may appear puzzling. After all, the market comprises individual stocks, so how can the *average* stock underperform? The answer lies in the nature of a diversified portfolio, which is composed of many stocks that don't march in tandem with one another. Some will be gaining while others are losing, thereby muting the portfolio's volatility. Since fluctuations in results drag down performance, diversified portfolios have beaten single stocks, on average, over time.

Exhibit 2 analyzes the returns of the S&P 500 and the average single stock over the 20 years ending in 2003.[2] The average annual return generated by the S&P 500 during this period was 14.3%, while the compound growth rate—the true measure of the growth of wealth—was 13%. The 1.3-percentage-point difference is

1984–2003 Annualized

	Arithmetic Avg. Return	Risk Drag	Compound Annual Return
S&P 500	14.3%	(1.3)%	13.0%
Avg. Single Stock	14.3	(4.4)	9.9

Compound Annual Return by Volatility Grouping[4]

12.6% Low Volatility
10.3% Medium Volatility
6.5%   High Volatility
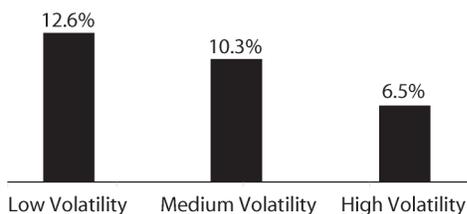
Source: CRSP, Standard & Poor's, and Bernstein.

Diversified U.S. Equities

Average Single Stock

Extra upside potential

Extra downside risk

(%)

Source: Bernstein.

attributable to "risk drag": the corrosive effect of volatility on compound growth. When we analyzed the performance of single stocks as a group, the results were far worse. They too had an average annual return of 14.3%;[3] however, the cost of volatility was much greater. The compound growth rate of single stocks was, on average, only 9.9%—not 1.3 but 4.4 percentage points behind their average annual result.

Further, when we grouped the single stocks into high-, medium-, and low-volatility cohorts, the results were striking.[4] The higher the volatility, the worse the compound growth rate.[5] The high–volatility stocks lagged the index returns by 6.5 points (cutting the market's return in half). Indeed, one out of five high–volatility stocks actually lost money over the full 20-year period, something the S&P 500 has never experienced over such a lengthy time frame since reliable records began in the 1920s. Further, the upside potential paled in comparison with the downside risk: Only 6% of the stocks in the S&P 500 beat the index by more than five percentage points a year over the 1984–2003 period, but 27% *under*performed by at least the equivalent amount.

In sum, the profile of the average single stock is decidedly unappealing. Over the 20 years ending in 2003, it earned essentially bond-like returns with far greater risk. As for the most volatile cohort of individual stocks, they averaged returns similar to T-bills'. Results like these appear to be at odds with the most basic principle of
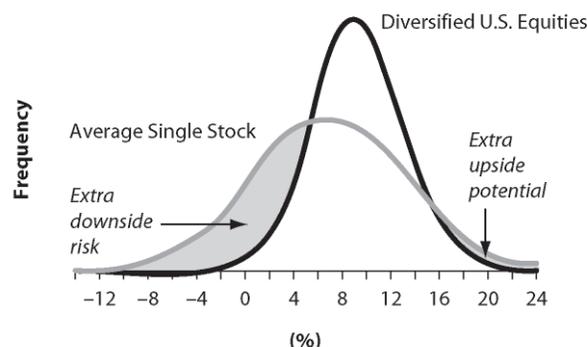
investing—that assets with higher risk should compensate with higher returns—but they are not. The analysis is consistent with finance theory, since it indicates that only market risks are rewarded, not *company-specific risks* (see, for example, Maginn and Tuttle [1990]).

As for future returns, Exhibit 3 illustrates our expectations moving forward for the average single stock and a diversified stock portfolio. On the horizontal axis of the display are compound annual returns, ranging from dismal on the left to superlative on the right. The expected frequency of each of those returns (out of 10,000 possible outcomes we modeled) is on the vertical axis.

Compared with the curve for the diversified portfolio, the curve for the single stock is:

- *Shifted to the left*: The average compound return generated by a single stock is likely to be lower than a diversified portfolio's.
- *Wider*: A single stock's returns tend to be far less predictable than a diversified portfolio's, and span a much broader range of possible outcomes.
- *Skewed*: The potential for a single stock to perform far better than a diversified portfolio, shown by the shaded area to the right, is far smaller than the likelihood a single stock will generate weaker returns, the shaded area to the left. In other words, while investors *may* get paid more in extra return for the extra risk they're taking on with a single stock, the odds are against them.

However, what if a single stock is seen as important enough to be emblematic of its industry? Consider, for example, a drug stock like Merck. Is exposure to this major

EXHIBIT 4
Time Mitigates Tax Penalty

Sale of XYZ Stock	
Current XYZ Stock Value	$10,000,000
Taxes Due (18.9% Rate)*	1,890,000
After-Tax Proceeds	8,110,000

Incremental Annual Return Needed to Recoup Taxes*

23.3% — 1 Year
4.3% — 5 Years
2.1% — 10 Years
1.1% — 20 Years
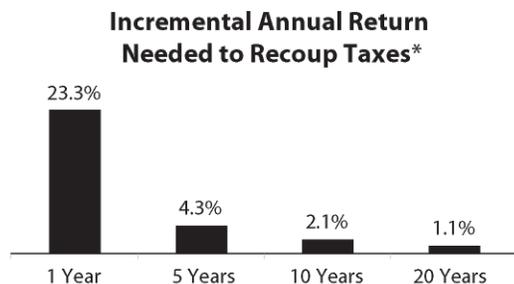
Cost basis assumed to be $0, with a federal long-term capital-gains tax rate of 15% and a state rate of 6%, yielding the 18.9% blended rate.

company a proxy for investing in pharmaceuticals in general? We analyzed the drivers of volatility in an investment in Merck. It turned out that only 20% of the stock's volatility was attributable to its industry. And another 16% of the volatility derived from the fact that Merck trades on the U.S. stock market (most stocks move in the direction of their home markets). The greatest portion by far—almost two-thirds—of Merck's share-price volatility was *purely a function of company-specific factors*, most of them unpredictable. The only reliable way to mitigate this risk is by diversifying into other companies and other industries.

The Impetus to Hold

All of the above seems to constitute a strong case for selling and diversifying much of the time. Single stocks are likely to carry far more risk than a diversified portfolio, with lower expected compound growth rates. Indeed, investors with concentrated exposure in a single stock who have *already* become quite wealthy have likely moved to a stage in their lives where significant wealth accumulation is of a lesser concern. Their concerns are predominantly protecting and growing their wealth (see Brunel [2002] on the "equity holding lives" of individuals). These are goals that a diversified portfolio is far more likely to meet. In fact, most fiduciaries, whether acting on behalf of a pension plan, a trust, or an individual investor, are now required to diversify. For example,

the Uniform Prudent Investor Act mandates that:

> A trustee shall diversify the investments of a trust unless . . . because of special circumstances, the purposes of the trust are better served without diversifying.

But that qualifier—"unless because of special circumstances"—is important, and often those special circumstances will relate to taxation. Most private investors of means will face a large tax bill if they sell. And although today's low tax rates reduce the cost of selling a low-basis position, a 15% federal gains tax is still a substantial amount to recoup.[7] Some state tax rates can add meaningfully more to the penalty.

In assessing the tax bill on a single-stock sale, an investor needs to consider not only its amount but his personal time horizon as well: how long he's willing to wait to earn the tax penalty back. The shorter the horizon, the more attractive avoiding a sale and holding the single stock becomes. To illustrate the relationship between time and taxes, in Exhibit 4 we assume that an investor owns $10 million of Stock XYZ, acquired many years ago at a zero cost basis. At a 6% state tax rate, the investor's effective blended federal/state rate would be 18.9%,[8] so if she sells her entire XYZ position she'll owe $1,890,000 in gains taxes.

To recoup her tax penalty, she'll need a return of 23.3 percentage points *over and above* what she would have earned if she didn't sell XYZ. Garnering that level of return from the market in one year would be highly unlikely. But if her time frame is longer than that, her picture changes dramatically. After 10 years, for example, the 23.3-point penalty would be recouped by an extra return of 2.1 points annually over what the investor's original single stock would have produced. It's a gap that diversification should generally be able to close: As shown in Exhibit 2, the market has historically outpaced the typical single stock by more than that. With a 20-year horizon, an incremental return of about one percentage point a year would be enough to justify a decision to sell and diversify. For many investors, however—even those with the time and the assets to easily absorb a one-time tax hit—taxes are only one of the barriers to diversification.

The field of behavioral finance has provided great insight into the crosscurrents between investing and psychology. The key conclusion from scores of studies conducted by investigators in this discipline is that when faced with monetary issues investors often eschew optimal alter-

Psychological Barriers to Diversification

Bias	Description	Investor Behavior
Anchoring	Assuming the future will be like the past	Expect continued outperformance from single stock: **HOLD STOCK**
Overconfidence	Overrated ability to predict uncertain occurrences	Single stock seen as a known and successful entity: **HOLD STOCK**
Attraction to long shots	Overestimating occurrence of positive low-probability events (like winning lottery)	Lure of big win: **HOLD STOCK**
Underestimating the likelihood of extreme events	Overly discounting the probability of unusually good and unusually bad outcomes	The possibility of life-changing negative results ignored: **HOLD STOCK**
Regret avoidance	Regret for *taking action* more intense than regret for negative consequences of taking *no action*	Single stock may continue to appreciate, which would cause regret had it been sold: **HOLD STOCK**
Reference dependency	Inappropriate reference point may influence decision-making	Reference point for a single stock tends to be its highest price; and so selling at a lower price feels like a failure: **HOLD STOCK**
Loss avoidance	Incurring large risks to avoid a sure loss	Avoid taxes attendant on diversifying: **HOLD STOCK**

natives because of one or another widely held behavioral bias (Kahneman and Riepe [1998]; Kahneman and Tversky [1973; 2000]; Nevins [2004]). As indicated in Exhibit 5, these behavioral biases tend to push investors in the direction of holding rather than selling a single stock—interestingly, whether the motivating factor is *avoiding* risk or *embracing* it in pursuit of the big payoff. As powerful as these behavioral inducements can be, studies have found that putting these decisions in an analytical framework can help investors arrive at better decisions (Kahneman and Tversky [2000]).

TWO CASE STUDIES

It seems that most investors would be wise to divest at least a portion of their concentrated positions. But how much is enough? The advice has to be customized. For each investor, the characteristics of his concentrated stock and his portfolio as a whole, the tax bill he'll face upon sale, his tolerance for risk, and his long-term goals are unique. We use a proprietary wealth-forecasting model that integrates the client's circumstances with our capital-markets forecasts and our single-stock return analysis to develop a tailored solution.[9] Our recommendations always

highlight two alternatives for the investor to consider: a *minimum* amount of the single stock to sell, designed to help ensure that his core needs will be met; and an *optimal* solution driven by his circumstances and risk tolerance. To bring this process to life, we present two representative examples of investors facing the single-stock dilemma.

Partners Sell Their Business

John Smith and Jane Jones have been partners for many years in a successful printing business, which they've decided to sell to XYZ Corp., a large conglomerate. In exchange, John and Jane each acquire $10 million of XYZ—a stock with medium-level volatility—in a non-taxable exchange of shares. Their effective cost basis in XYZ is zero. What should John and Jane do with their windfalls? We start with a profile of their circumstances and goals (*Exhibit 6*).

Jane is younger and more aggressive, and her goals are more ambitious, but her wealth is also considerably more concentrated: The lion's share of her money is tied up in XYZ. John's goals and lifestyle are more modest (he spends a lower percentage of his assets than she does, for example). He is aiming to protect his wealth; given

EXHIBIT 6
Case-Study Profiles

	John Smith	Jane Jones
Age	70	55
Investment Time Horizon	5 yrs.	20 yrs.
Total Net Worth	$20 million	$12.5 million
% of Net Worth in XYZ Stock	50%	80%
*Annual Spending Needs**	$400,000	$375,000
*Asset Allocation Excl. XYZ***	60% stock/40% bonds	80% stock/20% bonds
Self-Described Risk Profile	Moderate	Aggressive
Critical Goals	Preserve nominal wealth	Grow nominal wealth
	Limit volatility	Maintain lifestyle
	Maintain lifestyle	

*In first year, growing with inflation

**Stock allocation: 35% U.S. value, 35% U.S. growth, 25% developed foreign; 5% emerging markets. Bonds are 100% diversified municipals. Proceeds from any sales of XYZ are invested in this allocation.

his much shorter investment horizon, he is contemplating the time when his heirs could benefit from a step-up in cost basis. For both John and Jane, there are arguments for holding and arguments for divesting their XYZ shares. The case for at least some divestment seems clear for Jane. Aggressive though she may be, having 80% of her wealth in one stock is clearly dangerous. As for John, the concentration risk is not nearly as great, but there are still benefits in diversifying—namely, a sharp reduction in the volatility of his portfolio. *And so for both investors, our advice would be to reduce their holdings, although in Jane's case to a much larger degree.*

We'll begin with John:

> **Recommendation for "John Smith"**
> *Minimum Divestment: 0%*
> *Optimal Divestment: 40%*

With $10 million in assets exclusive of his XYZ shares, a short investment horizon, and a conservative spending budget, our analysis indicates that even if XYZ Corp. were to dissolve, the probability of John's failing to provide for his spending needs would be close to zero. Therefore, although holding on to all his XYZ stock carries risks, he need not divest to meet his core needs.

But John is concerned about short-term volatility, which can eat into his assets. And with a portfolio half in one stock, significant fluctuations in wealth—even over a relatively short period—are likely. We quantified the chances that he would experience a loss of 20% or more at any

point during his five-year time horizon. We'd estimate the probability of that event at 36% if he retains his current portfolio. That's probably more risk than John is prepared to accept. By selling a substantial portion (40%) of his shares and using the after-tax proceeds to invest in a diversified portfolio, John can reduce those odds to one-in-five. If he sells virtually all his XYZ, the threat becomes far smaller.[10]

How Much Can John Make?

Although diversifying would bring John significant risk reduction, the *cost* would likely be less wealth. Over only a five-year time horizon, it is unlikely that John could recoup the tax cost of selling. And so John faces the crux of the single-stock dilemma: how to make the best trade-off. The results of our analysis in John's case are depicted in Exhibit 7, which shows our upside, median-case, and downside forecasts for three divestment strategies.[11]

For example, if John were to sell 40% of his XYZ shares, we'd expect that after five years he'd have a 10% chance of ending up with a total portfolio worth $37 million or more, a 50% chance of having no less than $23.6 million, and a 90% chance of being left with at least $15.7 million. Of course, he could do better than that upside number—or worse than the downside. By way of contrast, if John were to *hold* all of his XYZ, we estimate that his median and upside outcomes would beat both of the two divestment alternatives we're considering here.

But that growth potential needs to be weighed against the risks to his future wealth. And on this metric, holding

"John Smith": Portfolio Value
After Taxes and Spending[6]

(Year 5, Initial Value: $20 Mil.)
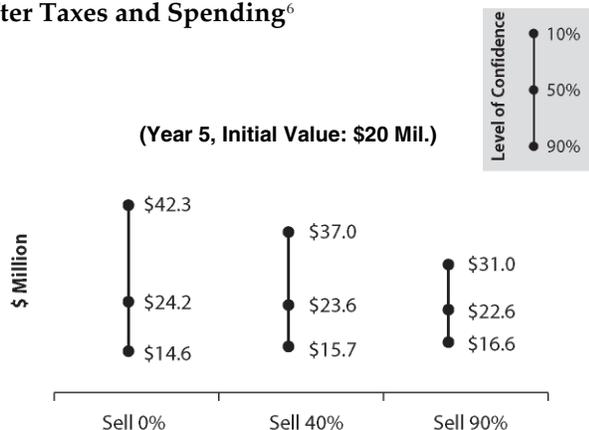
Based on information in the "John Smith" case study and Bernstein's return estimates.

"Jane Jones": Probability of Running Out of Money[6]

(Year 20, After Taxes and Spending)
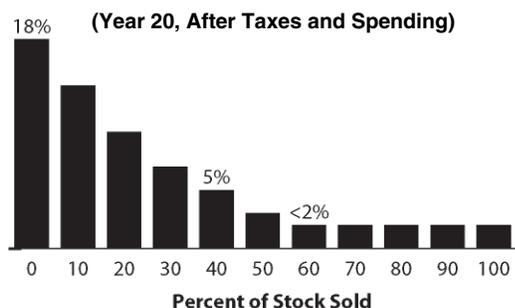
Based on information in the "Jane Jones" case study and Bernstein's return estimates.

creates a great deal more *variability*. If John held all of his XYZ shares and the stock performed poorly, his $20 million could end up being worth $14.6 million or less 10% of the time. At the other extreme, if he decided to sell 90%, we forecast that he'd cut his downside losses by $2 million versus holding—but also slash his upside potential. It's a classic risk/reward tug-of-war. By taking a "middle-of-the-road" course and selling 40% of his XYZ:

- He'd be only $600,000 worse off than holding in the median case;
- He'd gain $1 million more in downside protection;
- And he'd still have the opportunity to end up with almost twice as much money should the stock take off.

To identify the optimal decision for any investor, we combine the mathematical probabilities for his wealth in the future with *how he values those probabilities*—his appetite for big gains and his willingness to absorb large losses. Here we borrow from utility theory to quantify the amount of pleasure or pain that an individual experiences from different outcomes, given his unique appetite for return and tolerance for risk (Campbell and Viceira [2002]).[12] When we integrate this analysis with the results of our wealth-forecasting model, we arrive at the unique concentration level optimal for each individual. In John's case, given his conservative bent, the risk-reduction benefits of divesting 40% of his stock would prove valuable enough to forgo a limited amount of upside potential. Even though he is quite risk-averse, we would recommend that he hold a large amount of the stock. The taxes he would incur offset the value of further diversification, even considering his low risk tolerance.[13]

Jane Jones's situation is quite different.

Recommendation for "Jane Jones"
Minimum Divestment: 40%
Optimal Divestment: 90%

In our view, Jane should act immediately to sell at least 40% of her XYZ shares. With 80% of her money tied up in the stock, she runs a far greater risk than John of compromising her lifestyle. If XYZ blows up or underperforms over a long period of time, the consequences would be devastating. If Jane sells no XYZ shares and maintains her current spending levels, we'd estimate her probability of running out of money at nearly one-in-five over her 20-year investment horizon (*Exhibit* 8): an unacceptable level of risk for almost any investor. By divesting just 40% of her XYZ position—she'd still have half her net worth tied up in the stock—we estimate that Jane would reduce her chances of going broke from one-in-five to one-in-twenty. A 40% sale would be our recommended minimum divestment in this case.

What about the other side of the equation—Jane's return potential in holding all of her XYZ? Isn't it large enough to offset her risk of running out of money? Indeed, if XYZ should soar, the upside potential is huge: an ending value of some $93 million or more. However, as shown in Exhibit 9, if Jane divested 40% of her shares rather than holding, we'd expect her portfolio to be worth far more—fully $3 million more—in the median case, and her downside would improve considerably.

But Jane shouldn't stop selling at the 40% level. With

E X H I B I T   9

"Jane Jones": Portfolio Value
After Taxes and Spending[6]
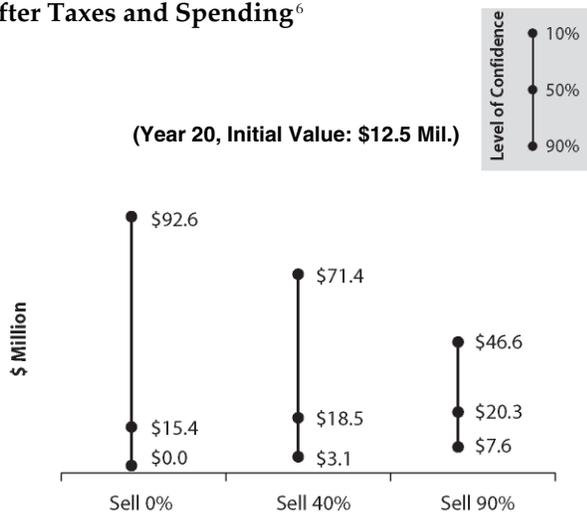
(Year 20, Initial Value: $12.5 Mil.)

Level of Confidence	
10%	
50%	
90%	

Based on information in the "Jane Jones" case study and Bernstein's return estimates.

E X H I B I T   1 0

Optimal Sale Recommendations by Stock Volatility*
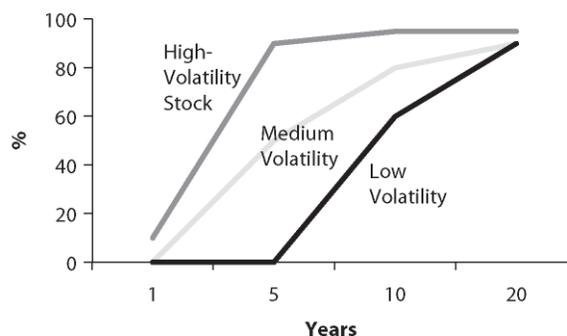
*Based on information in the "Jane Jones" case study and Bernstein's estimates of the range of returns for high-, medium-, and low-volatility single stocks. See Endnotes 4 and 6.

a 90% divestment, her median outcome would go up by close to another $2 million, reflecting the greater growth potential of a diversified portfolio over time. And while she'd give up significant upside versus the other scenarios, we'd estimate her downside portfolio value at $7.6 million. That may not sound very good, given that she started out with $12.5 million. But it's far better than being left bankrupt (our estimated downside with a 0% divestment) or with $3.1 million (the 40%-sale downside). Our optimal recommendation for Jane would be a 90% sale of her XYZ shares. Jane is more risk-tolerant than John, but her much longer time horizon and smaller pool of other resources lead us to recommend a larger sale.

Guidelines for Investors

These recommendations for John and Jane were tailored to their unique circumstances. Still, based on the variables that we analyze in every case, there is a set of principles that applies across the board. As the variables change, so must the recommendations. To illustrate, consider the three key principles below, and how altering assumptions can lead to radically different conclusions.[14]

1. *If more volatile, sell more.* All else equal, the more volatile the stock, the greater the risk borne by the investor and the lower the long-term growth. Therefore, a higher sale amount is typically prudent. But

the investor's time horizon can never be ignored. As shown in Exhibit 10, over a time frame as relatively short as five years, we'd advise selling some 90% of a highly volatile stock—far more than we'd recommend with a stock of medium or low volatility. But as the time horizon lengthens, the more the recommended sale percentages converge. Over 20 years, the chance of even a low-volatility stock underperforming—potentially at a dramatic level— becomes significant.

2. *If higher cost basis, sell more.* With a 75% cost basis in a zero-tax state, for example, all else equal we'd likely recommend divesting nearly all of a concentrated single stock. However, with a 0% basis in a high-tax state and a five-year time horizon, we'd probably advise selling about half the stock. But once again, as the time horizon extends outward, the diversification benefit tends to overwhelm the tax bill.

3. *Spending policy, volatility, and time horizon are all interrelated.* The critical factors determining minimum and optimal diversification levels all affect one another. Exhibit 11 illustrates how a minimum sale recommendation would be likely to vary with stock volatility and investor spending levels. The higher the spending budget and the greater the single stock's volatility, the higher we'd set the minimum divestment percentage. Indeed, at a spending level of about 3½% a year (grown with inflation), we'd recommend divesting at least half of even a low-volatility stock, and the lion's share of a high-volatility holding.

E X H I B I T 11
Minimum Sale Recommendation by
Spending Rate and Stock Volatility*

Percent of Starting Asset Value**	Stock Volatility		
	Low	Average	High
2.5%	0%	20%	30%
3.0%	20	40	50
3.5%	50	70	80

Spending†

**Based on information in the "Jane Jones" case study and Bernstein's esti-
mates of the range of returns for the stock groupings in the table. See
Endnotes 4 and 6.*

**Grown with inflation.

*†Spending is net of income. If the investor planned to remain in the work-
force for a lengthy period (and hence was less dependent on the single
stock), our minimum recommended sale amount would decline.*

E X H I B I T 12
Portfolio Value After Taxes[6]
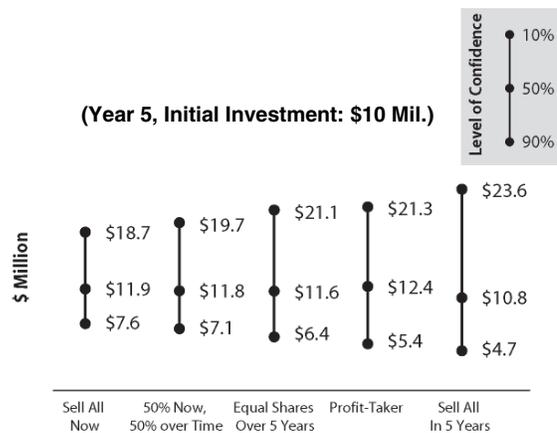
*Assumes that investor is subject to 6% state tax.
Source: Bernstein.

SELL IN STAGES—OR ALL AT ONCE?

Investors may be uncomfortable with divesting a sub-
stantial piece of their stock all at once. They may be con-
vinced that their stock is undervalued and poised for a
rebound. They may be uneasy about paying a large tax bill
in one year, or concerned about the impact that a large sale
might have on the market if executed too quickly. In the
case of corporate insiders subject to company or regulatory
trading restrictions, a blueprint for staged selling—a so-
called 10(b)5-1 plan that specifies how much and when a
stock will be sold—may be a valuable tool for helping exec-
utives achieve their long-term diversification goals.[15]

In situations like those, timed selling strategies can
offer "middle-ground" alternatives that allow investors to
smooth out their tax hit and retain meaningful upside
potential. Below are some options that might be consid-
ered by investors wishing to divest their holdings over a
five-year period:

- Sell all the stock now that they wish to sell (no
  staging)
- Sell 50% now, then equal portions quarterly over
  the next four years
- Sell equal portions quarterly over five years
- Sell as the stock appreciates—and in any case, after
  five years (the "profit-taker" approach)[16]
- Sell all the stock after five years

Increased Upside *and* Downside

Exhibit 12 presents our assessment of the rewards
and risks of these alternatives, using our wealth-forecasting
tool, for an investor with a $10 million position in a stock
with medium-level volatility. The outcomes (after taxes)
assume that all sale proceeds are reinvested in a diversified
stock portfolio.

The pattern is almost perfectly symmetrical: The
longer the hold, *the greater the upside potential* versus up-
front sale, but (in all cases save one) *the lower the median*
—and *the greater the downside risk*. It's a pattern that fol-
lows logically from the risk/reward characteristics of single
stocks. In our example of a $10 million position, we esti-
mate that an investor who waited five years before selling
any of her concentrated stock would increase her upside
potential by $5 million versus an immediate lump-sum
trade. On the other hand, the longer the investor waits
to divest, the more likely her concentrated stock will run
into a bad patch. If the investor waited the full five years
to sell any of her shares, our downside estimate is an after-
tax portfolio value of $4.7 million—fairly grim, since she
started out with more than twice as much. If instead she
sold half her shares immediately and the remainder in
equal installments over the five years, we'd expect a down-
side value almost $2½ million better.

The one exception to this pattern is the profit-taker
approach, which has the highest median outcome of all—
since the investor is taking money off the table only when
the stock shoots up. However, if the stock is held in the
face of negative price momentum, the downside risk is

EXHIBIT 13
A Representative Prepaid Variable Forward

- Investor receives up-front payment (typically 80–90% of value) in exchange for delivery of variable amount of shares or cash in the future
- Floor price protects investor from decline in value of the stock
- Cap price allows investor to participate in limited stock price appreciation

Enters prepaid forward contract
Investor → $10MM stock held as collateral
Investor ← Up-front payment ← Counterparty

Settles prepaid forward contract
Investor → Delivers shares (or cash) → Counterparty
Investor may retain some shares if stock price appreciates

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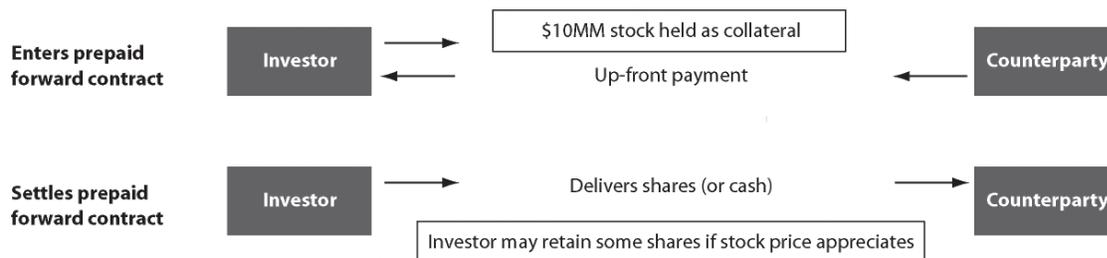
severe. In that case, we'd expect the profit-taking investor to be left with essentially half her original position.[17] In our view, this approach generally carries too great a price.

Timed strategies can offer viable alternatives for many single-stock holders. Still, for all the reasons above, we generally favor immediate divestment of all the shares earmarked for eventual sale. In all cases (except, of course, where prohibited), we'd advise selling at least the *minimum* divestment recommendation up-front: We wouldn't recommend that investors take extra risk with the assets needed to meet their core spending needs.

HEDGING SINGLE-STOCK RISK

Holding, selling, and trimming do not exhaust the possibilities for owners of concentrated stock positions. Some believe that hedging strategies can "do it all": protect wealth, delay taxes, provide further upside potential in one's stock and diversify a portfolio at the same time. Over the last several years, prepaid variable forwards (PVFs) have become the hedging strategy of choice for many investors (Smith and Eisinger [2004]).[18] But unsurprisingly, they are not a free lunch. So how can one determine when hedging will or will not be a better alternative than a straight sale?

In this study we employed our wealth-forecasting model as a guide to answering that question for investors in a variety of circumstances, with different time frames and different settlement methods for the hedge (physically—delivering the shares to the counterparty—or keeping the stock and paying cash). We considered various return scenarios for single stocks and for the market

—and factored in taxes. Using this methodology, we highlighted the critical trade-offs for any investor considering hedging—since, of course, there's no one-size-fits-all answer. Since PVFs have become so popular, we devote most of our discussion here to that vehicle.

How a PVF Works

PVFs are complex instruments,[19] and their structure has been the subject of detailed studies other than our own (see Welch [2003], for example). But to review, imagine that an investor owns $10 million worth of a single stock. By entering into a PVF contract with a counterparty (usually an investment bank), he agrees to sell his shares at a specified future date. In exchange, he receives an up-front cash payment representing the lion's share (usually 80%-90%) of the stock's current value (*see Exhibit 13*). He can do anything he wishes with that money—invest in a diversified stock portfolio, for example. The contract would typically give him downside protection through a predetermined floor price for the stock and the potential to participate in a portion of its upside, should it appreciate.

Further, since the delivery amount is not preset but dependent on the value of the stock at the expiration of the contract, no taxes would be due until then. And the investor could choose to settle either by delivering his stock to the counterparty (so-called "physical settlement") or—if he wanted to retain his shares—by cash. This structure is much like a traditional collar's (providing downside protection via a purchased put and a limited upside via a sold call)—but with a more effective mechanism for diversification via the large up-front cash pool.[20] Of course,

Probability of Three-Year PVF Outperforming Sale After Taxes*

Stock Annualized Return				
10%+	>98%	>98%	>98%	>98%
5–10%	96%	97%	93%	92%
0-5%	8%	10%	12%	11%
Negative	<2%	<2%	<2%	<2%
	Negative	0–5%	5–10%	10%

Market Annualized Return

*Assumes federal capital-gains taxes at 15% and state gains taxes at 6%, reinvestment of proceeds in 100% diversified equities, investor retention of the current dividend on the hedged stock, and physical settlement of the contract.

Source: Bernstein.

none of this comes free, since the up-front payment the investors receive is less than the full value of their stock. That gap represents the cost of the PVF's embedded options and the financing of the cash proceeds.

Prepaids are not for everyone. They're complicated, often misunderstood, and require large amounts of money. But they can be a preferred means of managing a concentrated position, particularly for:

- *Investors unwilling or unable to relinquish their single stock* for emotional reasons or because of trading restrictions.[21] These investors will often find the downside protection of hedging valuable relative to holding.
- *Investors with short time horizons.* Upon their death, their heirs may be entitled to a step-up in cost basis on the assets they inherit, meaning that they could avoid paying capital-gains tax altogether. In this situation, hedging can be a better strategy than holding or selling.

Selling Offers Better Protection

To begin, we analyze whether a typical three-year PVF, physically settled at expiration, would be preferable to a straight sale. When the shares are physically settled, taxes are due on the position. So the question becomes whether the benefits of tax deferral and the upside potential in the stock outweigh the costs of the PVF; clearly, this depends on the specifics of the situation. Exhibit 14 illustrates the probabilities that such a PVF would outperform an outright sale given varying market returns (the hori-

zontal axis) and single-stock returns (vertical axis). We're assuming a $10 million single-stock position ($100 per share, $0 cost basis). The PVF is structured as follows:

- An up-front payment to the investor of $85.80 per share
- A floor of $100 per share (akin to a purchased put)
- A cap at $120 per share (akin to a sold call)

It's clear that *the better the stock performs, the more likely that this representative PVF will beat outright sale.* In fact, the performance of the single stock is the most important determinant of whether the PVF beats outright sale. Once the stock hits a return target of about 5% a year (including dividends—not an excessively difficult bogey), the PVF is likely to win out. With that amount of appreciation, the investor in this case will more than cover the cost of the transaction ($14.20 per share—the difference between his $100 initial position and the up-front payment he received). Interestingly, how the market does is virtually irrelevant, since the up-front payment from the PVF has provided the investor with the means to create a diversified portfolio of comparable size. One way or another, the investor "owns the market." However, it should be noted that PVFs can be structured in various ways. Some investors may be particularly bullish on their single stock and therefore choose to accept a smaller up-front payment in hopes of a big payoff from their concentrated position. On the other hand, an investor less sanguine about his single stock may opt for a large up-front payment as a protective tactic.

In the case of our representative PVF, we estimate that the single stock will meet its 5% hurdle rate about half the time. There's some irony here, since a PVF is often thought of as a hedge against poor single-stock performance. In reality, if the stock performs poorly the investor would have been better off *selling*. The stock's appreciation is needed to offset the PVF's cost, since the investor will still owe taxes on the up-front payment when he settles the contract. In this $10 million example the PVF had a downside $600,000 worse than a straight sale. With a success rate of only 50%, and a downside worse than a straight sale, this PVF does not represent a particularly enticing financial payoff for the investor: Its appeal is largely emotional (continuing to hold a stock that's been a winner and delaying a big tax bill). On the other hand, if this same strategy is adopted to protect a stock position that may receive a near-term step-up in cost basis as a result of the owner's death, the results would improve dra-

matically. In that situation, well over $1 million in taxes would not just be deferred, but probably *eliminated*, since the stock would be delivered to the heirs at full basis. This is why hedging can be particularly useful for investors with short time horizons.

Incidentally, investors concerned predominantly with downside insulation may be better off with traditional collars. With a collar, an investor is not compelled to incur additional financing costs for diversification purposes. Some investors believe that *monetized collars* can provide comparable protection with more favorable tax treatment than PVFs. While details on the debate are beyond the scope of this article, readers interested in pursuing the topic should see analyses by Gordon [2001] and Gordon and Rosen [2001].

The Specter of Straddle Taxation

So far we've been assuming that the investor gives up his shares when the hedging contract expires. But some investors may not want to do that. They may want to take back their shares, believing that they have become undervalued. They may want to enter into a new hedge that would offer continued downside protection in the stock while delaying taxes even longer (or possibly eliminating them). In order to do this, an investor can settle his contract by delivering cash instead of shares. Unfortunately, though, cash settlement can bring a host of complications—and the longer the hedge is maintained on that basis, the more damaging the effects can become.

The concept of cash settlement sounds appealing: Since the shares are never delivered, no taxes are due. However, investors haven't escaped taxation altogether, since they have responsibility for the tax consequences of any *gains or losses on the hedge*. This raises a key problem called "straddle taxation." The rules are complicated, but the concept is simple: If a hedging transaction is settled in cash, any gains from the hedge are *taxable immediately* at *higher short-term rates*, while losses from the hedge are treated as *long-term* and *may not be deductible until the underlying stock is sold*.[22] For the investor, this is a lose–lose proposition.

Although the implications of straddle taxation are essentially the same with virtually any hedging transaction, we'll stick with our representative $10 million PVF to illustrate the potential complications that may arise if the stock either *rises* or *falls* significantly:

- If the stock has dropped to $60 at settlement, the investor will be required to come up with cash to

buy back his shares from the counterparty. Since he has already received $85.80 up-front, that shouldn't pose a problem. However, the investor does owe *short-term gains* taxes, due immediately, on the $25.80 per share he's gained on the contract. What would have ordinarily been part of a long-term gain (on the up-front $85.80) is now subject to highly unfavorable short-term treatment. Assuming a combined federal and state rate of 38.9%, that translates into a tax bill of $1 million. If the stock drops low enough, the tax bill due on the hedge may be larger than the taxes that would be owed if the investor had opted to physically deliver the shares. In that case, the investor is left paying the taxes he had hoped to avoid and divesting the stock he had presumably hoped to hold (at least for a while).

- If the stock has risen to $160 at expiration, settlement will also be sticky. The investor will get to keep shares equal to the first $20 of the gain, since that's the cap on the PVF. But that's the extent of his upside participation. If he decides he wants to retain his shares unhedged he'll need to pay the counterparty $140 per share, or $14 million. Even if he had that cash on hand, would he want to vastly increase his concentration risk? And while he'd be due a $5.4 million capital loss (*long-term*), he wouldn't be able to harvest it until the underlying shares were sold. Alternatively, if he is still averse to selling any of his stock, his best bet is probably to remain hedged by "rolling over" the PVF, using the up-front proceeds from the new contract to help pay the counterparty. In so doing he's also preserved the potential for a step-up in cost basis down the road for his heirs. However, as we discuss below, rolling over is costly, and the longer the technique is employed the less likely it will prove to be effective.

Rolling Over: Time Hurts

The critical issue in rolling over is whether avoiding the capital-gains tax on the underlying stock outweighs the costs and complications of continuing to enter into a new hedge. To address this question, we looked at two strategies using cash settlement (*Exhibit 15*): hedging for three years with a PVF; and hedging for nine—i.e., "rolling over" the three-year hedge twice.

Over the three-year period, our representative PVF beat outright sale on the upside, on the downside, and in the median case, highlighting the short-term benefits of tax deferral. However, since the investor has cash-settled

EXHIBIT 15
Rolling Three-Year PVFs*
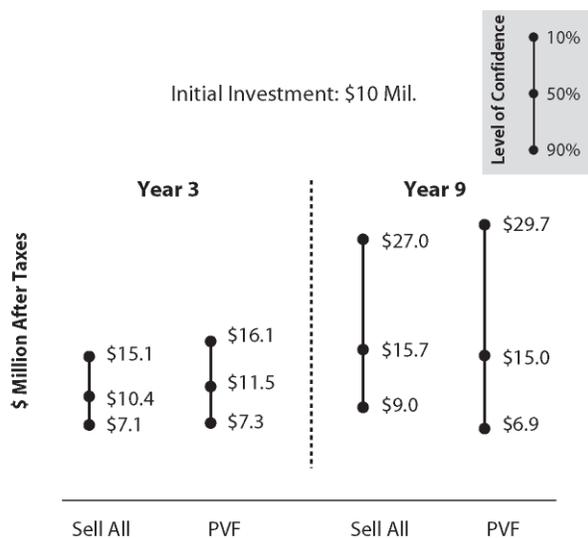
*Assumes cash settlement for previous PVF contracts and rollovers to new contracts using the up-front payments from subsequent contracts. Assumes floor and cap remain constant at 100% and 120% of price at times of roll. Up-front payment, initially at $85.80, will vary at each roll, primarily based on interest rates and the stock dividend. See Endnote 6.

Source: Bernstein.

and discontinued her hedge, she's back where she was at the beginning: holding a highly concentrated low-basis stock. If she continues to roll over her hedge, time is not her friend. After nine years, in our judgment, in the absence of a cost basis step–up, the investor would clearly have been better off had she sold outright. The PVF loses to sale by more than $2 million on the downside and by $700,000 in the median case. The longer the hedging strategy is employed, the more the costs and risks build.

Still, although an outright sale is typically the best long–term bet, hedging—whether with a PVF or another vehicle—can be preferable to doing nothing, particularly if the stock represents nearly all of the investor's net worth. Regardless, for any investor considering hedging, careful individualized attention by tax and legal professionals, as well as investment experts, is critical.[23]

CONCLUSION

Single stocks have demonstrated a pronounced ten–dency to underperform the market over time. This sug–gests to us that given a long enough investment horizon, selling a substantive portion of one's holdings outright and paying the taxes is probably the best strategy. At a

minimum, investors should act to divest enough shares to help ensure meeting their long-term spending needs. Fur–ther divestment—up to an optimal point that we attempt to identify using a quantitative wealth–forecasting model—is, in our view, often beneficial.

For a subset of investors, particularly those with short investment time horizons or restrictions on sale, hedging via derivatives or, in some cases, staged rather than immediate sale may be the best way to manage a concentrated position. However, the broader appeal of these strategies is limited.

In our view, an analytical model that quantifies the costs and benefits of each strategy in a host of market environments is critical to ensure that investors and their advisors make well–informed decisions. Such a model can also highlight the risk/reward balance of strategies that lie beyond the scope of this article, including alternatives for investors with philanthropic intent, such as establishing charitable remainder trusts and foundations.

APPENDIX

NOTE ON BERNSTEIN WEALTH FORECASTING SYSTEM

Bernstein's Wealth Forecasting Analysis is designed to assist investors in making their long-term investment decisions as to their allocation of investments among categories of finan–cial assets. Our planning tool consists of a four-step process: 1) Client-Profile Input: the client's asset allocation, income, expenses, cash withdrawals, tax rate, risk-tolerance level, goals, and other factors; 2) Client Scenarios: in effect, questions the client would like our guidance on, which may touch on issues such as when to retire, what his cash-flow stream is likely to be, whether his portfolio can beat inflation long-term, and how different asset allocations might impact his long-term security; 3) The Capital-Markets Engine: a model that uses our propri–etary research and historical data to create a vast range of market returns, which takes into account the linkages within and among the capital markets (not Bernstein portfolios), as well as their unpredictability; and finally 4) A Probability Distribution of Outcomes: Based on the assets invested pursuant to the stated asset allocation, 90% of the estimated ranges of returns and asset values the client could expect to experience are represented within the range established by the 5th and 95th percentiles, typically illustrated on graphs. (In this study, we have omitted the 5th and 95th percentiles, focusing on the outcomes between the 10th and the 90th percentiles.) Outcomes outside the 10th-to-90th-percentile range are expected to occur 20% of the time. Expected market returns on bonds are derived taking into account yield and other criteria. An important assumption is that

stocks will, over time, outperform long bonds by a reasonable amount, although this is in no sense a certainty. Moreover, actual future results may not meet Bernstein's estimates of the range of market returns, as these results are subject to a variety of economic, market, and other variables. Accordingly, the analysis should not be construed as a promise of actual future results, the actual range of future results, or the actual probability that these results will be realized. For full details on our methodology and assumptions, contact Bernstein.

ENDNOTES

The authors thank Richard L.N. Weaver and Robert I. Greene, both of Bernstein Investment Research and Management, for their key contributions to this article.

[1] Sometimes the investor can maintain his lifestyle, whatever happens to the individual stock—and so holding the entire position is an acceptable alternative. However, the investor is often at some risk of bankruptcy if he does not sell at least some of his single-stock position. Our model will highlight this, and in these cases, we'll always recommend a minimum sale amount.

[2] For companies that stopped trading because of mergers or bankruptcies, we assumed investment in the market index from that date forward.

[3] It is a fortunate coincidence that the return of the average individual stock equaled that of the market index over this period. Because the index is capitalization-weighted, among other reasons, this need not be the case. However, two relationships are true for all periods: The risk of individual stocks, on average, is far higher than the market's, and therefore their risk drag is notably larger. Therefore, we conclude, it is reasonable to assume the expected compound growth rate for the average stock will be notably lower than for the market as a whole.

[4] We grouped stocks based on volatility during the prior five full years (1979-83). Low-volatility stocks represented 25% of the index and had volatilities less than 24%; medium-volatility stocks represented 50% of the index and had volatilities ranging from 24%–35%; high-volatility stocks represented 25% of the index and had volatilities in excess of 35%. S&P 500 volatility was 15.8%; all volatilities are based on the annualized standard deviation of quarterly returns.

[5] Investors often look at an investment's average return over a period of years. However, this is not the rate at which wealth invested in that asset will grow. Consider three investments, each held for two years. Investment A earns 10% in each of the two years. Investment B begins by gaining 30% in the first year, but then losing 10% in the second; C gains 50% at first and then declines 30%. Each of these has an average annual return of 10%. However, the first has no annual volatility, while the second and third fluctuate from one year to the next. The more volatile an investment, the more its *compounding* rate—the true measure of the growth of wealth—deviates from its average return, since making up for a loss requires more than a commensurate subse-

quent gain. This concept is sometimes called "risk drag." In this case, it reduces Investment B's compounding rate relatively modestly to 8.3% and C's to only 2.7%. (Investment A, of course, compounds at its average 10% rate.) Mathematically, the relationship among these concepts can be approximated by the formula: Expected Compound Growth = Average Arithmetic Return − Volatility^2/2. This concept was the topic of a *Wall Street Journal* article in October 2003 (see Whitehouse [2003]).

[6] Based on Bernstein's estimates of the range of returns for the applicable capital markets over the time frame indicated in the exhibit. Data do not represent any past performance and are not a promise of actual future results. See the Appendix for further details.

[7] Tax rates are based on Code as of June 2004; unless a future Congress extends the current tax code, on January 1, 2009, the maximum long-term federal capital-gains tax will revert to 20% from its 15% level at this writing.

[8] Some investors who sell their stock at a large gain may be subject to the Alternative Minimum Tax and would therefore have a higher effective tax rate.

[9] For a more detailed discussion of our wealth-forecasting system, see the Appendix.

[10] For illustrative purposes, we are showing only three divestment percentages; we model all sale amounts from 0% to 100% in 10-percentage-point increments.

[11] In line with note 10 above, we model our forecasts for any level of probability in 10-percentage-point increments. In addition, for the purposes of this article we are showing the upside as the outcome at the 10th percentile of probability and the downside as the outcome at the 90th percentile. Our model is built to show values from the 5th to the 95th percentiles; see the Appendix; we have omitted those extreme cases here.

[12] To make these comparisons we use something called the "Constant Relative Risk Aversion" utility function. The "utility" of a given level of wealth is expressed by:

$$\text{Utility} = (\text{Wealth}^{(1 - 1/K)})/(1 - 1/K)$$

where K represents the individual's risk aversion. To assess the investor's risk aversion, we use his expressed preference between stocks and bonds. For example, an investor who would allocate his investments 100% to bonds would have a far lower value of K than an investor who would allocate 100% to stocks. For each strategy, the utilities of the various possible outcomes are averaged to arrive at the expected utility. The strategy with the highest expected utility value would be optimal.

[13] Hedging with derivatives may also be appropriate for John, given the combination of his short time horizon and risk aversion; see below under "Hedging Single-Stock Risk."

[14] The data underlying our three general divestment guidelines are based on the "Jane Jones" case study, but the relationships apply universally.

[15] In October 2000, the Securities and Exchange Commis-

sion added this rule to the Securities Exchange Act of 1934. Rule 10(b)5-1 provides an affirmative defense against insider-trading liability if a corporate insider demonstrates that before becoming aware of inside information he entered into a binding contract to purchase or sell a security, instructed another person to purchase or sell a security, or adopted a written plan for trading securities.

[16]A typical profit-taker approach might work like this: The investor sells 25% of his initial shares if a $100 stock rises to $120, 50% if the stock rises to $140, 75% at $160, and 100% at $180. Even if these targets are not met, the entire position targeted for divestment is sold at the end of the designated time period.

[17]An investor following the profit-taking approach might consider selling a series of call options that have exercise prices equal to the market prices at the points she wishes to sell. Though not shown in our display of outcomes, the income generated from the call premium due to the investor would modestly mitigate her downside risk, and the strategy would provide a disciplined method for exiting the position.

[18] In their *Wall Street Journal* article, Smith and Eisinger [2004] cite a Thomson Financial study that in 2003 more than 80% of corporate insiders' hedging transactions were prepaid forwards.

[19]A PVF contract is highly complex and needs to be structured properly because of tax and other considerations. Any investor considering a PVF should consult his legal and tax advisors.

[20]An investor can borrow money against a collar, but if he plans to reinvest the funds in marginable securities, his loan is limited by regulation to 50% of the market value of the stock underlying the collar.

[21]This group may include corporate insiders. Investors facing corporate or regulatory restrictions should consult their legal and tax advisors before entering into a PVF contract. Some of these investors may not be permitted to sell or hedge their shares.

[22]Straddle-taxation rules apply only to stocks purchased after January 1, 1984.

[23]Bernstein does not offer legal or tax advice, but can play a role by evaluating the financial implications of various hedging alternatives.

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