Increasing the Tax-Effectiveness of Concentrated Wealth Strategies

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Despite living through dramatic market declines, horror stories from friends, colleagues, and the media, and a surfeit of market research, many investors continue to hold too much of their net worth in a single concentrated stock position. This may because of where the investor is on the "Investor Life Cycle" (see Brunel [2003]), or perhaps because of behavioral finance-related issues that hinder the investor from making rational decisions with respect to his stock holding (see Welch [2004]). Perhaps the age-old "fear and greed" is preventing the investor from taking appropriate steps to reduce her exposure—fear of paying taxes and greed for more profit from a higher stock price.

The risks the investor is taking from a concentrated stock position are well researched and documented (see Siegel et al. [2000], de Vassal [2001], Loeper [2001], and Boyle et al. [2004]). And the conclusions are clear—investors holding concentrated stock positions are not being adequately rewarded for the risk they are taking. In a slightly different vein, a recent study indicates that one commonly recommended "leveraged diversification" strategy (i.e., taking out an unprotected margin loan against the concentrated stock position and using the proceeds to diversify) actually *increases* the overall risk position for the investor—it is worse than doing nothing at all (see McCann and Luo [2003]).

Investors that do understand the need for protection and/or diversification are faced with multiple strategies for accomplishing their goal. Although charitable and/or gifting strategies (charitable remainder trusts, private foundations, donor advised funds, etc.) are viable alternatives, this article focuses on increasing the tax efficiency of variable prepaid forwards (VPFs), one of the most commonly used financial strategies.

Investors seeking diversification are initially faced with the "sell or hedge" decision, and this fundamental decision is driven by investor expectations for the future of the stock. If the investor is bearish on the stock, then selling is the preferred strategy. If the investor is bullish, then hedging and monetization strategies (a collar and loan or a VPF) may be viable. For a more in-depth discussion of the mechanics of various hedging strategies, see Kiefer [2000], Miller [2002], and Boyle, et al. [2004].

An outright sale of the stock can be made more effective through the use of a "completion strategy," whereby the after-tax proceeds of the sale are reinvested into a portfolio that is as non-correlated as possible to the underlying concentrated stock, thereby reducing the sector- and security-specific risk associated with the concentrated holding (see Siegel et al. [2000]). And any sales program for taxable investors potentially can be improved with the use of tax-enhanced index products (products designed to closely track the performance of a specified index on a pre-tax basis, while

actively harvesting losses within the portfolio that can be used to offset gains elsewhere in the portfolio). As an alternative, Farr [2004] suggests that the prudent use of long/short equity hedge funds can be used to improve the tax profile of a diversified stock liquidation strategy.

Farr also writes: "Some research suggests that immediate diversification is superior to monetization techniques such as a variable prepaid forward transaction—unless the proceeds from the monetization are invested in a tax efficient investment strategy."[1]

The purpose of this article is to explore this concept that integrating VPF hedging strategies with a tax-enhanced reinvestment portfolio may improve the effectiveness of the VPF as a diversification strategy. VPFs can be thought of as a tax-deferred sale of the hedged stock—the investor receives cash today for reinvestment, but does not pay taxes on the sale of her stock until the maturity of the VPF (assuming a physical settlement at maturity). To the extent that a tax-enhanced reinvestment strategy is employed with the proceeds of the VPF monetization, the investor should be able to realize an index-like return on the reinvestment portfolio while harvesting losses along the way that can be used to reduce or offset the taxes due upon settlement of the VPF.

Using an actual (but disguised) case study, the authors will present a realistic investor scenario and then illustrate how the combination of a VPF with a tax-enhanced reinvestment portfolio can improve the overall effectiveness of the diversification strategy. One primary goal is to illustrate to investors who are reluctant to diversify out of their concentrated single stock position because of the taxes incurred when the stock is sold[2] that there may be strategies available that provide downside protection, generate immediate liquidity for an index-like diversification strategy, and defer and reduce the ultimate tax hit realized when the concentrated stock position is sold.

A BRIEF REFRESHER ON VPFs

Variable prepaid forward sale strategies (VPFs) are most appropriately thought of as a tax-deferred sale of stock. In exchange for a cash advance today, the investor agrees to deliver a contingent number of shares at the maturity of the transaction (typically two to five years later). Mechanically, a VPF consists of a collar and an embedded loan against the protected stock. That is, the investor purchases a put option on the underlying stock (which provides downside protection), sells a call option on the stock (which puts a cap on the amount of upside growth retained and partially or completely pays for the cost of the put option), and takes an up-front cash advance against the protected position.

The put and call options need to be far enough apart (the rule of thumb is a "bandwidth" of 20%) to avoid the constructive sale rules,[3] and the trade is explicitly documented to not be a loan, but rather a forward sale of securities. This allows the counterparty bank to avoid Regulation T or Regulation U margin lending restrictions on how much it can advance to the investor.[4]

The investor receives a cash advance up-front (typically between 75%-90% of the market value of the stock, depending on the stock being hedged and the structure being executed), with no restrictions on how those proceeds can be reinvested. In exchange, the investor agrees to deliver some number of shares at the maturity of the deal. Exactly how many shares will be delivered is determined by the structure of the deal and the price of the stock at maturity (see Welch [2001, 2003]).

The IRS has ruled favorably on the tax treatment of VPFs, assuming they are properly structured and executed.[5] So, upon successful execution of a VPF, the investor has achieved four primary objectives:

1. Downside protection (defined by the put strike price);
2. Upside growth retention (defined by the call strike price);
3. Immediate liquidity for diversification (defined by the up-front cash advance); and
4. Tax deferral (defined by the maturity of the transaction).

CASE STUDY

Investor A (Investor) is an affiliate of large company (ticker: "ABCD") that trades on the Nasdaq. The investor plans to remain actively involved in the management of ABCD, and holds a significant percentage of his net worth in company stock. He currently owns 1 million shares of the company, and the stock is trading at $15 per share.

The investor is bullish on the future of ABCD, but recognizes the need for increased diversification in his personal portfolio. He does not want to sell the shares outright, and is investigating alternative disposal strategies. As a resident of California, the investor is subject to both federal and state capital gains taxes.

As an affiliate, one appropriate strategy may be the use of a VPF (Welch [2001]), and based on discussions with

EXHIBIT 1
Alternative VPF Hedging Strategies for ABCD

Ticker Symbol of Underlying Shares:		**ABCD**	
INPUTS			
Maturity:	**3.00 years**		
Number of Shares to be Hedged:	1,000,000		
Spot Price:	$15.00	Avg. Basis in the Stock: $5.72	
Current Market Value of Stock:	$15,000,000		

VPF Structure	Percent	Price	Stock Growth Rate Retained By Investor (Per Annum)
Floor Price: Wide Band	90%	$13.50	
Ceiling Price: Wide Band	130%	$19.50	9.14%
Floor Price: Narrow Band	100%	$15.00	
Ceiling Price: Narrow Band	120%	$18.00	6.27%

VPF Structure	Percent		Price	Implied "Financing" Cost (Per Annum)
Cash Advance Against the Wide Band VPF	82.51%	$12,376,500		
Repayment Amount on Wide Band VPF*	90.00%		$13,500,000	2.94%
Cash Advance Against the Narrow Band VPF	90.78%	$13,617,000		
Repayment Amount on Narrow Band VPF*	100.00%		$15,000,000	3.28%
After-Tax Proceeds of Sale of Stock	84.97%	$12,744,960		N.A.

Dividends on Underlying Stock:	$0.00	(per share, per annum)	
Capital Gains Tax Rate:	24.30%	(State and Federal)	(Assumes CA residency)
Tax Rate on Qualified Dividends:	24.30%	(State and Federal)	
Ordinary Tax Rate:	44.30%	(State and Federal)	(Tax Rate Paid on Any Hedged Dividends)

* Investor owes this amount back plus any increase in the underlying stock price above the ceiling price.

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the investor to determine objectives and views on the underlying stock, the structures illustrated in Exhibit 1 were priced. To summarize, the investor was interested in a three-year deal, and was interested in a relatively "narrow" structure (i.e., the 100%–120% VPF) and a relatively more "bullish" strategy (i.e., the 90%–130% VPF). These structures were put out for competitive bid among multiple counterparty firms, which were asked to solve the cash advance rate for each structure. The results of the winning bid are shown in Exhibit 1. One other important input into the overall analysis is the historical volatility of ABCD, which was assumed to be 42%.

ANALYZING THE RISKS OF REMAINING UNHEDGED

Remaining unhedged in a single stock by definition entails the notion of risk. While the client in this particular case study recognized this risk on a qualitative level and decided to diversify out of the single stock, it is often helpful to demonstrate this risk on a quantitative basis. One such approach is to describe this risk in terms of the range of possible outcomes through a technique called Monte Carlo simulation. In this approach, a single stock's return is varied randomly over multiple scenarios but in a way that describes the distribution of expected outcomes. This distribution can be estimated as a func-
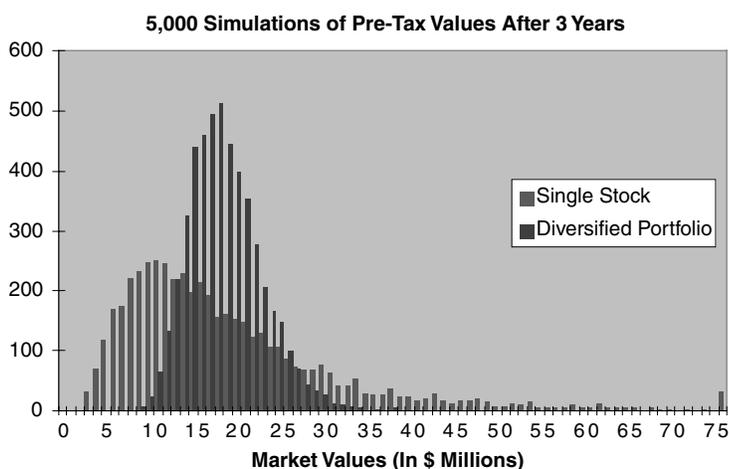
The Risk of a Concentrated Single Stock Position

5,000 Simulations of Pre-Tax Values After 3 Years
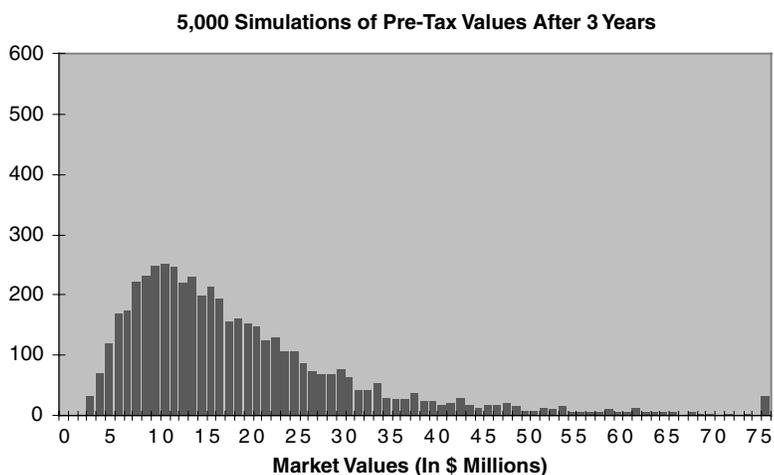
E X H I B I T 3
Comparing Single Stock and Diversified Portfolio Performance

5,000 Simulations of Pre-Tax Values After 3 Years

tion of the stocks' average expected return, its volatility, and an assumption of the shape of the distribution. In this case study, we assume an annual return of 8%, the 42% volatility that was used by the derivative firm in pricing its VPF, and assume a lognormal shaped distribution.[6] Given this distribution, or range of outcomes, one can view graphically the risk of a stock and assess the probability of the stock underperforming some expected outcome. In Exhibit 2, we show a distribution of the market value of the client's single stock after three years for 5,000 randomly generated scenarios.

The distribution exhibits a common characteristic

of a highly volatile stock—a wide range of results with an extended right-hand tail. One can calculate the probability of certain outcomes by looking at the frequency of results. For example, the frequency of the portfolio growing to more than $30 million in three years (doubling from the initial $15 million) is found by totaling the number of outcomes to the right of that point in the distribution. There are 724 instances out of 5,000 where this is the case, implying a probability of 14.5%. However, the frequency of scenarios where the value of the stock is cut in half, or worse, is 1,267, or a probability of 25.3%. This illustrates what many unfortunate investors in Internet stocks learned after 1999, that the dark side to betting on the upside potential of risky stocks is the real risk of dismal returns. This characteristic is even more prominent when compared on a relative basis to a less risky alternative such as a broadly diversified portfolio.

In Exhibit 3, the distribution of the results of having been invested in an S&P 500-like portfolio with the same expected return of 8% is superimposed upon the single stock distribution. As one would expect, the distribution is narrower due to the lower risk[7] of this diversified portfolio.

When comparing the probabilities of outcomes, a striking difference is shown (*see Exhibit 4*). While the diversified portfolio may have little chance to produce the stellar returns of the single stock, it is very effective at reducing the downside risk. In this case, the risk of losing one-half or more of the initial investment over a three period is quite low at 0.64% compared to 25.3% for the single stock. In other words, single stocks carry significant downside risk when compared to diversified alternatives.

Ultimately investors must weigh the downside risk of a single stock with that of its upside potential based upon their expectations for the stock and the market and their tolerance for risk. This article focuses on downside risk based on a premise that individuals who were lucky and/or smart enough to obtain great wealth by way of a concentrated stock position should focus more on locking in or preserving that wealth than on continuing to grow it.

E X H I B I T 4
Probability of Outcome (after 3 years)
of Portfolio Ending at . . .

	Single Stock	Diversified Portfolio
Less than or equal to		
$5 mil.	4.44%	0.00%
$10 mil.	25.34%	0.64%
$15 mil.	48.28%	24.30%
More than		
$15 mil.	51.72%	75.70%
$30 mil.	14.48%	0.88%
$45 mil.	5.06%	0.00%

COMPARING RISK REDUCTION ALTERNATIVES IN THE PRESENCE OF TAXES

For a single stock investor, the preservation of wealth usually does not come free. In the taxable world, the investor may incur a significant tax cost when selling the stock in order to reinvest back into a more diversified portfolio. If that investor executes a VPF transaction, that tax cost is deferred but eventually incurred. In addition, the VPF carries implied costs determined by the relationship between the upside potential allowed via the ceiling, the downside protection, and the amount of initial proceeds. This implied cost may be difficult to discern unless all the outcomes (the distribution) can be compared to other alternatives.

Using the case study parameters presented above, we model four VPF alternatives and two comparison cases in an environment of taxes and apply Monte Carlo simulation in order to compare their distributions (*see Exhibit 5*).

For the VPF alternatives, taxes are modeled as they would be incurred by an actual VPF. Realized gains of the underlying single stock are effectively deferred until the VPF contract is settled at the end of three years when some or all of the shares of the stock are delivered. Any remaining shares are assumed to be sold and all taxes related to settlement of the VPF are applied in our model.

In our study, the cash advance received when the VPF contract is initiated is invested into a market-like index, thus providing the diversification sought by the client. In our models of VPF alternatives 1 and 2, the cash advance proceeds are assumed to be invested in a model

of an S&P 500 index[8] with taxes paid on simulated dividends and the long- and short-term gains realized from turnover. Alternatives 3 and 4 are similar to 1 and 2 in how the Narrow and Wide VPFs are modeled, but in these cases the cash advance proceeds are invested in a model of a *tax-enhanced* S&P 500.[9] This is a simulation of a sampled portfolio that tracks that of the simulated S&P 500 index but which "harvests" portions of its positions to generate net losses. Over the three-year period, these losses from the simulation average about 25% of the initial amount invested. These losses are valuable in that they are carried forward to directly offset the long-term gains realized when the VPF contract matures.

Comparison Case 1 defines the status quo of remaining in the single stock. Taxes are avoided but the risk of the single stock is incurred. Comparison Case 2 defines the situation of selling the stock outright, paying the taxes, and diversifying into the same model of the S&P 500 as described above. Neither of these is a viable alternative in our case study since the client is an insider and prefers to retain control of the single stock for the three years. However, these cases are useful as benchmarks for comparison to the VPF alternatives.

THE RESULTS

The Monte Carlo simulations of the returns of the single stock and the S&P 500 described earlier become inputs to the tax-aware models in Exhibit 5. Five thousand simulations are run, and distributions of after-tax market values are produced for the various alternatives at the end of three years; the results are shown in Exhibit 6.

The VPFs, as they are designed to do, narrowed the range of outcomes relative to holding the single stock. In addition, note that the Wide VPFs do indeed provide a broader range of outcomes than the Narrow VPFs. It also important to note that while the distributions of the VPFs show relative downside protection when compared to the single stock, they do not exhibit the explicit downside protection that might otherwise be implied by the existence of the VPF floors. The reason for this is twofold: 1) Taxes paid at settlement reduce the final market values, and 2) the VPF alternatives include the results of the cash advance invested in a risky, albeit diversified, S&P 500.

Analysis of the alternatives by visual inspection is limited, so we define three statistics or metrics to effectively examine and compare the alternatives (*see Exhibit 7*). Calculating these metrics for the 5,000 simulations produces the results shown in Exhibit 8.

E X H I B I T 5
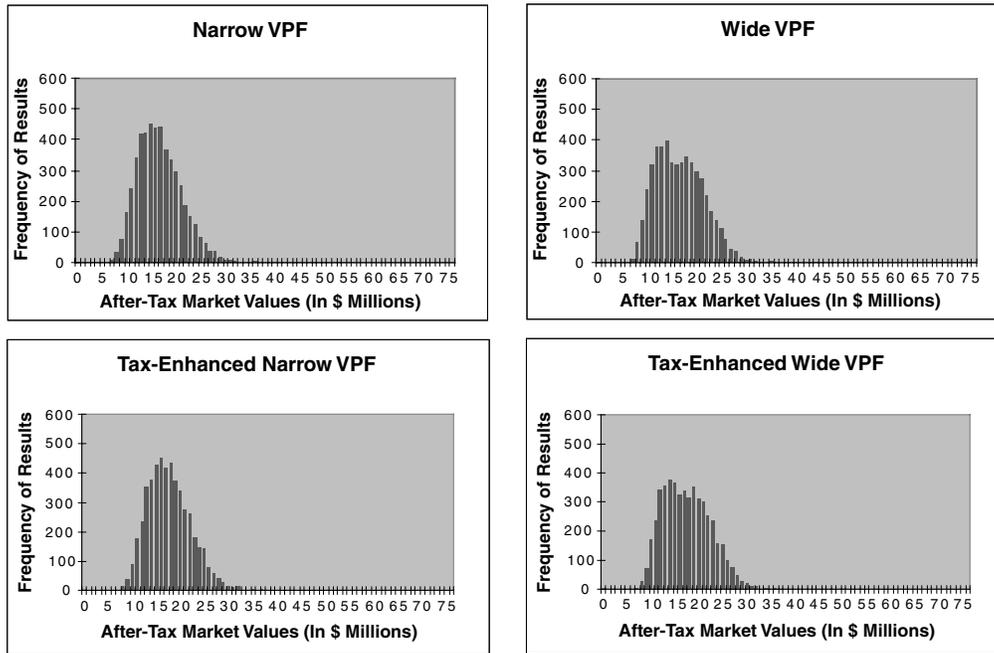**Summarizing the Alternatives**

VPF Alternatives

1. *Narrow VPF:* Enter into Narrow (100%-120%) Variable Prepaid Forward contract, investing the cash advance in an S&P 500 index portfolio. At end of year three, settle contract with shares, sell any remaining stock not delivered, and pay all taxes related to settlement of contract.

2. *Wide VPF:* Enter into Wide (90%-130%) Variable Prepaid Forward contract, using investing the cash advance invest in an S&P 500 index portfolio. At end of year three, settle contract with shares, sell any remaining stock not delivered, and pay all taxes related to settlement of contract.

3. *Tax-Enhanced Narrow VPF:* Enter into Narrow (100%-120%) Variable Prepaid Forward contract, investing the cash advance in a *tax-managed* S&P 500 portfolio. At end of year three, settle contract with shares, sell any remaining stock not delivered, and pay all taxes related to settlement of contract.

4. *Tax-Enhanced Wide VPF:* Enter into Wide (90%-130%) Variable Prepaid Forward contract, investing the cash advance invest in a *tax-managed* S&P 500 portfolio. At end of year three, settle contract with shares, sell any remaining stock not delivered, and pay all taxes related to settlement of contract.

Comparison Cases

1. *Hold ABCD:* Hold the stock for the three years.

2. *Sell & Diversify:* Sell stocks immediately, pay taxes, and invest net proceeds into an S&P 500 index portfolio for the three years.

E X H I B I T 6
Distributions of Market Values After Three Years

Mean

Comparing the alternatives by the Mean metric shows that both Tax-Enhanced versions of VPFs outperform their counterparts. This reflects the value of the losses produced from the tax-managed S&P 500. These losses are used to offset the gains realized at settlement of the VPF contract and thus reduce the tax cost and boost after-tax market value.

The Narrow versions of the VPFs do better than their Wide counterparts. This may at first seem counterintuitive since the Wide VPFs have a higher ceiling on the single stock. The Wide VPFs, however, have a lower floor, which affects the overall average of the distribution. This, in conjunction with the fact that the Narrow versions receive a larger cash advance, which earns a market return, helps to produce the higher mean result.

The VPFs outperform that of the Sell & Diversify case. This reflects the fact that a VPF essentially produces a type of "protected" leverage when the cash advance is invested in the market in conjunction with the limited exposure to the underlying stock. Since we assume an 8% annual return for both the stock and the S&P 500 index, this leverage enhances the mean. However, this leverage would produce the opposite effect if market returns turn out to be negative.

The VPFs are trumped by the comparison case of holding the single stock. The primary reason for this is that, unlike the alternatives, holding the single stock avoids any tax cost to its final market values. Simply examining the mean is misleading, however, since it ignores the risk of a significant decline in the value of the unprotected and undiversified single stock position.

Mean/Standard Deviation

Comparing the VPF alternatives by this metric show that the Narrow versions outperform the Wide versions due to the lower standard deviations of their outcomes. In fact, the Narrow VPF actually dominates the Tax-Enhanced Wide VPF alternative. While tax enhancement in this alternative increases the mean result, it also increases the standard deviation enough to produce a lower ratio than the Narrow VPF.

Because of the implicit leverage of the VPFs and the corresponding increase in the standard deviation of their outcomes, the VPF alternatives are dominated by the comparison case of Sell & Diversify when looking at this metric. Selling the single stock and diversifying, while not a viable alternative in this case study, can be a compelling option.

By risk-adjusting the mean of outcomes by stan-

EXHIBIT 7
Defining Evaluation Statistics

1.	*Mean:*	This metric measures the average of the distribution of outcomes for each alternative, without factoring in the risk associated with that average outcome.
2.	*Mean/Standard Deviation:*	This metric provides a risk-adjusted mean by dividing the mean by the standard deviation of the distribution. The smaller the standard deviation, or the tighter the distribution of final outcomes, the more confidence there is in realizing results close to the expected outcome.
3.	*Probability < Initial Liquidation:*	A downside risk measure, this metric measures the probability that the client will end up with less money in three years than the initial value of their stock, less the tax liability owed on the unrealized gains ($15,000,000 less $2,125,584 in long-term taxes = $12,874,416)

EXHIBIT 8
Comparative Metrics of Outcomes by Scenario

	VPF Alternatives				Comparison Cases	
	Narrow VPF	**Wide VPF**	**Tax Enhanced Narrow VPF**	**Tax Enhanced Wide VPF**	**Hold ABCD**	**Sell & Diversify**
Mean	$ 16,248,008	$ 16,139,667	$ 17,201,644	$ 17,012,025	$ 18,831,684	$ 16,019,951
Standard Deviation	$ 4,412,411	$ 4,872,717	$ 4,475,677	$ 4,922,531	$ 13,429,188	$ 3,609,640
Mean over Standard Deviation	3.68	3.31	3.84	3.46	1.40	4.44
Probability < Initial Taxed Amount	24.4%	30.0%	17.2%	23.2%	39.2%	18.9%

dard deviation, the single stock comparison case of Hold ABCD now looks inferior to the VPFs. In other words, the higher expected outcome of the single stock is not justified by the amount of risk incurred.

Probability Less than Initial Taxed Amount

This metric, more than the others examined, is consistent with the goal of the case study—preserving accumulated wealth rather than creating it. It looks at the probability of underperforming the initial economic state of the client, or the value of the client's stock less its tax liability. In other words, this metric assesses a downside risk, the chance the investor will be worse off in the future than where he is now.

For the comparison case of holding the ABCD stock, this probability of being in a worse position in three years is quite high at 39.2%. Simply diversifying into an S&P 500 index reduces this probability to 18.9%. These types of relative results are quite common as a single stock, on average, exhibits twice the risk of a diversified index.[10]

As with the metric of risk-adjusted mean, the Narrow VPFs dominate the Wide VPFs. In addition, the positive effect of the tax-managed S&P 500 clearly ben-

EXHIBIT 9
Factoring in Single Stock Alpha
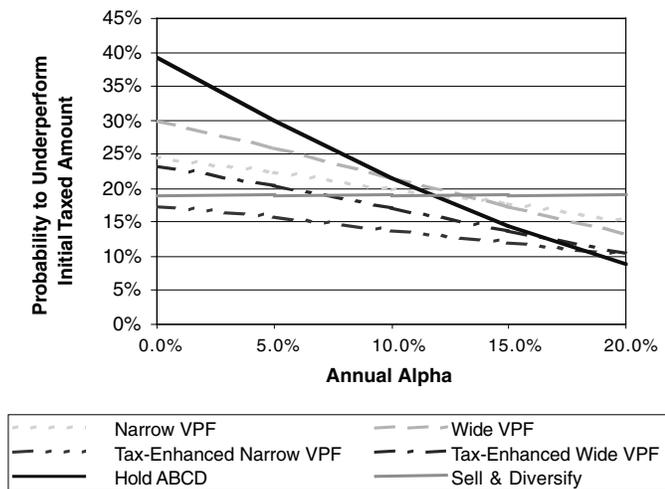
efits the tax-enhanced versions of the VPFs.

When compared to Sell & Diversify comparison case, the VPFs are mixed. Again, the benefit from the implied leverage in these VPF alternatives appears to be offset by the increase in risk. One VPF alternative, however—the Tax-Enhanced Narrow VPF—does dominate, with a probability being worse off in three years of only 17.2%. Here, a combination of the higher cash advance invested in the tax-managed S&P 500 with the narrower ceiling and floor produces a superior result.

FACTORING IN SINGLE STOCK ALPHA

As is often the case with clients who created their wealth via concentrated, single stock holdings, the client in our case study is somewhat bullish on his holding of ABCD. Assuming a higher return for the single stock than for the market not only affects the final range of results of the stock, but will affect the final results of the VPFs as well.

To address this notion, we vary the expected annual return of ABCD by introducing annual stock alphas of 5%, 10%, 15%, and 20%. As before, the 5,000 Monte Carlo simulations are run for each of these expected return sets and the resulting stock returns are input into the tax-aware models for the VPFs. In this case, we focus on the Probability to Underperform the Initial Taxed Amount.

Exhibit 9 shows how this metric varies as a function of our annual alpha assumptions.

As would be expected, introducing a stock alpha

increases, or shifts, all final outcomes of the single stock. This in turn improves the final, after-tax market values of the VPF alternatives. This makes intuitive sense as well—investors should not really consider hedging strategies as an alternative to selling the stock unless they are bullish enough on the underlying stock that the upside exposure can cover the carrying cost of the protected leverage. As alpha increases (assuming a positive market environment), the Probability to Underperform the Initial Taxed Amount is reduced for the single stock and the VPFs. (Note that the comparison case of Sell & Diversify is completely independent of the ABCD alpha as it is not invested in the stock.) As alpha increases to around 8% per year, the Tax-Enhanced VPFs in this case study dominate all other alternatives. While increasing alpha benefits the ABCD stock's downside risk the most directly, it requires a hefty annual alpha assumption of around 19% before the comparison case of holding ABCD dominates all the VPF alternatives. Keeping the single stock is not justified if the client is only moderately bullish.

SUMMARY

One of the fastest growing, and more intriguing, aspects of wealth management is the integration of behavioral finance concepts into wealth management solutions, and this is especially true when considering concentrated wealth positions. As a reminder, behavioral finance, simplistically, is the study of why rational investors frequently make highly irrational decisions when it comes to their money.

The experience of the authors is that this is perhaps more true with the holders of concentrated wealth than anywhere else. Quite frequently, it is the concentrated stock position that made the investor wealthy in the first place (e.g., an entrepreneur who built a company and then either went public or sold her company to another company in exchange for stock, or an inheritor of a concentrated wealth position via an estate transfer). Very often, there is a strong emotional attachment to the stock, and this attachment is frequently strengthened during periods of extreme price movement (e.g., if the stock falls dramatically the investor hangs on in order to avoid the crystallization of the loss, and if the stock has enjoyed a dramatic increase the investor is afraid to sell "too soon" and lose out on future fortunes).

These are situations where hedging and diversification strategies can play an important role. "The math" may indicate that an immediate sale of the stock is the most appropriate course of action, but the investor, for whatever reason, simply can't or won't take that rational

or unemotional step. It may help to point out to the investor that selling the stock and staying long the stock are, in fact, the two most aggressive positions that can be taken with respect to the concentrated holdings.

As illustrated by this article, the use of simulation analysis can help quantify the risks associated with different strategies. As shown, hedging allows the investor to take the middle path between the two extremes of selling or staying long. It has the additional advantage that there is great flexibility to make the hedging strategy look more like selling (if the investor is more bearish) or more like staying long (if the investor is more bullish) simply by changing the trade structure.

By definition, hedging seeks to eliminate the extreme highs and lows of possible outcomes. As a result, it may be a more palatable alternative to an outright sale for those investors with heavy emotional attachment to their stock and a bullish opinion on the future performance of that stock.

What this article illustrates is that different solutions will prove to be optimal depending on subsequent developments in the stock and the overall market. But the investor has no way of knowing in advance what will happen, other than that "doing nothing" will, in most circumstances, prove to be the most risky strategy.

In summary, the use of Monte Carlo simulation can help quantify possible outcomes, the use of tax-enhanced investing can help mitigate the tax consequences of a chosen strategy, and knowing and understanding the pros and cons of selling, hedging, and holding helps the investor make an informed decision with respect to his/her concentrated wealth position.

ENDNOTES

[1]Our own experience is that if the underlying stock being hedged grows by more than the after-tax cost of funding in the VPF (3%–5% per annum in today's environment, depending on the structure and maturity of the VPF), then hedging will outperform a straight sell and reinvest strategy. The higher the assumed reinvestment rate on the diversified portfolio, the more the underlying hedged stock will need to grow to outperform the outright sell strategy.

[2]In the experience of the authors, this is an unfortunately large number of investors.

[3]See I.R.C. §1259.

[4]See Federal Reserve Board Regulation T and Regulation U.

[5]See IRS Revenue Ruling 2003-7.

[6]The lognormal distribution is a variant of the familiar bell-shaped normal curve. However, unlike the symmetrical normal distribution, the lognormal distribution has a right-hand tail that is stretched and a left-hand tail that is limited. This distribution better fits a stock whose return on the downside is limited to −100% but theoretically has infinite upside.

[7]We assume a standard deviation of 14%.

[8]The model for the S&P 500 index is similar to the approach described by Stein et al. [1999] where the index is modeled as a single security and the tax costs are determined from the impact of turnover's interaction with price return, dividend return, and unrealized gains. Turnover in this case is assumed to be 4% per annum.

[9]The model of the Tax-Enhanced S&P 500 is a version of the loss harvesting model described in Stein and McIntire [2003]. Essentially, a simulated portfolio of approximately 200 hypothetical stocks is built to track a simulated S&P 500 index with a pre-tax alpha of zero and a tracking error to the benchmark no greater than 1.5%. As in an actual portfolio, tax lot information is tracked and prices determined by the Monte Carlo simulation are applied to these lots to produce unrealized gains and losses. On a quarterly basis, portions of positions with unrealized losses are opportunistically "sold" to harvest these losses with the constraint that the stock's weight in the simulated portfolio must be within 50 basis points of its weight in the simulated S&P 500.

[10]Source: Barra USE3 risk model.

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